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BOOK OF ABSTRACTS

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ABSTRACTS

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1. IMPROVING THE EFFECTIVENESS OF MARINE CONSERVATION THROUGH THE APPLICATION OF SOCIO-ECONOMIC MONITORING METHODS. Aalbersberg, William; Guilbeaux, Michael D.; Mejia, Manuel N.; Reynolds, Jim; Seeto, Pamela; SALAFSKY, NICK; Tawake, Alifereti. Community Conservation Network; 212 Merchant Street, Honolulu, Hawaii 96813, USA. Email: mike@conservationpractice.org (T) 808-780-1855 (MDG).

Marine conservation projects in the Indo-Pacific typically struggle through similar challenges, many in isolation, losing precious time in their efforts to stem the rapid depletion of marine resources and biodiversity. In a effort to better link biological knowledge and conservation action with the measurement and achievement of conservation success, a "Learning Network" of community-based marine projects has been initiated which focuses on capacity building, evaluation of project success, and sharing learning. The Locally Managed Marine Area (LMMA) Network operates in eight countries, numerous sites, and uses a common framework to determine conditions under which an LMMA approaches work, don't work, and why. An LMMA is defined as an area of water that is actively being managed by local communities. Socio-economic information, in addition to bio-physical data, is voluntarily collected by participating projects which assists in providing feedback to stakeholders and in the evaluation of project success. Collective sharing of skills, data, experiences, and lessons allows projects to learn more quickly and adapt and improve their management activities. In some countries, such as Fiji, the practitioners and villages participating in the LMMA Network have developed locally-appropriate socio-economic monitoring approaches which have provided important feedback to community members, NGOs, government agencies, and policy makers. For example, when elements of a mangrove ecosystem were managed for sustainability in Verata Village, the community witnessed a significant increase in clams, mud lobsters, and household income. Other potential success stories and lessons learned from the Network experience.

2. NON-INDIGENOUS MARINE SPECIES: AN EMERGING THREAT TO IMPACTED CORAL REEFS. ABDULLA, AMEER; Floerl, Oliver. Global Marine Programme, IUCN-World Conservation Union, Parque Tecnologico de Andalucia, Calle Maria Curie, 35, Malaga, Spain, Ameer.Abdulla@iucn.org; National Institute for Water and Atmospheric Research, New Zealand, O.floerl@niwa.co.nz.

The spread of marine non-indigenous species (NIS) has become a global environmental issue due to a rapid increase in commercial shipping and recreational boating over the past century, activities that may introduce species to locations outside their native biogeographical range. Outbreaks of marine NIS can have serious ecological and economic impacts in affected regions, and may even pose a threat to human health. In tropical waters, disturbed or degraded habitats such as bleached or tsunami-hit coral reefs may be at particular risk of being colonized by marine NIS. One such area, the Seychelles archipelago, experienced 80-95% coral mortality following the 1997/1998 El-Nino. We conducted a baseline survey for the distribution of marine NIS in the main port and other shipping environments on the main island of Mahe, as well as surrounding healthy and degraded coral reefs. The results of these surveys are presented and their implications on reef recovery are discussed. Targeted monitoring of high-value areas is essential for early detection of NIS in degraded and protected coral reef habitats. This understanding must be complemented with incursion response strategies and action plans for managers to stem the introduction and expansion of introduced species on coral reefs and related habitats.

3. TOWARDS A BASIN-WIDE STRATEGY FOR CONSERVING THE AQUATIC BIODIVERSITY OF THE AMAZON BASIN. ABELL, ROBIN; McGrath, David. World Wildlife Fund, 1250 24th St. NW, Washington, DC 20037, USA, robin.abell@wwfus.org, (RA); Núcleo de Altos Estudos Amazônicos, Universidade Federal do Pará, Belém, PA, Brasil. 66.075-900, dmcgrath@amazon.com.br (DM).

Conservation biologists and managers agree that river basins are appropriate units for freshwater biodiversity and water resource planning and implementation, but how can this principle be applied to the Amazon River Basin, the largest watershed in the world? What elements of planning and implementation need to extend across the entire Amazon, and which can be targeted over smaller areas, from sub-basins down to individual water bodies? In this presentation we address these questions, drawing from work in the Amazon and in other large river basins around the world. We argue that while important work can and does occur over smaller areas, a basin-wide plan that identifies the scales over which drivers and threats operate is critical to ensuring that basin-wide processes are maintained. We present a step-wise framework for basin-wide planning in the Amazon, and also discuss necessary institutional mechanisms for implementation, especially considering the transnational nature of the basin. We also discuss how smaller-scale innovations can be either scaled up or replicated. We conclude with a discussion of research and collaborative needs, including ways of integrating terrestrial and freshwater biodiversity conservation that capitalize on efforts to designate protected areas.

4. EFFECT OF CHROMOSOMAL POLYMORPHISM IN THE CONSERVATION OF BRAZILIAN DWARF RED BROCKET DEER (*Mazama nana*). ABRIL, VANESSA V.; Duarte, José M. B. Departamento de Genética e Melhoramento Animal, Faculdade de Ciências Agrárias e Veterinária, Universidade Estadual Paulista, Jaboticabal, SP, 14884-900, Brazil, van_abril@yahoo.com.br (VVA).

The *Mazama nana* populations have several troubles with strong antropic pressure in the remaining forest fragments of its distribution's areas. Besides this problem previous studies had detected a chromosomal polymorphism in the species that can negatively interfere in the reproductive rates, speeding up the species extinction process. This work looked for to identify the rearrangements and involved chromosomes, with the aim of establish a relation between the karyotypic variants and the possibility of reproductive isolation between specimens. We analyzed 24 captive individuals by C-banding, G-banding and NOR-banding techniques. A polymorphic system of Robertsonian fusions was characterized by 9 chromosomal variants (2n=36 to 41, NF=54 and 56) that are not related to the geog raphic origin of the animals. The majority of the individuals had been heterozygous for different centric fusions. This rearrangement type has minimal impact and generally does not cause severe problems in the production of balanced gametes in the heterozygote. The possibility of polymorphism to interfere with the intrapopulation fertility exists and will depend on the fusion characteristics, the involved chromosomes and the number of rearrangements. This should be considered in the development of *in* and *ex situ* conservation programs to this species.

5. PROMOTING SUSTAINABLE HUMAN SETTLEMENTS AND ECO-CITY PLANNING APPROACH: SOUTHEASTERN ANATOLIA REGION AND SOUTHEASTERN ANATOLIA PROJECT(GAP) IN TURKEY. ACMA, BULENT. Anadolu University, Department of Economics, Unit of Southeastern Anatolia Project (GAP), 26470 Eskisehir/TURKEY Tel:+90 222 3350580ext.6171 Fax:+90 222 3353616 E.mail:bacma@anadolu.edu.tr.

The Southeastern Anatolia Project (GAP), one of the most important projects to develop the remarkable natural resources of the world, is considered as a chance to make use of rich water and agricultural resources of the Southeastern Anatolia Region. In the recent years, the concept of promoting sustainable human settlements and eco-city planning approach have been included into the GAP Project. The aim of this study is analyze the concepts of promoting sustainable human settlements and eco-city planning approach in the GAP Project that has been still processed. In the first section, the region of Southeastern Anatolia and the GAP Project will be introduced briefly. In the second section, the stages of GAP Pro ject and the project existing will be analyzed. In the third section, the projects and sub-projects used for promoting sustainable human settlements will be introduced. In the last and fourth section, a series of policies and strategies for providing the process of settlements which is optimal and harmonizes with eco-system will be given.

6. CONSERVATION PLANNING FOR LARGE MACAWS: CONSIDERATIONS OF SPATIAL USE. Adamek, Krista; POWELL, GEORGE; Albites, Mario; Aleman, Ulisis; Amable, Richard; Ccoycosi, Julio; Imunda, Segundo; Sandoval, Ivan; Sandoval, Silver. Conservation Science Program, World Wildlife Fund, 1250 24th Street, NW, Washington, DC 20037 USA, george.powell@wwfus.org.

We are studying habitat use by 2 species of large macaws, *Ara chloroptera* and *A. ararauna* in the Peruvian amazon. We monitored their movements thoughout the year with radio-telemetry. During breeding season, pairs of *A. chloroptera* maintained relatively small (300-400 ha) individual home ranges while pairs of *A. ararauna* foraged in completely overlapping areas, in groups of 7 - 30 individuals. Three breeding pairs of marked *A. ararauna* used the same 1,700 ha area, though they were infrequently together. After chicks fledged, pairs of *A. chloroptera* with young expanded their home ranges but remained in the same general vicinity, sometimes foraging in larger groups (6-10 individuals). In contrast, *A. ararauna* pairs moved beyond their breeding range, eventually shifting their centers of activity more than 35 km away before returning to their previous year's breeding sites. All marked individuals made this long-distance movement at around the same time, but not together. *A. chloroptera* that did not breed apparently used even larger areas during the non-breeding season, and some disappeared from the 0.5 million ha area we censused with overflights. The expansive use of habitat by these macaws supports the need for conserving large blocks of Amazon forest.

7. USING FIRE INCIDENCE TO EVALUATE THE EFFECTIVENESS OF PROTECTED AREAS IN THE BRAZILIAN AMAZON. ADENEY, J. MARION; Pimm, Stuart. Nicholas School of the Environment and Earth Sciences, Duke University, Box 90328, Durham, NC 27708, USA, marion.adeney@duke.edu.

Protected areas are often touted as an important part of the long term conservation of tropical forests, but their effectiveness needs evaluation. Because fire is associated with landcover change in the humid tropics, fire incidence is one measure of the effectiveness of protected areas in preserving forests. We used data from the Ionia World Fire Atlas, a product of the European Space Agency (ESA), to evaluate the effectiveness of different reserve types in preventing fire within the Brazilian Amazon. Monthly fire maps in the form of nighttime 1 km^2 hot pixels show the locations of fires from 1996 through 2003. Reserves are compared by con trolling for size, prevalent landcover type and distance to roads. While all reserve types have lower incidence of fire then comparable non-protected areas, reserves differ by type in the incidence of fire per unit area. Indigenous reserves appear to be particularly effective at preventing fires. These findings have implications for conservation priorities in areas under high development pressure.

8. IDENTIFICATION OF PRIORITY AREAS FOR BAT INVENTORIES. AGUIAR, LUDMILLA M. S.; Machado, Ricardo B. Embrapa Cerrados, BR 020 km 18 Cx. P. 08223 - CEP 73310-970, Planaltina, DF - Brazil. ludmillla@cpac.embrapa.br (LMSA). Conservação Internacional - SAUS Quadra 3 Lote C Ed. Business Point sala 722 - 70070-934 Brasília-DF - Brazil (RBM).

Bats represent almost half of the mammal richness in some Brazilian biomes and are very important in ecological processes such as seed dispersal, pollination and plague control. They also play an important role in sanitary issues due to rabies transmission. In spite of their important role in Brazilian ecosystems the exact number of bat species in the country is yet not precisely known. Current estimatives indicate a total of 142 species in Brazil, but the inventories and collections are unevenly distributed through the country. A literature compilation of data showing all localities minimally sampled for bats (more than 20 species per locality) indicates that 98% of the countrys area is not surveyed. In order to identify gaps in bat knowledge and define priority areas for inventories We overlaid four maps: areas with any bat registry, areas possibly covered by existing bat research groups, existing protected areas (conservation units and indigenous reserves) and crossed these maps with the one of priority areas for conservation defined by the Environmental Ministry of Brazil. The results show that there are at least 142 high priority areas for bat inventories in Brazil, and the existing research groups could easily access 58% of them with minimal cost.

9. SYSTEMATIC SAMPLING OF EXTINCTION RISK: THE IUCN SAMPLED RED LIST INDEX. Akcakaya, H. Resit; BAILLIE, JONATHAN E. M. Applied Biomathematics, 100 North Country Road, Setauket, NY 11733 USA. Institute of Zoology, Zoological Society of London, Regents Park, London, NW1 4RY, UK, Jonathan.baillie@ioz.ac.uk.

We have entered the 21 st century with little understanding of trends in the conservation status of the world's biodiversity. The Red List Consortium has recently developed the Red List Index which measures the relative rate at which sets of species change in overall conservation status. This approach has been applied to birds and amphibians revealing an increase in extinction risk in these groups. However, to gain insight into trends in extinction risk of biodiversity globally, a much broader range of taxonomic groups must be included in the index. Here we outline the challenges of developing an index of extinction risk that is generally representative of the world's biodiversity and outline the new methods that have been developed for the IUCN Sampled Red List Index.

10. PRELIMINARY REPORT OF THE GENETIC DISVERSITY OF THE MANED- WOLF (*Chrysocyon brachyurus,* ILLIGER, 1815). Akimoto, Arthur K.; Carvalho, Clarissa B.; Moreira, José Roberto A.; Klautau-Guimarães, Maria N.; SALIM, DANIELA C. Departamento de Genética e Morfologia, Instituto de Biologia, Universidade de Brasília, Brasília, DF, 70919-970, Brazil, nklautau@unb.br. (AKA, CBC, MNK, DCS). CENARGEM, EMBRAPA, Brasília, DF 70770-901 Brazil (JRAM).

The maned wolf (*Chrysocyon brachyurus*), a native canide of South America, is listed as "near threatened" by IUCN and "vulnerable" by the Brazilian Government. In this preliminary report of genetic diversity of Maned Wolf, the polymorphism of 14 protein markers was investigated, revealing 42,9% of polymorphism and a mean heterozigosity of 5,6%. This study did not confirm a substancial reduction of the genetic variability of this species when compared to other canid species. Making additional use of the canine genetic map, which is completed described and available to academic researchers, it was also tested if a class of highly polymorphic tetranucleotide repeats described for the domestic dog (*Canis familiaris*) effectivelly amplify DNA in the maned wolf. Four microsatellite markers were initially analysed. All of them not only amplified DNA, but also revealed to be highly polimorphic. Sequence conservation between domestic dog and maned wolf showed to be sufficient to allow some PCR primers designed for use in dogs to be used in maned wolves, which will be useful for making rational decisions for conservation of diversity of this endangered species.

11. EXISTING BIOLOGICAL DATA & NEW BIOLOGICAL SURVEYS, WITH EMPHASIS ON TREES. ALBERNAZ, ANA LUISA; Moreira, Marcelo; Ramos, José; Assunção, Paulo; Franciscon, Carlos H. Coordenação de Ciências da Terra e Ecologia, Museu Paraense Emilio Goeldi, Belém, PA, 66077-530, Brazil (anakma@museu-goeldi.br). Projeto Dinâmica de Fragmentos Florestais, Manaus, 69011-970, Brazil (MM, PA). Coordenação de Pesquisas em Botânica, Instituto Nacional de Pesquisas da Amazônia, Manaus, 69011-970, Brazil (JR, CHF).

Although várzeas are probably the most easily accessed forests in the Brazilian Amazon, until recently the knowledge on its species distribution was extremely restricted spatially. These data were insufficient to support any of the previous divisions proposed to be used in conservation planning for the Brazilian várzea. We present the results of a study conducted along the ca. 3000 km of extension of Solimões-Amazonas Rivers, from Tabatinga to Santana. We will emphasize results of the survey on trees, because for them the presence of a species does not change seasonally, as happens for most of the other groups living in varzeas. 73 samples were taken in groups of 2-3 along 26 stops, totalizing 11938 individuals. Samples were taken when possible in high restingas. Community patterns were obtained by or dination, which revealed the existence of three main groups of communities: (1) Tabatinga-Manaus; (2) Manaus-Almeirim, and (3) Almeirim to the ocean. The region Manaus-Almeirim was grouped together due to the dominance of species adapted to altered environments, but has different species of narrow distribution in its different parts. So, for conservation purposes, we suggest to split this region in Santarém and to include parts of these four regions as targets.

12. THE CUIABÁ-SANTARÉM HIGHWAY REGIONAL PLANNING PROCESS. ALENCAR, ANE; Pena, Socorro; Costa, Rosana; Nepstad, Daniel; Mcgrath, David. Instituto de Pesquisa Ambiental da Amazônia - IPAM. Avenida Nazaré 669, Belem, PA 66035-170, Brazil (AA, SP, RC, DN, DM) Woods Hole Research Center - WHRC. 149 Woods Hole Road, Falmouth, MA, 02540 USA (DN, DM).

The pavement of Cuiabá-Santarém represents an opportunity for soybean producers and Manaus industrial enterprises to decrease their transport costs to the international and national markets. However, the asphalt announcement is already bringing profound implications for the region's land-cover, biogeochemistry, and for its people. The chances to diminish the impacts of this infrastructure investment lay on the development of a regional participatory planning process and a comprehensive zoning tool. We present an approach to regional planning for BR-163 Highway which includes systematic local and regional meetings and sectors demand's mapping in addition to the development of a zoning tool based upon the spatial distribution of agricultural and forestry aptitudes along the highway. In this zoning approach, spatial variables were used to indicate the potential areas for cattle ranching, soybean production, small holder agriculture and logging activities along this road. The variables were selected according to local stakeholder's indication of the most important needs for each activity. Potential areas for each activity were overlapped to derive a map where the potential areas of conflicts for negotiation were pointed out. This technique may be powerful for regional planning processes because it incorporates the real demands of the economic actors and shows the future conflicts of interest.

13. SEASONAL MOVEMENT AND HOME RANGE USE BY AGOUTIS (*Dasyprocta punctata*) ON BARRO COLORADO ISLAND (BCI), PANAMA. ALIAGA-ROSSEL, ENZO; Fragoso, Jose. M.; Kays, Roland. University of Hawaii at Manoa, 3190 Maile Way, Honolulu, HI 96822, enzo@hawaii.edu, fragoso@hawaii.edu. Curator of Mammals New York State Museum, CEC 3140 Albany, NY 12230, USA, rkays@mail.nysed.gov.

This study considers the scale of seasonal movement patterns within home ranges of the Central American Agoutis (*Dasyprocta punctata*). Twelve agoutis were captured and nine were radiocollared and tracked from January 2003 to December 2003 on Barro Colorado Island, Panama. 2,177 location fixes were recorded for all agoutis. Minimum Convex Polygon (MCP 100%) home range size for the 12 resident agoutis varied from 2.02 to 4.36 ha (X^2=3.02) for males and 1- 2.41 ha (X^2=1.66) for females, while 95% adaptive kernel method home range sizes ranged from 1.56 to 2.45 Ha (SE=0.173) for males and 1.34 to 1.97 ha (SE=0.13) for females. Monthly home range sizes were similar, but showed a monthly and seasonal shift in location. Daily movement distances averaged 850 m (± 215), and were affected by especially the availability of palms (*Astrocaryum, Attalea,* and *Oenocarpus),* and *Dipterix* trees. Most agouti bedding or resting sites consisted of fallen hollow logs, low tangled vine areas, or the space under fallen logs in the forest.

14. DISTRIBUTION AND FREQUENCY OF GALLS INDUCED BY A CECIDOMYIIDAE ON THE INVASIVE PLANT *Waltheria indica* L. (STERCULIACEAE). ALMEIDA, FELIPE V. M.; Silveira, Fernando A. O.; Santos, Jean C.; Fernandes, Geraldo. Laboratório de Ecologia Evolutiva de Herbívoros Tropicais, Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG,486.30161-970, Brazil, gwilson@icb.ufmg.br.

The frequency of galls induced by an undescribed species of Cecidomyiidae (Diptera) on *Waltheria indica* (Sterculiaceae) was studied. *W. indica* is an invasive weed in regeneration areas of Atlantic Forest in southeastern Brazil. Plants were collected in May 2004 and above-ground biomass, main stem length, number of leaves, number of galls per leaf and galled leaf area of 70 individuals were recorded. Nearly 90% of all plants and 25% of all leaves were attacked by the gall midge, with an average of 0,67 gall/leaf. Neither leaf area nor number of leaves influenced the number of galls. Thirty-eight percent of the variation in the number of galls was explained by stem length and plant weight. Natural enemies killed one third of the galls. Predation accounted for 22.9% of gall mortality, unknown factors killed 7,6%, microhymenopteran parasites killed 2,5% and fungi only 1%. Mortality factors were not influenced by leaf area or gall density. Data will contribute to a better understanding of the interaction between the Cecidomyiidae midge and its weed host, which can be useful in a possible use of galling insects in weed biological control in a biodiversity hotspot.

15. FISH AGREEMENT AND THE EXCLUSION OF COMMERCIAL FISHER IN THE LOWER AMAZON. ALMEIDA, ORIANA T. Instituto de Pesquisa Ambiental da Amazônia - IPAM - Av. Nazaré 669, Centro, 66.035-170 Belém, PA, Brazil, oriana@ipam.org.br (OTA).

The expansion of fishing activities by commercial fishers in the last 30 years originated a series of disputes between commercial and small scale fishers in the Amazon floodplain. Aiming at reducing this pressure over the resource, small scale fishers started to close their lakes to commercial fishers, escalating the conflicts between these two groups. To reduce these conflicts, the federal government approved a law in 1998 that allowed communities to regulate fishing in their lakes (managed lakes), but did not permit the exclusion of commercial fishers. This research had the objective to understand the impact of federal legislation on the traditional small scale fisher in the Lower Amazon. This was done by comparing 9 managed communities with 9 communities without management. The results showed that although communities cannot directly exclude commercial fisher, their rules do just that. The rules created are loose enough to permit the fisherman to keep the subsistence fishing activities without any additional restriction (no effort reduction) and, at the same time, are restricted enough to turn commercial fishing economically unfeasible. In this way small scale fishers not only eliminate commercial fishing activities, but also increase productivity in the lakes in the lower Amazon.

16. MARKET INCENTIVES FOR ENVIRONMENTAL LAW COMPLIANCE IN MATO GROSSO: OPPORTUNITIES AND LIMITATIONS TO ENVIRONMENTAL CERTIFICATION OF MEAT IN THE AMAZON. Almeida, Oriana T.; Stickler, Claudia M.; RIBEIRO, CARMELITA. IPAM, Av. Nazaré 669, Centro - 66.035-170 Belém, PA, Brazil, oriana@ipam.org.br, (OTA).

Deforestation has increased dramatically in recent years in the state of Mato Grosso, where soil, climate, and infra-structure make ranching and soy production highly competitive. One of the most complex and strict environmental legislations for rural landholders is the Brazilian "código florestal"- forestry code- for the Amazon. Since 1995, this law requires the maintenance of 80% of the forest on rural properties as a legal reserve. Given the high percentage of land that must be left in as a legal reserve, most private owners argue that the law makes productive activities economically unviable and that compliance of the law was reduced. In the present work, we evaluated cost-benefits of investing in low-priced land in the Amazon where 80% of the forest cover is required versus investment in high-priced land from the savanna region of Brazil where required forest cover is 20%. Results show that the cost of the legal reserve in the Amazon comprises 38 to 100% of the activity profit while it represents only 5 to 15% of the activity profit in area of savannas. While it is important to evaluate the impact of increasing the legal reserve from 50 to 80% on the property, it is also important to evaluate the impact of cost increases in production to develop policies that compensate initiatives that seek to conserve the environment in the region. One such policy mechanism is the certification of meat.

17. DENSITY OF LEAF-CUTTING ANTS IN REMNANTS OF THE ATLANTIC FOREST OF NORTHEAST BRAZIL. ALMEIDA, WALKIRIA R.; Araújo Jr., Manoel V. de; Barbosa, Veralucia S.; Silveira, Úrsula A.; Wirth, Rainer; Leal, Inara R. Departamento de Botânica, Centro de Ciências Biológicas, Universidade Federal de Pernambuco, Recife, PE, 50.670-901, Brazil, walreal@yahoo.com.br (WRA, MVAJr, VSB, UAS, IRL). Dep. of Plant Ecology & Systematics, University of Kaiserslautern, P.O. box 3049, 67653 Kaiserslautern, Germany (RMW).

In this study, we investigated whether fragmentation and habitat loss of the Brazilian Atlantic rainforest affected the population density of leaf-cutting ants (LCA). The study was conduced in 14 remnants at Usina Serra Grande, Alagoas, where a 3.500-ha fragment, the largest of the Pernambuco Center of Endemism, was used as the control area. Using the transect method, we surveyed 89 colonies of *Atta cephalotes* and *Atta sexdens* in 67.1 ha of forest. The colony density was 1.75 ± 6.35 ha^{-1} in the interior of the control area (22 colonies in 39.5 ha), 5.0 ± 7.42 ha^{-1} in the edge (< 100 m) of the control area (21 colonies in 4.2 ha), and 2.6 ± 2.38 ha^{-1} in the fragments (46 colonies in 23 ha). Although the difference in colony density across the three habitats was not significant ($H = 4.6549$, $gl = 2$, $p = 0.0975$) LCA appear to accumulate in forest fragments, and especially along the forest edge. This indicates that both area loss and edge creation affect population regulation in LCA. The fragmentation-related propagation of LCA may, in turn, considerably influence vegetation dynamics of small and large remnants of Atlantic rainforest (see poster by Corrêa *et al.*).

18. ODONATA COMMUNITY AS ASSESSORS OF THE IMPACT ON INTEGRITY OF THE ECOLOGICAL PROCESSES PRODUCED BY THE HYDROELECTRIC DAMS. Alonso-Eguía Lis, Perla; GUTIÉRREZ-YURRITA, PEDRO; Escofet, Anamaría. Subcoordinación de Hidrobiología y Evaluación Ambiental, Instituto Mexicano de Tecnología del Agua, Paseo Cuahunáhuac 8532 Jiutepec, Mor. 62550 México. tel/fax +0052 777 3293600 ext 401 y 410. palonso@tlaloc.imta.mx. (PAEL); Facultad de Ciencias Naturales, Licenciatura en Biología, Laboratorio de Zoología, Universidad Autónoma de Querétaro, Centro Universitario Cerro de las Campana, Cerro de las Campanas, Qro. 76010, Qro., México. Tel/fax +0052 442 1921200 ext. 5371, 5323. yurrita@uaq.mx. (PGY); Departamento de Ecología, Centro de Investigación Científica y de Educación Superior de Ensenada, Km. 107 Carretera Tijuana -Ensenada 22860, Ensenada, B.C. México. Tel/fax +0052 646 1750500 ext 242-246 aescofet@cicese.mx. (AE).

Odonata community were compared at eight sites within three hydrological basins: San JuanTula, and Moctezuma, all of them inside the influence area of the Big Dam Zimapán (Central-México). Physico-chemical, biotic and environmental characteristics were determined in each habitat. To describe annual appearance, both adults and naiads were considered, but only naiads were used for community structure analysis (richness, abundance and diversity). Statistical analysis of physico-chemical factors revealed no significant differences among sites. However, significant differences ($p< 0.05$) were found among sites when several types of data were analyzed together: biotic, environmental, and physico-chemical parameters. Jaccard's index clusters shows that community structure is limited by the kind of aquatic system (lotic or lentic) more than affinities between sites microbasin, even though Beta diversity showed a replacement rate of 38%, suggesting that naiads are sensitive to the regional heterogeneity of the system. Our interpretation is that the regional mosaic includes six sites with natural variations and two with important ecological perturbations: one with maximum frequency of disturbance due to the hydroelectric dam (Moctezuma) and another (Alfajayucan) impacted by the feeding habits of the introduced fish *Cyprinus carpio*. Odonata community showed to be highly sensitive to habitat disturb.

19. HABITAT USE BY BIGHORN SHEEP *Ovis canadensis weemsi* IN SIERRA DEL MECHUDO, BAJA CALIFORNIA SUR, MÉXICO. ALVAREZ-CÁRDENAS, SERGIO; Galina-Tessaro, Patricia; Guerrero-Cárdenas, Israel; Gallina, Sonia. Centro de Investigaciones Biológicas del Noroeste, S.C. Mar Bermejo N0. 195, Col. Playa Palo de Santa Rita, AP. 128, La Paz, BCS, México, 23090; Instituto de Ecologia, A. C.Km 2.5 Antigua Carretera a Coatepec No. 351, Apartado Postal 63, 91070, Xalapa, Veracruz, Mexico (SG).

Bighorn sheep is the main game species in México. Although their distribution is naturally fragmented, human activities and habitat fragmentation have restricted it to isolated mountainous areas. This study analyze the use-availability of physical and structural habitat elements for the bighorn sheep in Sierra del Mechudo, Baja California Sur. A non-mapping technique determine availability-selection of physical habitat variables for the bighorn sheep. Using GIS, an habitat quality model based on availability and arrangement of structural habitat elements is developed. Bighorn sheep don't use physical variables and habitat quality classes according to availability, they prefer mountain and canyons cliffs, slopes < 60%, elevations between 100-400 m and distances to escape terrain < 200 m. Habitat model indicates that 11% of the sampled land has poor habitat quality, 52% regular, 24% good, and 12% excellent for bighorn sheep. Bighorn sheep select sites with good and excellent habitat quality, and avoid poor, and regular. Sexual segregation is observed outside of the rut. Bighorn sheep conservation management will be based on the metapopulation, more than area by area, it will be focused on the la ndscape, making emphasis in corridors connecting bighorn sheep areas.

20. EFFECTS OF MAMMAL DEFAUNATION AND SEED DISPERSAL ON THE REPRODUCTIVE SUCCESS OF GERIVÁ (ARECACEAE: *Syagrus romanzoffiana*). ALVES-COSTA, CECÍLIA P. Laboratório de Interação Vertebrado-Planta, Departamento de Zoologia, Instituto de Biologia, Universidade Estadual de Campinas, CP 6109, Campinas, SP, 13.083-970, Brazil, cepacosta@yahoo.com.br.

Medium and large mammals are negatively affected by hunting and habitat loss. most affected in the neotropics are tapirs, peccaries, large rodents and deers. Consequently, the plant community may be affected through a reductionof seed dispersal, seed predation and/or herbivory. This study intended to determine the effects of defaunation onthe reproductive success of the gerivá (*Syagrus romanzoffiana*), a large seeded zoochoric palm (2-3 cm). The effects of distance from the parent plant and of defaunation on seed mortality and on the density of gerivá seedlings were studied in five Atlantic forest fragments with different degrees of defaunation of medium and large sized herbivorous mammals. The results showed a decrease of seed dispersal probability in defaunated fragments and a higher mortality of seeds close to conspecific adults. However, the density of recruite d plants in distances > 2 m from parent plant was similar in all fragments. This indicate that seedling recruitment was rather limited by the availability of safe sites (like gaps and forest edges) than by the biomass of seed dispersers. Gerivá populations may thus be most dependent on seed dispersers in less disturbed forests than in those with abundant forest gaps and edges.

21. ECOLOGICAL CORRIDORS AND BIODIVERSITY CONSERVATION: A CASE STUDY IN RIO DE JANEIRO STATE, SE BRAZIL. ALVES, MARIA ALICE S.; Bergallo, Helena G.; Rocha, Carlos Frederico D.; Jenkins, Clinton; Van Sluys, Monique. Departamento de Ecologia, IBRAG, Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier 524, Maracanã, 20550-011, Rio de Janeiro, RJ, Brazil, masa@uerj.br (MASA, HGB, CFDR, MVS). Nicholas School of the Environment and Earth Sciences, Duke University, Box 90328, Durham, NC 27708-0328, USA (CJ).

The destruction of natural habitats is the main cause of species extinction. Protecting what habitats remain, and restoring their connectivity, is vital to the protection of many species. In Rio de Janeiro State, only five large remnants of Atlantic Forest remain. Two of these include important conservation units, Parque Estadual dos Três Picos/PETP and Parque Estadual do Desengano/PED. Both are isolated and the landscape between them is dominated by extensive areas for grazing and agriculture. We propose a strategy to restore connectivity between these remnants, preventing the extinction of many species. The largest fragment (partially protected by PETP) forms the southwest end of our proposed biological corridor. In the northeast, PED protects much of the second largest fragment, and forms the opposite end. Between PETP and PED are one large forest fragment and several medium-sized fragments, currently unprotected, but which could form the seeds to grow a biological corridor. Much of the non-forested land appears to be economically of low productivity. We propose that the most appropriate strategy would be to develop a mosaic of land uses, enabling the connection between these two important Atlantic Forest remnants. Support: CI, CNPq.

22. CLIMATE CHANGE EFFECTS ON NEOTROPICAL MANAKIN DIVERSITY BASED ON ECOLOGICAL NICHE MODELING. ANCIÃES, MARINA; Peterson, A. Townsend. Natural History Museum and Biodiversity Research Center, 1345 Jayhawk Blvd., The University of Kansas, Lawrence, KS 66045-7561 (MA, TAP). Peabody Museum of Natural History, 170 Whitney Ave. New Haven, CT 06520-8118 (MA) marina.anciaes@yale.edu.

Assessing the nature and magnitude of climate change effects on populations is important to anticipating effects on species diver-

sity for conservation planning. We used ecological niche modeling to predict present and future distributions of 47 manakin species. Predicted distributions were highly coincident with independent test data for present-day distributions. Projections of potential distributions were made under 4 scenarios of climate change averaged. Assuming no dispersal ability, 22% of manakin species would likely go extinct from their current distributional areas, and present-day distributional areas would be reduced on average by 78%, becoming increasingly fragmented. Predicted area lost did not correlate with present distributional area, but regional topography was relevant, with higher losses of diversity predicted in the Cerrado and Amazonian regions than in montane regions. Distributional areas were predicted to shift on average by 350 km in various directions, with larger shifts in flatlands regions. Manakin populations will face large area losses and population isolation, and local extinctions will likely be frequent, regardless of present rarity, especially in lowland and plateau forests. Ecological niche modeling techniques can anticipate the nature and magnitude of climate change effects on biodiversity and be useful in identifying priority areas for conservation.

23. CAUSES OF SEX DIFFERENCES IN BILL MORPHOLOGY AND FORAGING BEHAVIOUR OF THE BAR-TAILED GODWIT (*Limosa lapponica*): IMPLICATIONS FOR SHOREBIRD CON. ANDERSON, MICHAEL G.; Dennis, Todd E.; Brunton, Dianne. Institute of Natural Resources, Albany Campus, Massey University, Private Bag 102-904, Auckland, NEW ZEALAND michaelgarethanderson@gmail.com (MA, DB). School of Biological Sciences, University of Auckland, Private bag 92019, Auckland, New Zealand (TD).

In this study we investigated sexual differences in morphology and behavior of a population of Bar-tailed Godwits (*Limosa lapponica baueri*) at Miranda, New Zealand, the wintering area for this species and an area of global conservation importance to shorebirds (Ramsar site). We used logistic regression models to evaluate intersexual differences in body weights and bill and wing lengths of up to 741 individuals. When standardized for differences in body size, male bill lengths were on average 23% shorter than those of females. Differences in the foraging behavior and diet of mal es and females were also significant during the 2001 and 2002 non-breeding seasons. Females took more large prey, found deeper in the substrate, while males consumed smaller, surface prey. Based on these results and anecdotal evidence from other studies, we conclude that the sexually dimorphic differences in bill length are too great to be entirely attributable to sexual selection. These results have conservation implications, as any future conservation efforts and studies of population dynamics will have to consider the different niche dimensions of each sex. Future habitat perturbations may potentially affect one sex more than the other, making this species vulnerable to human-induced population decline.

24. NO GENETIC STRUCTURE INDICATES HIGH GENE FLOW IN A MAHOGANY (*Swietenia macrophylla*, MELIACEAE) LOGGED POPULATION IN EASTERN AMAZONIA. ANDRÉ, THIAGO; Lemes, Maristerra R.; Gribel, Rogerio. Lab. de Genética e Biologia Reprodutiva de Plantas (LabGen), Instituto Nacional de Pesquisas da Amazônia (INPA), C.P. 478, Manaus, AM, 69011-970, Brazil, tandre@inpa.gov.br (TA, MRL, RG). Programa de Pós-Graduação em Ecologia - INPA (TA).

Due to over exploitation and habitat destruction, mahogany populations are greatly threatened over its distribution. Logging reduces the effective population size and may affect the dynamics of mating between remnant trees. Here we measure the effects of 70% removal of *S. macrophylla* adult trees on the genetic structure of seedlings established 10 years after logging. Individuals from one generation established previously to the logging (n=55) and one established after (n=51) were randomly collected over 4,100 ha in the Marajoara management project area, Pará State, Brazil. Genotypes were assessed at eight microsatellite loci previously developed for *S. macrophylla*. Microsatellite analysis was carried in an automatic DNA sequencer (ABI 3 77). A genetic differentiation within a population is induced when gene flow is limited and would be determined as a negative correlation between genetic relatedness and spatial distance. Queller and Goodnight's relatedness and spatial distances were calculated using the SPAGEDI software, and there was no significant correlation between them, both on adult individuals as on seedling's. The absence of genetic structure suggests the existence of long-distance seed dispersal and pollen flow predominantly between non-related individuals. Therefore, expected genetic effects of the current management practices are being counteracted by high gene flow on this population.

25. ENVIRONMENTAL ETHICS AND SCIENCE TO GUIDE POLICY FOR CONSERVATION BIOLOGY IN A GLOBALIZED WORLD. ANDRIOLO, ARTUR. Departamento de Zoologia, Instituto de Ciências Biológicas, UFJF, Campus Universitário, Juiz de Fora, MG, 36036-900, Brasil. andriolo@icb.ufjf.br.

In modern society the values and common sense are not property of all society members. The modern pluralism leads to an enormous relativism of the system values and interpretations. It raises the question: "How to respect differences and make decisions for nature conservation?". This study is to support the ethics values as an essential procedure for policy taking in consideration the modern pluralism. Ethics is the philosophic discipline that analyses and guide society based on rational procedures to take decisions to solve problems. More specific, Environmental Ethics is dedicated to discuss philosophical aspects of environmental problems. Science offers an academic system to reach an objective knowledge of reality, and supports theories and practices related to environmental conservation. Science is not restricted by the society morality values, but its applicability and success will depend on policy strategies and society permeability to those actions. Environmental conservation will take place in this scenario. This study concludes that it is essential to consider the ethic values to warrant that conservation strategies are applied successfully. A participative process allows to increase community understanding about the nature and the role they play in the system. Education is the core relational element to establish communication between scientists and society.

26. NICHE EXPANSION, COMPETITIVE RELEASE AND THE EVOLUTION OF PREDATION IN THE HOUSE MOUSE: LESSONS FROM GOUGH ISLAND, SOUTH ATLANTIC. ANGEL, ANDREA; Wanless, Ross M.; Hilton, Geoff; Ryan, Peter G. Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Private Bag, Rondebosch, 77701, South Africa, aangel@botzoo.uct.ac.za (AA, RMW, PGR). Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, UK (GH).

The introduced house mouse *Mus musculus* on Gough Island has occupied a vacant niche and in a classic example of competitive

release, has spread all over the island, occurring at very high densities. However, unlike on other islands, the mice on Gough have expanded their natural dietary range, and evolved an unprecedented predatory behaviour. Using infra red cameras, we collected evidence confirming that they have evolved the ability to prey on live, healthy Atlantic Petrel *Pterodroma incerta*, Great Shearwater *Puffinus gravis* and Tristan Albatross *Diomedea dabbenena* chicks. The great majority of attacks occurred in winter, suggesting that this behaviour evolved in response to the lean winter months, when food sources that mice ordinarily eat (terrestrial invertebrates and seeds) are greatly diminished. This behaviour is a sobering reminder of the unpredictable ability of invasive animals to exploit new food resources. It is also a novel ecological trait in the house mouse. When combined with the naiveté of seabirds and their behavioural inability to defend themselves against attack, the mice represent a new, significant threat to the millions of seabirds (from 20 species) breeding on Gough. Without ameliorative action, the persistence of several CITES listed species, including the endemics, is in danger.

27. THE IMPORTANCE OF RIPARIAN FOREST FOR BIRD SPECIES RICHNESS IN ATLANTIC FOREST. ANJOS, LUIZ DOS; Aleixo, A.; Lopes, E. V.; Favaro, F. L.; Volpato, G. H.; Serafini, P.; Poletto, F. Departamento de Biologia Animal e Vegetal, Universidade Estadual de Londrina, Londrina, PR, 86051-970, Brazil, llanjos@sercomtel.com.br.

We compared the bird community of the riparian forest with that of the surrounding upland forest in an Atlantic forest reserve, the Godoy State Park (GP), in northern Paraná State, southern Brazil. Point counts of unlimited distance were sampled monthly, from September-December 2001, in the upland and in the riparian forests. A total of 146 species were recorded; 42% of total species was strongly related to the riparian forest, 19% to the upland forest, and 39% to both types. Taking into account the abundances of the species in their guilds in a Correspondence Analysis, the large frugivore guild was the more closely related to the upland forest, while bamboo an d vine-tangles insectivores, edge omnivores, and edge insectivores were those more closely related to the riparian forest. Despite the stronger relation of the bird community to the riparian forest, the upland forest of GP seems crucial for conservation of some threatened species, as *Aratinga auricapilla* and *Triclaria malachitacea*. The heterogeneity of the GP, in terms of means the occurrence of upland and riparian forests, was crucial to its bird richness and it is expected that a reserve in Atlantic forest with less heterogeneity would have lower bird richness.

28. THE EFFECT OF MATRIX PERMEABILITY ON IMMIGRATION OF 11 SPECIES OF UNDERSTORY INSECTIVOROUS BIRDS. ANTONGIOVANNI, MARINA; Metzger, Jean Paul. Projeto Dinamica Biologica de Fragmentos Florestais (PDBFF/INPA), Manaus, AM, CP: 478, CEP:69011-970, Brazil, marina@inpa.gov.br (MA, JPM).

We test the influence of matrix permeability on the occurrence of immigrants of 11 species of understory insectivorous birds in forest fragments at the Biological Dynamics of Forest Fragments Project (BDFFP), near Manaus, Brazil. Surrounding matrix is composed of three vegetation types: second growth dominated by *Cecropia* spp.; second growth dominated by *Vismia* spp.; and open areas. To calculate the matrix permeability, we used a series of Landsat TM images from 1985 to 1992 and propose index that considers the distance between primary forest and the fragment and the resistance offered by the matrix. The resistance was inferred from the type and age of the matrix, with four simulated scenarios: P1- *Cecropia* is less resistant than *Vismia*; P2- *Vismia* is less resistant than *Cecropia*; P3- older second growth is less resistant than younger ones; P4- matrix structure or age does not affect resistance. We used logistic regression to examine the relationship between permeability values calculated by year, fragment, and landscape, with occurrence and immigration. The results indicate that older second growth dominated by *Cecropia* are more permeable to bird movements than is younger ones dominated by *Vismia*. The degree of isolation *per se* is not able to explain the immigration.

29. RAPTORS AND OTHER GROUPS OF BIRDS (IN THE CITY OF MOSCOW, IN MOSCOW, VOLOGDA AND IVANOVO REGIONS, RUSSIA). APAROVA, INGA I. Moscow Pedagogical State University, Kibalchicha, 6, buld. 5, Moscow, Russia, 234 522.

Raptors are widely studied in the world. Topical and trophical interactions, distribution's investigated. Though there's less comparative characteristics of raptors and other birds' interactions. We study such spatial interactions in habitats variously urbanized. Here're the results. In habitats from natural to Urbs raptors give their niche to Corvids. One of the main representatives - Hooded crow - is found a plastic species in urbanized landscapes. Most adaptable raptor - Goshawk - nests in forest park. Its adaptability is provided by the changes in its ethology and nesting phenology. There's a "window" around its nest free from Hooded crow's nests, that occupies the forest park 's edge. Crows prefer residential area to forest park. Most important crows' nestsite choice factor is the distance between nests and objects of particular ecological value. Hooded crows show great tolerance nesting in residential area in terms of each other, people and Urbs' predators. Co-existence of Corvids and goshawk on the same territory is possible, though there's some inter-isolation of the species left. If people's tolerance to raptors remains, their Urbs population can rather increase, and the population of Hooded crow - reduce insignificantly.

30. FISH BIODIVERSITY FROM PARANÃ RIVER VALLEY, BRAZIL. AQUINO, PEDRO D. P. U.; Ramalho, Alessandro M. B.; Martins-Silva, Maria Júlia; Rocha-Miranda, Fabio. Departamento de Zoologia, Instituto de Biologia, Universidade de Brasilia, Brasilia, DF, 70.919-900, Brazil, pedropua@pop.com.br.

Stream fish present high endemism tax and are little resistant to habitat degradation, so they are considered good bioindicators of water quality. The Paranã River is an affluent of the Tocantins-Araguaia basin, one of most import basins of Brazil. Fifteen sites were sampled along Paranã River basin, using gill nets and drag nets. In the Characiformes Order has been found specimens from Characidae, Anostomidae, Curimatidae, Prochilodontidae, Cynodontidae, Gasteropelecidae, Hemiodontidae, Erythrinidae and Crenuchidae families. Gymnotiformes were represented by Sternopygidae, Hypopomidae and Apteronotidae families. Individuals of Loricariidae, Pimelodidae and Doradidae families represented the Siluriformes order. The Ciclidae family was the only representing of Perciformes order. The high richness and density of fish species in the Paranã River Valley evidences the good wealth of aquatic microhabitats, showing the necessity of conservation efforts of these environments.

31. BIOLOGICAL CONSERVATION IN AN ERA OF ECONOMIC GLOBALIZATION. ARAGON, SUSAN. Clark Uni-

versity,950 Main Street, Graduate School of Geography, Worcester, MA 01610, USA, saragongeo@yahoo.com.

Usually when we talk about the environmental effects of globalization it is referred global spread of pollution and waste and to the effects of global warming. Less attention has been focused, at least in the conservation biology literature, to the indirect consequences of the globalization of investments, trade, production and technology on the efforts to conserve biological diversity. This paper will explore the effects of economic globalization in the loss and fragmentation of habitats, introduction of exotic species and harvesting of natural resources. The growth and spread of investment, capital and financial services are considered the landmark of globalization. As the case examples of Indonesia, Brazil, and Costa Rica shown larger investments will appropriate large land holdings dedicated mainly to ranching and timber exploitation. These two economic activities are the main causes of deforestation in the tropics. Additionally, acquisition of larger holdings left many farmers landless who are forced to migrate either to the cities or forest frontiers. The liberalization of trade, reducing agricultural subsidies, tariffs, taxes, regulations and barriers that block trade could have detrimental effects with the increase of accidental introduction of exotic species and the overharvesting of wild resources such as non timber products of tropical forest.

32. ESTIMATION OF CRACID ABUNDANCE BY LINE TRANSECTS IN NORTHERN OF LA PAZ, BOLIVIA. ARANIBAR-ROJAS, HUGO; Wallace, Robert D. Armonía /BirdLife International, Programa Mamaco, 5794 La Paz, Bolivia hugo_arn@hotmail.com (HA). Wildlife Conservation Society - Programa de los Paisajes Vivientes, Proyecto Paisaje, 3-355181, La Paz, Bolivia, wcsmadidi@zuper.net (RDW).

In Bolivia one of the most threatened bird family are the cracids. This report describes the population status of cracids community within the Madidi National Park and corresponding area of influence, in northern Department of La Paz, Bolivia. Data was collected by driving 545.9 Km of line transect in four places over a 3-years period. Species sighted were: *Penelope jacquacu*, *Mitu tuberosa*, *Pipile cumanensis* and *Ortalis gutatta*. In general *Penelope* and *Mitu* were the most abundant species, followed by *Pipile* and *Ortalis*. In the four places assessment, two contained all four species, and only *Mitu* was reported in all areas. Therefore, for one place whit two years of constant monitoring only for *Mitu* was found a notably annual variation in abundance. The density for the most common species (*Penelope*) is estimated with a range between 8.4 and 11.2 ind./km^2. *Penelope* and *Mitu* have habitat preference to *terra firme* forests, while the other species displayed no distinguishable preferences.

33. COMPARATIVE DEMOGRAPHY OF ASIAN ELEPHANT POPULATIONS (*Elephas maximus*) IN SOUTHERN INDIA. ARIVAZHAGAN, C.; Sukumar, Raman. Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560012, India, rsuku@ces.iisc.ernet.in.

We studied the population structure and demography of the endangered Asian elephant (*Elephas maximus*) across three populations (Nagarahole National Park, Mudumalai Wildlife Sanctuary and Periyar Tiger Reserve) in southern India with different levels of poaching pressure. Poaching for ivory selectively eliminates tusked male elephants from the population. Data on age-sex structure through visual observation and photography method were collected over a 3-year period (2001-2003). The adult sex ratio (number of males to females) in Nagarahole, which has a low level of poaching pressure, was about 1:5 that in Mudumalai with medium poaching pressure was 1:28, and that in Periyar with high poaching pressure in the past was 1:61. The proportion of adult males in Nagarahole was relatively stable across the study period, that in Mudumalai decreased slightly, while in Periyar it increased slightly. The fertility rate was 0.26 births per mature female per year in Nagarahole, 0.23 in Mudumalai, and 0.20 in Periyar. We thus discuss the possible effects of ivory poaching on population structure and demography of elephants, and implications for conservation.

34. IMPORTANCE OF COLOMBIAN SHADED COFFEE PLANTATIONS FOR CONSERVATION OF ANT BIODIVERSITY. ARMBRECHT, INGE. Universidad del Valle, Departamento de Biología, Apartado Aéreo 25360 Cali, Colombia, inge@univalle.edu.co.

Colombia is a megadiverse country and amongst the most important coffee producers in the world. Coffee plantations were traditionally shaded but now are mostly unshaded, which negatively impacts biodiversity. During 2001-2002, two field studies were carried out in order to test the importance of shaded coffee plantations for biodiversity conservation. This was conducted along a gradient of intensification of coffee production in the Colombian Andes. I studied the presence of ants in four coffee management systems: forest (no agriculture), polygeneric shaded coffee, monogeneric shaded coffee, and sun coffee (unshaded) plantations. Leaf litter-soil ants were sampled from 320 one square-meter plots in 16 farms and, in another experiment, a total of 2400 artificial bamboo twig nests were offered to nesting ants. Organic polygeneric shaded coffee plantations contained significantly higher ant species richness and their ant assemblages resembled forest patches more than other management types. Ant species in forests were at higher proportions in shaded coffee than in sun coffee. There were, however, a subset of ant species located only in the forests. Shaded coffee plantations are better at preserving litter ant species found in forest patches. However no coffee agroecosystem replaces the ant assemblages of forest habitats.

35. STRATEGIES FOR REINTRODUCING ISLAND-MAROONED SPECIES BACK TO MAINLAND FRAGMENTS. ARMSTRONG, DOUG P. Wildlife Ecology Group, Massey University, Private Bag 11222, Palmerston North, New Zealand, d.p.armstrong@massey.ac.nz.

Many New Zealand species declined substantially following the introduction of mammalian predators, and some species that were formerly found on the mainland have been "marooned" on predator-free offshore islands. Predators are now being controlled or eradicated in many locations on the mainland, potentially creating the opportunity to reintroduce species that have been absent for over 100 years. This raises three questions: (1) How many animals should be translocated? (2) What level of predator control is needed to allow viable populations on the mainland? (3) How large do the managed areas need to be to ensure populations do not decline due to emigration into the unmanaged matrix? I address the first two questions in this talk. Answering thes e questions requires understanding how populations are regulated in the absence of introduced predators, and how survival and reproduction declines as a function of predator abundance. We therefore need to model data obtained from both island and mainland situations. However, island-marooned species have never been studied in the presence of predators, so preliminary models need to

be developed using data from surrogate species, then updated after mainland reintroductions take place. I show how such models were developed for the North Island saddleback, the first species to be returned to the mainland.

36. MODELING RISKS AND IMPACTS IN THE VARZEA. ARRUDA, WARLEY C.; Forsberg, Bruce; Silva, U.L.; Miranda, F. P.; Beisl, C.; Garcia, J. W. Coordenacao de Pesquisas em Ecologia, Instituto Nacional de Pesquisas da Amazonia, CP 478, Manaus AM 69011-970, warleyarruda@vivax.com.br (WCA, BRF); World Wildlife Fund - Brasil (ULS); CENPES - Petrobras S.A. (FPM); COPPE - UFRJ (CB); Petrobras S.A. (JWG).

Large river floodplains are complex ecosystems where habitat and community structure vary continually in response to seasonal inundation cycles. Due to their seasonal connection to large river networks these systems are also especially vulnerable to impacts from river born pollutants and regional hunting and fishing pressure. Sophisticated models are required to predict the spatial and temporal variability of floodplain habitats and biota and evaluate their vulnerability to different anthropogenic threats. Here we describe a series of interrelated models which were developed to evaluate the risks and potential impacts of oil spills in the central Amazon floodplain of brazil, a region referred to locally as the várzea. Included are models for predicting the variability of habitat structure, the spatial pattern of inundation and the complex flow-path of oil spills in the várzea. The development of a risk management tool which integrates these models together with geo-referenced biological and socioeconomic data in a GIS environment is also discussed.

37. THE USE OF CAMERA TRAPPING TO IDENTIFY MEDIUM AND BIG MAMMALS IN CENTRAL AMAZON RAINFORESTS. ARTEAGA, MARIA CLARA; Spironello, Wilson. Projeto TEAM (Tropical Ecology Assessment and Monitoring).Instituto Nacional de Pesquisas da Amazônia. Manaus, AM, CEP 69083-000, Brazil. mariaclaraarteaga@yahoo.com.

Mammals play an important role on diversity maintenance in Tropical Forests as herbivores, seed dispersers and controlling population growth of several species. The nocturnal and inconspicuous habits of most mammalian species and the dense covertures from forested areas make difficult monitoring and evaluating its community structure. Camera traps are a non-invasive method that permits to cover large areas along continuous time, and to detect rare and cryptic species. This method is being used to evaluate the medium and big mammal community in two reserves of upland rainforests from Central Amazon. Seven stations were settled in each reserve during two months from both rainy and dry seasons. In each station two cameras with passive sensor were installed to pick up the photos. The total sampling effort was 20.496 hours/camera during rainy season and 18.984 hours/camera during dry se ason. A total of 51 mammals were registered, composed by six orders, eight families and 15 species. This method has showed useful to register high species number in short time period. During long-term period it will help to evaluate activity patterns and population dynamics for that species that can be identified individually, being important to plan future conservation strategies in Tropical Forests.

38. THE INTRODUCTION OF THE NILE TILAPIA, *Oreochromis niloticus*, IN LAKES AND RESERVOIRS OF BRAZIL: A THREAT TO THE GLOBAL DIVERSITY OF FRESHWATER FISH SP. ATTAYDE, JOSÉ LUIZ. Departamento de Botânica, Ecologia e Zoologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte, Natal, RN, 59072-970, Brazil, attayde@cb.ufrn.br.

Brazil has the largest diversity of freshwater fish species of the world but has imported several species in the last decades for aquaculture and fisheries purposes. The Nile tilapia, *Oreochromis niloticus*, has been largely introduced in Brazil since the 70´s and is now one of the most widespread exotic fish species in the country. The objective of this work was to evaluate the effects of the Nile tilapia introduction on the reservoir fisheries in the northeast of Brazil. The CPUE or catches per unit of effort (Kg/fisherman/year) before (1971-1975) and after (1976-2000) the establishment of the Nile tilapia in the reservoirs were compared and the results show that the CPUE of several indigenous species were significantly reduced after the establishment of the Nile tilapia in the reservoir s. These results suggest that the introduction of the Nile tilapia in the reservoirs altered the structure of the fish communities, with negative consequences for the indigenous fish species. The mechanisms that must have accounted for these effects are resource competition with other species and modification of the water quality through changes in turbidity and eutrophication mediated by fish. Tilapia introductions should be considered a threat to the global diversity of freshwater fishes.

39. CONSERVATION OF NICOBAR FLYING FOX BY INITIATING THE INVOLVEMENT OF THE INDIGENOUS COMMUNITIES IN THE NICOBAR ISLANDS, INDIA. AUL, BANDANA. Department of Animal Behaviour and Physiology, School of Biological Sciences, Madurai Kamraj University, Madurai, Tamil Nadu, India, bandana_aul2002@yahoo.com.

The Nicobar flying fox is an endemic flying fox found in the Central Nicobar Islands. Already extinct from the northernmost island in the Nicobars, this species is facing serious threat due to hunting and habitat loss due to unsustainable forest practices. If current practices persist, the species will face extinction. The present project is working to ensure the survival of the species with research aimed at two main objectives: 1.) a community based conservation initiative that will emphasize indigenous people's participation in the conservation of this threatened species through education and awareness campaigns near roost sites and areas with high hunting pressure, and 2.) an intensive research program to identify ecological requirements for the species involving identification of roost sites, foraging patterns and range, inter-island migration and habitat use. This would further allow the researchers to establish community-based roost adoption, protection and subsequent monitoring of flying fox populations. Post tsunami, a long term plan is being initiated to help people decide where to settle and how best to sustainably use forest resources. The team cannot begin education campaigns until islanders regain their homes and a source of income, but researchers are in the process of helping them do this.

40. EFFECT OF DISTANCE BETWEEN FOREST PATCHES ON THE MOVEMENTS OF BIRDS BETWEEN THEM IN AN ATLANTIC FOREST LANDSCAPE. AWADE, MARCELO; Boscolo, Danilo; Metzger, Jean Paul. Rua Fer-

não Dias, 98, apto. 71, São Paulo, SP, 05427-010, Brazil, marceloawade@yahoo.com.br (MA). Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, 321, São Paulo, SP, 05508-900, Brazil, (DB, JPWM).

The Atlantic Forest is one of the most threatened biomes, represented greatly by short and isolated forest fragments and the functional connectivity, which refers to the biological responses to the landscape structure, is poorly known. Understand how species percieve the enviroment arround their habitats is essencial to biodiversity conservation. Our objectives were verify the effect of the distance between Atlantic forest fragments, isolated by pastures or agriculture, on the occurrence of movements between them, for five bird species (*Dysithamnus mentalis*, *Thamnophilus caerulescens*, *Automolus leucophthalmus*, *Chiroxiphia caudata* e *Basileuterus culicivorus*), using playback trials. All species were able to cross open areas to reach other fragments. To three of them (*D. mentalis*, *B. culicivorus* e *C. caudata*) this displacements were related to the distance to be traversed. *Chiroxiphia caudata* exhibited the longest critical distance (81m) above which the movements were rare. Considering 80m as a threshold, this distances were esteemed short, since only 0,15% of the fragments in the landscape studied are connected. This may cause disrupted territories of these species and in alterations of the structure and dynamics of their populations, what is thought to influence the proneness to extinction of birds. Thus, more studies on functional connectivity are extremely necessary.

41. THE CONSERVATION IMPLICATIONS OF A 22 YEARS EXPERIMENTAL STUDY OF RECRUITMENT IN AN INTERTIDAL SEA ANEMONE. AYRE, DAVID. Institute for Conservation Biology and School of BIological Sciences University of Wollongong, Wollongong, NSW 2522, Australia, dja@uow.edu.au (DA).

Intertidal populations are often thought to be ephemeral and dramatic changes in area and density are expected to be at least partially driven by pulses of planktonically dispersed immigrants. I use a 22 yr study of recruitment and adult densities and distributions to test these ideas within populations of the asexually viviparous sea anemone *Actinia tenebrosa* on Rottnest Island, W. A. Populations are arrayed in linear strips and maintained by localised dispersal of brooded clonal larvae, although each clone is either male or female and sexually produced offspring are thought to be widely dispersed. By monit oring wholly cleared, partially cleared and undisturbed populations and their surrounds I show that adult distributions are incredibly stable over decades, with the area occupied by local populations fluctuating < 5%. Recruitment is highly correlated with adult density per m, but within cleared areas recolonisation varies dramatically with levels of exposure. Wholly cleared areas > 10m from adult anemones received no recruits during the study and recruits were not detected > 5m from established adults. These data imply that the recovery of populations after disturbance will be extremely limited and conservation efforts must be focussed on the very small areas of current adult habitat.

42. LIVESTOCK DEPREDATION BY JAGUAR AND PUMA IN THE PANTANAL REGION OF BRAZIL. AZEVEDO, FERNANDO C. C. Department of Fish and Wildlife Resources, College of Natural Resources, University of Idaho, Moscow, ID 83844-1136, USA, azev3517@uidaho.edu.

Habitat loss, close proximity to domestic livestock, and direct competition from poachers removing natural prey, may force jaguars and pumas to coexist spatially with domestic animals and consequently use them as prey. In an attempt to study livestock depredation in the Pantanal of Brazil, 11 cats (nine jaguars and two pumas) were monitored during 2003-2004 in three livestock ranches. From January to August 2004, of all carcasses of wild prey found (43), predation by jaguars represented the majority of recorded incidents (86.3%, 19 animals). Capybaras, marsh deer and caiman constituted the wild prey most taken by jaguars. A total of 100 domestic animals were found dead or killed during the period. Of all domestic animals found dead, depredation accounted for only 22.0% (22 animals). The average rate of predation of livestock at the main ranch, San Francisco farm, and in two neighbor farms represented 1.45 ± 1.11% of all livestock. Considering the total number of cattle within San Francisco area at the beginning of 2004 (4.951 heads), predation by jaguars and pumas represented only 0.18% of all cattle. The abundance of wild prey apparently contributed for low depredation of cattle in the area.

43. THE FUTURE MAMMALS OF THE AMAZON. AZEVEDO-RAMOS, CLAUDIA; Amaral, Benedito D. do; Curran, Lisa M.; McDonald, A.; Soares-Filho, Britaldo; Nepstad, Daniel. Instituto de Pesquisa Ambiental da Amazonia, SCLN 210, Bl. C, sala 211, 70862-530 Brasília, DF, Brazil (c.azevedo-ramos@terra.com.br) (CAR., BA). Yale University, School of Forestry and Environmental Studies, 370 Prospect St., New Haven, CT, 06511, USA, (LMC, AM). Centro de Sensoriamento Remoto/Centro de desenvolvimento e Planejamento Regional, Universidade Federal de Minas Gerais, 31270-901 Belo Horizonte, Brazil (BSF); Woods Hole Research Center, P.O. Box 296, Woods Hole, MA, 02543, USA (DCN).

We assessed how land-cover change in Amazonia would potentially affect forest cover within mammal species ranges with future trajectories of deforestation in Amazonia. Land use change from 1996 to 2001 was generated from Landsat ETM+ and projected for 50 years using DINAMICA model. A mammal vulnerable index was calculated using multicriteria analysis on available variables (habitat use, IUCN red list categories, CITES categories and h unting pressure). We identified species assemblages with similar habitat requirements using cluster analysis. Based on a comparison between land-cover change and the vulnerable index, we generated maps identifying vulnerable regions for mammals under different development scenarios. This approach can be easily adapted regionally or to other taxa. Maps are powerful tools to visually access complex systems. These results may help decision makers to consider ecological costs and benefits of different development strategies for Amazonia and assist conservation biologists to identify vulnerable species and regions for conservation strategies.

44. POPULATIONAL GENETIC STRUCTURE OF *Manilkara huberi* (DUCKE) A.CHEV., A HEAVILY LOGGED AMAZONIAN TIMBER SPECIES. AZEVEDO, VANIA C. R.; Ciampi, Ana Y.; Kanashiro, Milton. Programa de Pós-graduação em Biologia Molecular, Departamento de Biologia Celular, Instituto de Biologia, Universidade de Brasília, Brasília, DF, Brasil. azevedovcr@unb.br (VCRA). Embrapa Recursos Genéticos e Biotecnologia, PqEB final W5 norte, CEP 70770-900 Brasília DF, Brasil (VCRA, AYC). Projeto Dendrogene, Embrapa Amazônia Oriental, Belém, PA Brasil (MK).

Molecular markers have been increasingly used to gain understanding of population genetic structure, to quantify the effects of habitat fragmentation and guide conservation strategies. This

research, part of the Dendrogene Project (www·cpatu·embrapa·br/ dendro/ index. htm), aims to study the genetic diversity and population genetic structure of a natural population of *Manilkara huberi*, known as maçaranduba, using microsatellite markers to identify possible logging impacts as input for the design of conservation strategies. This species is intensively harvested due to its suitability for the construction industry. Three hundred adult trees and nine hundred seedlings were sampled in a two hundred hectare plot at the Tapajós National Forest, Pará, Brazil. All individuals were genotyped using an automatic sequencer ABI 377 with seven highly polymorphic microsatellite loci. The following estimates were obtained for adults and seedlings: observed heterozygosity (Ho) 0,71 and 0,63; genetic diversity (He) 0,86 and 0,82; fixation index (f) 0,17 and 0,23. All the estimates are significant (CI 95%). The adult population shows significant spatial genetic structure. This results show that this species is endogamic and will be very useful as a tool, together with more genetic studies that are been conducted, to help design strategies for forest management to meet production and conservation goals.

45. AFRICAN WILDLIFE COLLEGE AND CAPACITY BUILDING TO ADDRESS THE BUSHMEAT CRISIS THE EXPERIENCE OF GAROUA WILDLIFE COLLEGE (CAMEROON). BABALE, MICHEL; Bailey, Natalie D. Ecole de Faune de Garoua, BP 271 Garoua, Cameroun, Tel: 237 956 56 09, Fax: 237 227 31 35 (mbabale@yahoo.fr) (MB); Bushmeat Crisis Task Force, 1700 Connecticut Avenue, NW Suite 403, United States of America, Tel: 202 588 1924, Fax: 202 588 1069 (NDB).

At the start of the 21st century, the threats facing African wildlife have become increasingly alarming. In the Congo Basin in particular, the unsustainable illegal, commercial bushmeat trade consumption has reached record levels, depleting the forest ecosystem of its wildlife. To counter the bushmeat crisis, Central African institutions have engaged in a variety of initiatives to raise awareness, develop capacity, enforce laws, develop appropriate policies and identify bushmeat alternatives. Garoua Wildlife College in particular has worked to build the capacity of African wildlife managers through the development of a bushmeat training course module with the support of WWF-U. S. R. E. Train Education for Nature program and the Bushmeat Crisis Task Force. Approximately 30 professionals from nine countries have been trained during the first two training sessions. An evaluation of the module was completed following the second training session (2004). In this session, we will present results and lessons learned from the first two years of bushmeat training courses in Francophone Africa.

46. MONITORING DHOLE (*Cuon alpinus*) POPULATION AND PREY IN THE NILGIRI BIOSPHERE RESERVE, SOUTHERN INDIA. BABU, V. N. Asian Nature Conservation Foundation, c/o Centre for Ecological Sciences, Indian Institute of Science, Bangalore, 560012, India, narendra@asiannature.org.

Dhole, *Cuon alpinus*, packs were monitored between 2000 and 2003 in the Mudumalai WLS and Nilgiri North Forest Division, an area covering approximately 300 km^2 in the Nilgiri Biosphere Reserve, southern India. Prey densities were also monitored during the same period across different habitats and the locations of the resting sites of the dhole's principle prey - chital (*Axis axis*) were mapped. Habitats types across the study area were characterized using classified satellite imageries. Location data of four dhole packs ranging across this study area showed a home range (minimum convex polygon) that varied between 15 to 66 km^2. The dhole population showed high intra annual fluctuations due to high pup mortality in the study packs. Higher mortality (disappearance) was observed among pups of smaller packs. The densities of the dhole's prey namely chital, sambar (*Cervus unicolor*) and black naped hare (*Lepus nigricollis*) were found to be stable across the study period and hence served as a good prey base. It was found that core areas of dhole home ranges had a significantly higher number of chital herds than non-core areas. Areas surrounding chital resting sites and the habitats within the dhole home ranges contained a higher percentage of open habitats.

47. BIODIVERSITY CONSERVATION IN RESTORED CORAL LIMESTONE QUARRIES ON THE KENYAN COAST. BAER, SABINE; Kahumbu, Paula. Lafarge Eco Systems, P.O.Box 81995, Mombasa, Kenya (Sabine.Baer@bamburi.lafarge.com).

East African Coastal Forests are one of the 25 of the world's biodiversity hotspots, supporting one of the highest densities of plant endemism in the world. However, forest loss is considerable, and many of the endemic species are threatened with extinction. This paper presents a unique case of biodiversity conservation in disused coral limestone quarries of a cement plant on the Kenyan coast. A total of approx. 100 ha of disused quarries have been restored into indigenous coastal forest ecosystems over the last 30 years; the restoration area is increasing as mining continues. Initially *Casuarina equisetifolia* is planted as pioneer species to colonize the open quarry, and over the years create humus from leaf litter and a suitable microclimate for other plant species to grow. Causarina plantations are thinned to create room for the introduction of indigenous coastal vegetation. Over the last 15 years more than 400 coastal plant species have been introduced into the mature Casuarina plantations. While the main aim is to create diversity, special emphasis is laid on timber trees and threatened species. 31 threatened plant species have been established successfully, 11 of them producing seeds. The restored forests are used as demonstration site for local communities.

48. BLACK RHINOCEROS BROWSING FACILITATES RESOURCE AVAILABILITY: IMPLICATIONS FOR DONOR POPULATION MANAGEMENT. BAGGALLAY, THADAIGH; Linklater, Wayne L.; Owen-Smith, Norman; Swaisgood, Ron R. Centre for African Ecology, University of Witwatersrand, School of Animal, Plant & Environmental Sciences, Jan Smuts Avenue, Private Bag 3, Witwatersrand, Johannesburg 2050, South Africa. tbaggallay@yahoo.com (TB, NOS). School of Biological Sciences, Victoria University of Wellington, P.O. Box 600, Wellington, New Zealand, and Terrestrial Ecology Research Unit, University of Port Elizabeth, South Africa (WLL). Conservation and Research for Endangered Species, Zoological Society of San Diego, P.O. Box 120551, San Diego, CA92115, USA (WLL, RRS).

Up to 27 black rhinoceros (*Diceros bicornis*) have been removed each year since 1980 from Hluhluwe-iMfolozi Park (HiP), South Africa, for introductions elsewhere and to encourage compensatory reproduction in this strategically important donor population. However, HiP's population has not responded positively to reduced densities; population size and fecundity appear static. Perhaps substantial removals actually reduce habitat quality by allowing trees to out-grow rhino reach because browsing controls tree height and encourages coppicing? We measured black rhinoceros browsing on eight preferred food species and compared them in areas of high and low removals. Black rhino select for browse

0.5-1m high (58% of all black rhino browsing, n=383 trees). High removal areas had lower preferred tree densities in the selected height range (27 per 100m, n=6 transects) than did low removal areas (56 per 100m, n=5) and higher densities of trees > 1m (88 and 68 trees per 100m, n=6 and n=5, respectively), suggesting that trees had grown into taller, less selected and accessible, height classes since removals. Black rhino feeding maintains favored woody plants at the preferred browsing height. Removals of black rhinoceros from donor reserves may need to be carefully distributed across the landscape to maintain browsing pressure.

49. CHANGES IN POPULATION DENSITY OF TWO ENDEMIC PLANT SPECIES IN GUNNER'S QUOIN AN OFFSHORE ISLET OF MAURITIUS AFTER ALIEN RAT AND HARE ERADICATION. BAIDER, CLAUDIA; Florens, F. B. Vincent. Mauritius Herbarium, Mauritius Sugar Industry Research Institute, Reduit, Mauritius. cbaider@msiri.intnet.mu (CB). Department of Biosciences, Faculty of Science, University of Mauritius, Reduit, Mauritius (FBVF).

Gunner's Quoin is a volcanic islet of 76 ha situated 4 km offshore of Mauritius and home to the largest population of several threatened Mauritian endemic plants. Despite being overrun by invasive alien plants, this Nature Reserve retains great conservation value as a potential site for reintroduction of endemic reptiles presently confined to Round Island, another islet. We present the first vegetation survey of the islet eight years since the eradication of rats and hares in 1996, which predated on seeds and seedlings of the two main native species, *Latania loddigesii* (Arecaceae) and *Pandanus vandermeerschii* (Pandanaceae). The number of adult *Latania* remained unchanged over 22 years, but *Pandanus* lost 25% of its reproductive population since 1982, and presently more than 1/3 of the remaining plants are senescent. Regeneration of both species increased dramatically. However most of the plants are confined to the coastal fringe and regeneration occurs down slope under female trees due to native dispersers being extinct. Both species have already vanished from parts of the islet. In the meantime potent dispersers are reintroduced, artificially dispersing seeds is necessary to ensure the long-term maintenance of the species in one of their last localities in the wild.

50. EVALUATING IMPACTS OF PROBLEM ANIMAL CONTROL ON LOCAL COMMUNITY SUPPORT FOR PROTECTED AREA CONSERVATION AT BWINDI IMPENETRABLE NATIONAL PARK, UGANDA. BAKER, JULIA; Leader-Williams, Nigel. Durrell Institute of Conservation and Ecology, University of Kent, Canterbury, Kent, CT1 7NS, United Kingdom. jeb9@kent.ac.uk.

Improved relations with local communities are a primary motive for managers of protected areas to mitigate crop raiding by wild animals. Crop raiding patterns and impacts on local livelihoods have been established, although the assumption that problem animal control gains local support for protected areas has rarely been examined. The analysis was based on law enforcement data from 1996-2000 on patrol encounters with crop raiding by wild animals; mitigation incidents; and, farmers' complaints about crop raiding to rangers passing their fields on patrol, at Bwindi Impenetrable National Park, Uganda. We found that crop raiding patterns are highly localised around Bwindi. Baboons cause most crop loss although infrequent but severe raids by mountain gorillas and elephants occur in certain areas. Farmers experiencing raids by flagship species received most mitigation. Farmers experiencing baboon raids accounted for most complaints and exhibited a greater mismatch between complaints and actual damage. Benefits from protected areas for rural communities are primary strategies of integrated conservation and development at Bwindi, and considered successful in conflict resolution. Yet despite community benefits, human-wildlife conflict continued for individuals not receiving mitigation. Thus, incorporating problem animal control and law enforcement with community-based programmes is recommended for the integrated policy of Bwindi.

51. IMPACTS OF CLEARFELL LOGGING ON LITTER BEETLES: ARE RESERVE CORRIDORS EFFECTIVE? BAKER, SUE C.; Richardson, Alastair M.M.; Barmuta, Leon A. School of Zoology, University of Tasmania, Private Bag 05, Hobart, Tasmania 7001, Australia. bakers@utas.edu.au.

Clearfell logging is changing the age structure and spatial dynamics of wet eucalypt forest in Tasmania, Australia. Litter-dwelling Coleoptera are sensitive to both coupe- and landscape-scale effects of logging, but if the logging is done according to natural disturbance principles, clearfell harvesting need not threaten their populations. Litter beetle assemblages did not differ between sites that had been either logged (clearfell, burn, and sow) or burned by wildfire 33 years previously. Landscape-scale impacts appear to be a greater conservation threat than the harvesting regime used. Litter beetle assemblages differed with the successional age of the forest, thus fragmentation of the landscape into small coupes grea tly reduces the connectivity between remaining areas of mature forest. Streamside reserves (40 — 60 m wide) and occasional 100 m-wide wildlife habitat strips (usually riparian) preserve some older forest and provide connectivity pathways. However, the zone in which litter beetles are edge affected (up to 25 — 50 m) can extend as far into the riparian strip as the stream bank. An increase in the logging rotation period and/or more and wider reserves are probably required if these forests are to continue to provide timber as well as maintaining natural habitat values and conserving their dependent species.

52. WILDFIRE IN THE AMAZON'S TRANSITIONAL FOREST: IMMEDIATE IMPACTS AND POSITIVE FEEDBACKS. BALCH, JENNIFER K.; Nepstad, Daniel; Curran, Lisa M.; de Carvalho Jr., Oswaldo; Azevedo-Ramos, Claudia; Brando, Paulo. Yale University, School of Forestry and Environmental Studies, 370 Prospect St., New Haven, CT, 06511, USA, (jennifer.balch@yale.edu) (JKB, LMC). Woods Hole Research Center, P.O. Box 296, Woods Hole, MA, 02543, USA (DCN). Instituto de Pesquisa Ambiental da Amazônia, Av. Nazaré 669, 66035-170, Belém, Brazil (DCN, OC, CA, PMB).

The Amazon's transitional forest extends along the southern edge of the basin, concurrent with an explosive frontier pushed by big agriculture and cattle ranching. With increasing ignition sources and a conducive climate, escaped fires frequently sweep through this transitional forest. We describe the fire behavior and the immediate damage and tree mortality from one square kilometer of burned forest in Mato Grosso, Brazil - one of the largest experimental fires in the tropics. In addition to direct damage these low intensity, creeping understory fires open up the forest to future fires through positive feedbacks. We look at these feedbacks by quantifying the consequent increase in fuel loads through mortality and leaf shedding, structural opening of the canopy, and resulting changes in understory microclimate. Predictions of more severe climatic shifts and the economic pressure to transform this forest make understanding how fire influences this ecosystem key to its preservation.

53. BIRD DIVERSITY AND ENDEMISM IN NATIVE *Polylepis* FORESTS AND EXOTICS PLANTATIONS, NATIONAL PARK TUNARI, BOLIVIA. BALDERRAMA, JOSÉ ANTONIO. Centro de Biodiversidad y Genética, Universidad Mayor de San Simón, Cochabamba, Bolivia, tangara_sp@hotmail.com.

Only limited data have previously been published on the effect on fauna of " *modern"* institutionally promoted land-use of exotic plantation forestry, specially in such endangered habitat like the *Polylepis* forests. This study was aimed to evaluate the effects on the bird fauna of exotic plantation in the Tunari National Park. We collect data in three different types of habitat: a) *Polylepis* forests, b) Exotic plantations of *Eucaliptus* and *Pinus* and c) Mixed forests of native and exotics trees. We found that there were statistical differences in relation of diversity and abundance of bird species among natural vegetation and exotic plantations. In relation of endemism, this was clearly lower in exotic plantations and in mixed forests. We also took data in three fragments of *Polylepis* woodlands whit different type of matrix surrounding and there were statistical differences among the fragments, matrix whit exotics plantation had lower diversity, abundance and endemism, endangered birds like *Poospiza garleppi* are also absent of this native fragments due to impoverishment of habitat. We conclude that there are negative effects of exotic plantation on bird fauna, when the native vegetation is substituted whit exotic plantation and even when native vegetation is surrounded by exotic plantations.

54. VARIABILITY OF EDGE EFFECT AS A RESULT OF HABITAT STRUCTURE, LANDSCAPE CONTEXT AND TAXON. BÁLDI, ANDRÁS; Batáry, Péter; Erdös, Saci. Animal Ecology Research Group, HAS, Hungarian Natural History Museum, Ludovika tér 2, Budapest, Hungary, H-1083 (baldi@nhmus.hu). Department of Zoology, Hungarian Natural History Museum, Ludovika tér 2, Budapest, Hungary, H-1083.

Edge effect is the discontinuity of population and community characteristics near the border of the habitat. Edge effect was described for many organisms and habitats, and these studies suggest that edge effect depends on taxon, habitat structure and spatial scale. However, it is always difficult to synthetize individual studies. This study aimed to evaluate edge effect for a great variety of taxa (348 species of plants, 34 of orthopterans, 103 of beetles, 90 of spiders, 124 of bees, and 3314 individuals of orthopterans, 4344 of beetles, 6833 of spiders, 483 of bees) in three different grassland regions in different landscapes. The sampling was carried out in Hungary in solonchak alkali steppes, solonetz alkali steppes and meadows using pitfall traps, sweeping and singling techniques in 2003. GLIM showed that general edge effect was present in orthopterans and spiders, but with significant interaction of edge with grazing intensity (habitat structure). Marginal significance w as found in plants for the edge with region interaction, and none for beetles and bees. These preliminary results suggest that the great variety of edge effect found in many studies may not be the consequence of variability of individual studies, but also a common character of communites.

55. LANDSCAPE FOREST MOSAIC INFLUENCING UNDERSTOREY SPIDER ASSEMBLAGES IN SOUTHERN BRAZIL SUBTROPICAL FOREST. BALDISSERA, RONEI; Hartz, Sandra; Ganade, Gislene. Laboratório de Ecologia de Populações e Comunidades, Departamento de Ecologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, 91540-000, Brazil, roneibaldissera@yahoo.com.br (RB, SMH). Laboratório de Ecologia da Restauração, Biologia, Universidade do Vale do Rio dos Sinos, São Leopoldo, RS, 93022-000, Brazil (GG).

Composition of spider communities is strongly determined by vegetation features. Therefore spiders can indicate patterns of alterations in human managed landscapes. We investigated richness, abundance and composition of understorey spider assemblages in three stands of four habitats at a National Forest in southern Brazil: araucaria forest, araucaria plantations, pine plantations, and eucalyptus plantations. Vegetation between 1-2.5m above ground, inside two sampling units per stand, was beaten in six seasons (2003/2004). We caught 9251 spiders (eight guilds, 29 families, 132 species). Pine plantations showed the highest abundance (N=2955), and eucalyptus plantations the lowest (N=1248). Pine plantations showed the highest richness (S=72), and araucaria forest the lowest (S=56). Between habit at abundances was significantly different in Autumn 2003 and 2004, Winter 2003, and Spring 2004, and within habitat in Autumn 2003 and 2004. We found no differences in estimated number of species between and within habitats. Ordination and cluster analysis of stands based on guilds revealed three groups: 1) eucalyptus forest stands, 2) two pine plantation stands, and 3) araucaria forest and araucaria plantation stands. We concluded that araucaria plantation is effective in maintaining spider diversity, with pines and eucalyptus also playing an important role in this kind of managed ecosystem.

56. THE NEW ZEALAND FAIRY TERN (*Sterna nereis davisae*): ENDANGERED OR COMMON? PRELIMINARY ANALYSIS USING MITOCHONDRIAL DNA. BALING, MARLEEN; Brunton, Dianne. School of Biological Sciences, The University of Auckland, Private Bag 92019, Auckland, New Zealand. m.baling@auckland.ac.nz (MB). Institute of Natural Resources, Massey University (Albany Campus), Private Bag 102-904, North Shore Mail Centre, Auckland, New Zealand. (MB, DB).

Fairy terns (*Sterna nereis davisae*) are one of New Zealand's rarest bird species, with an estimated population size of 40 individuals. Nationally listed as "Endangered", the New Zealand Department of Conservation Recovery Plan for this species has been implemented from 1997-2002, and re-assessment of this Plan is underway. Questions regarding continuation of the Recovery Plan have been raised, with particular concerns about the endemism and genetic relatedness of the New Zealand fairy tern population to the other two larger main breeding populations in Australia and New Caledonia. This study focuses on sequencing the NADH subunit 2 (ND2) region of the mitochondrial DNA, with samples collected from New Zealand, Australia and New Caledonia. We aim to elucidate the degree of gene flow, thus identifying any possible migration or isolation within and between the three populations. Knowledge of the relationship among populations will also contribute to the taxonomic status of fairy terns, either confirming or refuting the subspecies level of New Zealand fairy tern population, one of the main concerns for re-assessing the New Zealand Fairy Tern Recovery Plan.

57. OUTPUTS FROM THE ROYAL SOCIETY WORKSHOP. BALMFORD, ANDREW; Crane, Peter; Dobson, Andrew P.; Green, Rhys E.; Mace, Georgina M. Conservation Biology

Group, Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ, U.K. (AB, RG). Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, U.K. (PC). Department of Ecology and Evolutionary Biology, Eno Hall, Princeton University, Princeton, NJ 08544-1003, USA (AD). Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 2 DL, U.K. (RG). Institute of Zoology, Zoological Society of London, Regent's Park, London NW1 4RY, U.K. (GM).

At the 2002 Johannesburg Summit 190 countries endorsed a commitment to achieve, by 2010, a significant reduction of the current rate of biodiversity loss. In July 2004 the Royal Society hosted a Discussion Meeting and a workshop to review the approaches and data currently available for monitoring progress towards this target. This presentation summarises the results of that review. Most existing and proposed indicators use data collected for other purposes, which may be unrepresentative. In the short term, we need to expand the databases and improve the statistical techniques that underpin these indicators to minimize potential biases. In the longer term, indicators based on unrepresentative data should be replaced with equivalents based on carefully designed sampling programmes. Many proposed and existing indicators do not connect clearly with human welfare and they are unlikely to engage the interest of governments, businesses and the public until they do so. Most fundamentally, our understanding of the mechanisms linking the status of biodiversity, earth system processes, human decisions and actions, and ecosystem services impacting human welfare, is still too crude. Involvement of social and earth system scientists, alongside biologists, is thus a high priority.

58. TRAINING AND CAPACITY BUILDING ACROSS THE PROGRAMS OF THE WILDLIFE CONSERVATION SOCIETY: FIELD EXPERIENCES AND FUTURE DIRECTIONS. BANHAM, WILL; Penn, Meade Love. Wildlife Conservation Society, 2300 Southern Boulevard, Bronx, New York 10460-1099, USA, wbanham@wcs.org.

Long-term biodiversity conservation will only be achieved by building local capacity and support for conservation, reducing dependence on unsustainable and limited external resources. Capacity building is a key strategy of WCS. Through stand-alone capacity building projects or components within wider conservation projects, WCS supports individuals and institutions to identify, plan, implement and evaluate cost-effective conservation activities. A Training & Capacity Building Program provides centralised support, coordination and funding for scholarships, field research and NGO institutional development. A survey of WCS programs over recent years identifies varied approaches to capacity building. Individual capacity building includes curriculum development, lecturing, supervising and mentoring students, scholarships and research grants. Institutional capacity building includes technical assistance, informal and formal training, scholarships and institutional development grants. Whilst overall effectiveness is difficult to demonstrate, long-term commitment is identified as critical. For individuals, personal mentoring is important, whereas institutions require attention to the multiple interdependent components of institutional capacity. The results suggest that greater strategic prioritisation and planning, more effective use of resources and expertise through collaboration between partners, and increased attention to measuring effectiveness in terms of clear conservation impacts will be necessary before significant and sustainable capacity for biodiversity conservation is achieved.

59. FOREST FOCAL SPECIES SELECTION AND USE FOR CONSERVATION PLANNING BY MEANS OF A MULTI-SCALE ENVIRONMENTAL ANALYSIS. BANI, LUCIANO; Massimino, Dario; Bottoni, Luciana; Massa, Renato. Department of Environmental and Landscape Sciences, University of Milano-Bicocca, piazza della Scienza 1, I-20126 Milano, Italy, luciano.bani@unimib.it.

To develop a quantitative method to identify focal species by means of a multi-scale environmental analysis we used a GIS based long-term breeding bird database (Columbiformes, Coraciiformes, Piciformes, Passeriformes) in conjunction with environmental data from field surveys and land use digital maps. Focal species groups were identified on the base on their sensitivity to variables at three different scales (landscape, patch, and plot). We determined the effect on bird species abundance of: (a) landscape connectivity measured by a patch proximity index; (b) fragmentation, considering patch size and edge effects; and (c) plot forest structure. Therefore, our focal species groups represent bird communities linked to specific landscape features or di fferent bird community successions. We also assessed the effectiveness of these focal groups in forest bird conservation planning by evaluating their umbrella effect according to two different criteria for the selection of sites that should be protected, based on: (a) focal species abundance; (b) three-scale environmental suitability. Although the latter criterion is not as efficient as the former, it may be useful for conservation purpose when species abundance information is lacking or when simple guidelines for habitat management, restoration, or economic exploitation are needed.

60. INVASIVE ALIEN SPECIES IN COLOMBIA. BAPTISTE, MARIA PIEDAD; Franco, Ana Maria; Diaz, Juan Manuel. Programa Biología de la Conservación, Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Bogotá D.C., Carrera 7 # 35-20, Colombia, mpbaptiste@humboldt.org.co, amfranco@humboldt.org.co, jmdiaz@humboldt.org.co (MPB, AMF, JMD).

The presence of exotic flora and fauna species is known in Colombian ecosystems. Despite this fact, invasive species have only been studied in particular cases such as the introduction of hydrobiological species and the possible effects caused by Crazy Ant (*Paratrechina fulva*). In order to prevent and control the negative impact of invasive species in the country, the Humboldt Institute has the purpose to consolidate unified bases and establish information exchange and disclosure mechanisms on this issue. Therefore, in collaboration with other researchers we developed an informative brochure regarding some of the most troublesome exotic species in Colombia, for instance the Bullfrog (*Rana catesbeiana*), the gorse (*Ulex europaeus*) and the Crazy Ant, including photos, basic information and some of the impact of these species. Additionally, the Humboldt Institute is developing a database on invasive species distributed in Colombia, and is promoting investigations on such species. We expect this brochure to become a key tool to identify invasive species in Colombia in order to achieve a better understanding of this global problem.

61. FREQUENCY OF OCCURRENCE OF TUMORS IN GREEN TURTLES, CHELONIA MYDAS RECORD BY PROJETO TAMAR-IBAMA IN THE BRAZILIAN COAST FROM YEARS 2000 TO 2004. BAPTISTOTTE, CECÍLIA; Moreira, Luciana M. de P.; Becker, José Henrique; Lopez, Gustave; Castilhos, Jaqueline C. de; Lima, Eduardo; Grossman, Alice; Wanderlinde, Juçara; Marcovaldi, Maria Ângela. Projeto

TAMAR-IBAMA, Avenida Paulino Muller, 1111, Vitória, Espírito Santo, 29042-571, Brazil, cecília@tamar.org.br.

Fibropapillomatosis is a debilitating and potentially fatal tumor for sea turtles. First records in the Brazilian coast occurred in 1986. 4.471 green turtles (*Chelonia mydas*) were measured and examined, between 2000 and 2004, for the presence of tumors, which in field conditions were identified morphologically by visual examination. Whenever possible, samples were collected and directed for examination. 14,96% of these individuals presented tumors. Occurrence frequency of tumors by year was: 2000, 12,91%, n=604; in 2001, 14,96%, n=809; 2002, 14,79%, n=818; 2003, 19,95%, n=842; 2004, 12,95%, n=1398. Occurrence frequency of tumors in each state respectively in 2000, 2001, 2002, 2003 and 2004 was: Ceará (n=452) 0,00; 24,00; 26,83; 46,83; 34,04; Rio Grande do Norte (only 2003/2004 n=46) 50,0; 27,27; Sergipe (n = 64) 0,00; 9,09; 20,00; 9,09; 19,05; Bahia (n=1073) 10,26; 19,05; 17,01; 19,51; 10,19; Espirito Santo (n=617); 34,48; 31,63; 31,25; 17,29;15,53; Rio de Janeiro (n=126) 0,00; 0,00; 9,52; 5,26; 2,04; São Paulo (n=2093) 10,29; 9,17; 7,71; 12,84; 8,06. Available data do not indicate an increase trend in the occurrence frequency of tumors in green turtles along brazilian coast. Continuous monitoring for recording fibropapillomatosis is a necessary action for defining strategies of conservation of this species.

62. ACIYA PEOPLE AND THE DESIGN AND DECLARE AN ECA OF CA 160-180.000 HA, IN THE SOUTHERN PORTION OF THEIR TERRITORY (WHICH IS 1,220,000 HA) IN THE APAPO. BARAZANO, JESUS. Conservation International - Colombia (CI) Carrera 13 No. 71-41 Santa Fe de Bogota, Colombia.

This potential ECA is where Caparú Biological Station, managed by CI Colombia, is established, and where the most sacred site for them is - Taraira Lake -, which is also the largest lake in Colombian Amazonia, and protects various species of endangered species (e. g., *Melanosuchus niger, Arapaima gigas, Pteronura brasiliensis)*. In Caparú (from 2002 named Mosiro Itajura) we have been also establishing a training program for indigenous leaders of ACIYA. They have been trained in issues they consider important for the functioning of their organization (preparing proposals, using computers), and also issues important to closely participate in the research done at the Station by CI Colombia people and students. We recently also started working with the leaders of the organization, to promot e agreements between the 20 communities of the reserve, regarding rules for the use of wildlife and other forest resources.

63. SPATIAL DISTRIBUTION OF TWO MELASTOMATACEAE SPECIES IN A VEREDA OF CENTRAL BRAZIL: A POSSIBLE CASE OF INVASIVE SPECIES. BARBOSA-SILVA, DENISE; Rocha, Dulce M.S. Departamento de Botânica, Instituto de Biologia, Universidade de Brasília, Brasília, DF, 70.919-900, Brazil, denisebarbosasilva@yahoo.com.br (DBS). Faculdade de Ciências da Saúde, Centro Universitário de Brasília, UniCEUB, SEPN 707/907, Brasília, DF, 70.790-075, Brazil (DMSR).

Vereda is a phytophysiognomy of Cerrado Biome, characterized by hydromorphic soils saturated all year long and the presence of Xyridaceae, Eriocaulaceae, Poaceae, Cyperaceae, *Mauritia flexuosa* (palm tree) and shrubs, mainly Melastomataceae species. We analized the spatial distribution and some population structure parameters of *Lavoisiera bergii* and *Trembleya parviflora* (Melastomataceae) at the Estação Ecológica de Águas Emendadas, Planaltina, Federal District, Brazil. These species occasionally occur scattered along veredas, and at Águas Emendadas they present dense patches dominating certain areas. Three transects, 30m apart, were established cutting the vereda along its width, each subdivided in contiguous parcels of $10m^2$. All individuals (1217 *L. bergii*; 926 *T. parviflora*) inside 63 parcels were counted and had their height measured. Mean density per parcel was 1.93 ind/m^2 (S^2 =8.41) *L. bergii*; 1.47 ind/m 2 (S^2 =1.90) *T. parviflora*. Mean height 83.18cm (S=49.44) *L. bergii*; 103.57cm (S=66.14) *T. parviflora*. The correlation of number of individuals per parcel was negative and non significant (r = -0.148, p=0.251). However, their relative frequency in each parcel suggest a mutual exclusion. Both species present an aggregate distribution. This vereda is drying and this might be the reason for the population increase of these species, which might behave as invaders when habitat conditions change.

64. THE BIODIVERSTIY VALUE OF PRIMARY FORESTS, NATIVE SECOND GROWTH AND EUCALYPTUS PLANTATIONS IN AMAZONIAN BRAZIL. BARLOW, JOS; Overal, William L; Venturieri, Giorgio; Mestre, Luiz; Ferreira, Leandro; Gardner, Toby; Peres, Carlos A. School of Environmental Sciences, University of East Anglia, Norwich, NR4 7TJ, United Kingdom; Museu Parense Emilio Goeldi, Av. Magalhães Barata, 376 - São Braz, CEP: 66040-170, Belém, PA, Brasil; Embrapa Amazônia Oriental, Tv. Dr. Enéas Pinheiro s/n, C.P. 48, Belém, PA, Brasil.

Although fast-growing tree plantations and natural second-growth forests are becoming increasingly common land uses across the humid tropics, there is relatively little information on the value of these habitats for biodiversity. We sampled the vegetation and 14 faunal indicator groups in 15 sites located in the Jari region of north eastern Amazonian Brazil. Transects were placed in areas of primary forest, 13-18 year old second-growth (capoeiras) and mature (4-5 year old) Eucalyptus plantations. Although data collection is ongoing, we are able to compare and contrast the responses of three commonly used indicators of habitat perturbation and biodiversity - birds, Nymphalidae butterflies and Euglossine bees. Eucalyptus plantations with a native understorey provided surprisingly good habitats for some species within these groups, and butterfly trapping success was an order of magnit ude higher in Eucalyptus than in the other habitats. However, plantations also held very few species that were also recorded in primary forest, and native second growth forests should be considered the most attractive option for maximising the biodiversity potential for afforestation projects in degraded tropical lands.

65. USE OF LINEAR TRANSECTS FOR ASSESSING MAMMAL COMMUNITIES AND POPULATIONS: LIMITATIONS OF SHORT-TERM STUDIES. BARROS, CAMILA S.; Carvalho, Fábio M. V.; Carlos, Henrique S. A.; Fernandez, Fernando A. S.; Travassos, Leandro; Pereira, Peônia B. M.; Sandino, M. Departamento de Ecologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, CEP: 21941-590, Brazil, cbarros@biologia.ufrj.br (CSB, FMVC, FASF, LT, PBMP, MS). Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte MG, CEP: 31270-901, Brazil. (HSAC).

Linear transects, widely used for assess mammalian community composition and population abundances, have serious limitations in short-term studies. Medium-sized and large mammals were

censused within an ecological evaluation for Poço das Antas Biological Reserve, southeastern Brazil. Six transects (1-1.5km each) were sampled for 12 days at the dry and wet seasons of 2003 (154.5km distance). The species found were *Dasypus novemcinctus*, *Cebus apella*, *Leontopithecus rosa lia*, *Allouatta guariba*, *Sciurus aestuans* , *Hydrochaeris hydrochaeris* , *Nasua nasua* and *Tamandua tetradactyla*; only the first (42 sightings) was recorded more than five times. Community composition could not be reliably assessed, as 35 species known from previous studies at the reserve were not detected. Abundance could be estimated (Distance method) only for *D. novemcinctus*; for remaining species sampling error was unacceptably high. Nevertheless, many other studies with linear transects in Brazil are frailed with similar s ampling problems. For most species and habitats, sample sizes needed for reliable estimates can only be obtained with prohibitively long census distances. Linear transect sampling for mammals has often been abused, and it can generate reliable estimates only with long-term studies and for a limited cast of species and habitats, such as primates in forests, and big ungulates in grasslands and savannas.

66. THE MANAGEMENT OF MIGRATORY FISHES. BARTHEM, RONALDO; Goulding, Michael. Museu Paraense Emílio Goeldi, Belém, Brazil; University of Florida, USA.

The catch of the migratory species represents about 70-90% of the total landing in the biggest cities of the Amazon Basin. These species may be grouped into two categories: (i) the lowland migratory species, that migrate hundreds of kilometer along the lowland Amazon basin; and (ii) the Andes-estuary migratory species, that migrate thousand of kilometers between estuary and Andes. The jaraqui (*Semaprochilodus* spp.) migration in the Rio Negro are well understand, and their migratory pattern is usually a reference of the studies of others lowland migratory species. The tambaqui (*Colossoma macropomum*) migration along muddy, black, and clear waters rivers in the Madeira Basin is also well known. These species spawn in the muddy-water and its eggs-larva drift downriver up to 15 days. The down river floodplains area is their nursery zones. Others migratory characoid species show similar migration pattern. The Andes-estuary migration is a strategy adopted by at least two catfish species: dourada (*Brachyplatystoma rousseaux*) and piramutaba (*B. vaillantii*). They spawn close to the Andes area and their eggs-larva drift downriver to the estuary. The estuary is their nursery zone. The management of the Andes-estuary migration must obviously consider all Amazon Basin. In the other hand, the management of lowland migration considers only a restricted area, in general that where the local fishing fleet is fishing. However, the lowland migration behavior works like a pearl neck chain, where each pear would be a single module of migration. It module receives the adult migrating up river and the larva drifting down river. The stock depletion in several parts of the Amazon may threaten the lowland migratory species.

67. CONSERVATION AND MANAGEMENT OF THE AMAZON CATFISHES BY THE GENETIC RESEARCH. BATISTA, JACQUELINE S.; Formiga-Aquino, Kyara; Farias, Izeni P.; Bertucchi-Vogt, Naiara A.; Marão-Siqueira, Tatiana; Alves-Gomes, José A. Instituto Nacional de Pesquisas da Amazônia - INPA, Av. André Aruaújo 2936 Petrópolis, Manaus, Amazonas, Brazil, CEP: 69060-001, jac@inpa.gov.br (LTBM/COPE).

The commercialization of catfishes in the Amazon includes national and international markets; 70% of the captured species are the piramutaba (*Brachyplatystoma vaillantii*) and the dourada (*B. rousseauxii*) of the family Pimelodidae. These two species are captured by commercial and artisanal fishermen along the main Solimões/Amazonas channel. Information in DNA molecules can be used for phylogeographic and population studies as a tool for conservation and management of species. This study investigates the genetic variability of piramutaba and dourada along the Solimões/Amazonas channel, and potential differentiations of stocks for each species. Samples from 30 individuals of each species were collected at five localities along the Solimões/Amazonas channel and at five tributaries of this system. Analyses show there is no association of genetic differentiation and geographic separation of sampling localities in both species. Although not significant, the estuary region and tributary headwaters have higher genetic variability than upper Solimões. These results indicate that all regions are highly connected. The system has to be managed as a whole, conserving both the tributary headwater breeding areas and the estuary feeding area, as well as the main Solimões/Amazonas channel which serves as a corridor between these to regions.

68. STRATEGIES FOR THE MANAGEMENT OF SEDENTARY SPECIES. BATISTA, VANDICK DA SILVA. Departamento de Ciências Pesqueira, Faculdade de Ciências Agrárias, Universidade Federal do Amazonas (UFAM), Manaus, AM, 69077-000, Brazil, tchoni@uol.com.br.

Conservation of varzea environments would be facilitated if riverine people were motivated and willing to take conservation actions. However, they need to reap benefits for taking more risks and for spending more time being patrons of the floodplains and rivers. Fishes are an excellent exploitable resource. They usually are the most abundant and more fecund animals used by man, supporting even relatively intense fishing efforts. On the other hand, fish populations depend on the conservation of habitat integrity to maintain high productivity. This in particular applies to sedentary species that could give economic and social returns to riverine communities. There are many strategies that make the management of these species viable, but their application cannot be generalized due to regional differences and differences in local development. Adaptive practices are suggested as the best way to find the successful solutions to these complex problems.

69. USING DECISION THEORY IN INVASIVE PREDATOR MANAGEMENT: OPTIMAL DECISIONS FOR CONTROL VERSUS ERADICATION. BAXTER, PETER; Sabo, John L.; Wilcox, Chris; McCarthy, Michael A.; Possingham, Hugh P. School of Botany, University of Melbourne, Parkville VIC 3010, Australia, pbaxter@unimelb.edu.au (PWJB, MAMcC); Australian Research Centre for Urban Ecology, Royal Botanic Gardens, Melbourne, c/o School of Botany, University of Melbourne, Parkville VIC 3010, Australia (MAMcC, PWJB); School of Life Sciences, Arizona State University, Tempe AZ 85287-1501, USA (JLS); The Ecology Centre, Department of Zoology and Entomology, University of Queensland, St. Lucia, QLD 4072, Australia (CW, HPP); Department of Mathematics, University of Queensland, St Lucia, QLD 4072, Australia (HPP).

When complete eradication of an introduced predator is unlikely, an appropriate management objective may be to minimise the extinction threat to the native prey population, using judicious predator control. We modelled the control of an invasive predator by incorporating management strategies into a stochastic Lotka-Volterra predator-prey model. We examined three strategies: constant removal number, constant removal effort, and "trigger re-

moval", whereby managers reduce predator variance by keeping its population below a fixed threshold. The relative success of these strategies was assessed in terms of reduction in extinction risk, also considering the cost of management. The model w as most sensitive to rate of prey increase, predator attack rate and predator process error. Removal efficiency - reflecting either success in meeting removal targets, or correctly identifying resultant population levels - was also important for determining the best strategy. For example, assuming perfect removal efficiency often indicated that fixed harvest should be the best strategy, while relaxation of this assumption frequently led to trigger harvest (and occasionally fixed effort) being preferred. The results are compared with those from a stochastic dynamic programming approach, which allows for the optimal management strategies to change according to population densities.

70. AN ASSET FOR NATURE AND PEOPLES' LIVELIHOODS IN KENYA: AN ECO-BURSARY FUND FOR SECONDARY STUDENTS. BAYA, STANLEY; Thomas, Shelly L. A Rocha Kenya P.O. Box 383, Watamu 80202 Kenya (assets@arocha.org) (SB). Department of Biological Sciences, University of Maine, Orono, ME 04469, USA (ST).

For years Kenyan reserves were regarded as government property; neighboring communities had no say in the management or direct benefits accrued from the natural resources. This resulted in antagonism between conservationists and those earning their livings from these resources. The Arabuko-Sokoke Forest, the largest remnant of East Africa Coastal Dry Forest, is home to six globally endangered bird species. The forest merges with Mida Creek, a tidal inlet and roosting site for migrant birds. Together they form an UNESCO Biosphere Reserve. Famous for its birds and rare mammals, this Reserve attracts more than 4,000 tourists every year. Nevertheless, the cost of living drives families to overexploit these sites through illegal hunting, fishing, and logging. In order to link conservation and development efforts, A Rocha Kenya designed ASSETS (Arabuko-Sokoke Schools and Eco-Tourism Scheme), a programme that channels income accrued from sustainable eco-tourism to the nearby communities for secondary school scholarships. Ninety-three students from four communities are supported. This contributed to a significant change of attitude toward the Reserve from the beneficiary communities. Furthermore, students planted 17,000 trees around their homes, including 1,300 mangroves at Mida Creek. This is an excellent model for other conservation projects in Kenya and around the world.

71. A DIAGNOSIS OF USE AND CONFLICTS WITH MAN-MADE FACTORS FOR THE MARINE TUCUXI DOLPHIN IN AND AROUND A PROTECTED AREA IN SOUTHERN BRAZIL. BAZZALO, MARIEL; Flores, Paulo A.C. Ph.D. Candidate in Biological Sciences, Universidad de Buenos Aires, Argentina, mbazzalo@hotmail.com (MB). International Wildlife Coalition-Brazil, C.P. 5087, Florianópolis, SC, 88040-970, Brazil (MB, PACF).

Habitat reduction, fragmentation and loss are crucial for the conservation at both the species and population levels. Although this has been widely assessed on land ecosystems, it is less so in the marine realm were coastal cetaceans are known to suffer this threat. Herein it is applied GIS methods and other analysis to evaluate habitat conflicts for a resident, small population of the marine tucuxi dolphin (*Sotalia fluviatilis*) in and around the Environmental Protection Area of Anhatomirim (~27º30´S, 48º31´W), southern Brazil, a conservation unit of direct use. During 2001-2003 we collected data on dolphins' distribution and area use, marine mussel farms, fishery ports, fishery sites and boat traffic routes. There is high conflict in dolphins' area use and the manmade factors with reduction and fragmentation of habitat, with almost no area available only to dolphins. Fishery sites and boat traffic routes seem to be the most important factors of impact although the strong and constant increase in mussel farms deserves attention. Conservation needs and outcomes include constant, adequate enforcement of fishery, mussel farm and boat traffic regulations as well as regulating boat traffic and mussel farming in important areas not yet given specific regulations.

72. FISHBASE FOR THE AMERICAS: IMPROVING ACCESS TO BIOLOGICAL INFORMATION IN THE WESTERN HEMISPHERE. Beard, Douglas; Canonico, Gabrielle; Grosse, Andrea; Batista, Yabanex; MOSESSO, JOHN. U.S. Geological Survey National Biological Information Infrastructure (NBII), 12201 Sunrise Valley Drive, MS 302, Reston, Virginia, 20192, USA.

FishBase is an online global database containing information on over 28,500 species. The information contained on the site includes scientific and common names, pictures, references, key facts, graphs, reports, data for download, support for the parametrization of ecosystem models, and various tools such as trophic pyramids for major ecosystems. FishBase includes Western Hemisphere data, though content is incomplete for many species. For example, photos, point data for maps, and biological information are often missing. The regional use by countries participating in the InterAmerican Biodiversity Information Network (IABIN) could probably be increased if more common names used in the region were included. The National Biological Information Infrastructure (NBII) Fisheries and Aquatic Resources Node (FAR) is working with FishBase and IABIN to enhance Western Hemisphere fisheries information within FishBase by incorporating regional search capabilities, South American fisheries biodiversity maps, Columbian fisheries information, and common names in the various languages. NBII will also provide deep links to existing information in its system. NBII seeks to provide the Western Hemisphere natural resource community with better access to FishBase information, and to improve data content and data quality of fisheries and biodiversity data available to experts and lay persons.

73. ANPHIBIAN COMMUNITY STRUCTURE IN A MOSAIC LANDSCAPE. BECKER, CARLOS GUILHERME; Fonseca, Carlos Roberto. Laboratório de Interação Animal - Planta, Centro 2, UNISINOS, São Leopoldo, RS, 93022-000, Brazil, cfonseca@bios.unisinos.br.

We evaluated how the replacement of Araucaria Forest by tree monocultures affects the community structure of litter amphibians. The study was carried out in the Floresta Nacional de São Francisco de Paula (Southern Brazil) that is a mosaic landscape composed by Araucaria Forest and tree monocultures of *Araucaria angustifolia*, *Pinus*, and *Eucalyptus*. The distinctive use of these habitats by amphibian community was evaluated selecting three one-hectare areas for each habitat. In each area, five pitfall traps with drift fences were randomly installed. Bimonthly censuses were carried out from October 2003 to December 2004, with a total effort of 1440 traps. day. In total, 241 individuals of seven species were recorded; *Bufo ictericus* and *Physalaemus lisei* being the most abundant species. The diversity and species richness of amphibians were significantly higher in Araucaria For-

est and monocultures of *Eucalyptus* than in areas of *Araucaria* and *Pinus*, despite there was no difference in abundance among habitats. Species composition differed slighlty among habitats, however, mostly due to rarer species. The presence of a matrix of Araucaria Forest nearby tree monocultures tends to minimize their negative impact to the amphibian community.

74. DEERS AND PECCARY DISTRIBUTION, ABUNDANCE, AND HABITAT IN TABASCO, MEXICO. BELLO-GUTIERREZ, JOAQUIN; Guzmán-Aguirre, Carlos-Cesar; Chablé-Montero, Candelario. División Académica de Ciencias Biológicas, Universidad Juárez Autónoma de Tabasco. Km 0.5 carretera Villahermosa-Cárdenas, Entronque a Bosques de Saloya, Villahermosa, Tabasco. México. joaquin.bello@cicea.ujat.mx.

Ascertaining species distribution and abundance is basic for conservation strategies, especially in regions like Tabasco, which only maintains 2% of original plant cover, affecting large species like white-tailed deer (*Odocoileus virginianus*), brocket deer (*Mazama americana*), and collared peccary (*Pecari tajacu*). In this study, we determined these species'distribution, abundance, and microhabitat in La Sierra State Park (SSP) and Tenosique Sierra, Tabasco, located in southeastern Mexico. On 500 x 1 m transects, distribution and abundance were determined from tracks. Microhabitat characteriza tion was based on herb cover, thermic and protection cover from predators. Also we measured shrub and tree richness, density, and height. The collared peccary had the widest distribution, appearing in 12 sites of the SSP and seven in Tenosique. It was followed by the white-tailed deer and brocket deer. The most abundant species was collared peccary and the least brocket deer (P=0.001). Significant differences were found in total protective cover (P= 0.04), 100-150 (P=0.02) and 150-200 (P=0.02) strata, lowest for the brocket deer. Tree height and diversity were highest for the habitat of collared peccary (P= 0.05 and 0.007, respectively). All species use altered sites, especially collared peccary and white-tailed deer, but ones with high cover (80%), while brocket deer uses well-preserved sites.

75. PLANT DIVERSITY OF UNDERSTORY IN THREE REFORESTATION AREAS IN THE NORTH OF PARANA STATE, BRAZIL. BENATO, TAIS; Barbosa, Carlos Eduardo A.; Jardim, Pedro S.; Torezan, Jose Marcelo. Departamento de Biologia Animal e Vegetal, Universidade Estadual de Londrina, Londrina, PR, 86.051-990, Brazil, torezan@uel.br.

Forest cover in the Parana State represents less than 10% of the existent in the early 20th century. This situation difficults the regeneration of degraded lands through secondary succession, due to the lack of seed sources. In this context, reforestation programs may accelerate the process. We analyzed the success of reforested areas - understory composition and structure, and the influence of environment factors on diversity and the aspects of the ecology of the species sampled. Three reforestation areas, implanted 9, 10 and 15 years ago, were sampled, with six plots of 25 m2 each, including plants over 10 cm of height. Data over the crown cover, herb cover, light intensity and distance from fragments were collected. There were 139 species sampled, belonging to 41 families. The most common dispersion syndrome was zoochory, followed by anemochory and autochory, highlighting the importance of fauna dispersion. Within the sampled species, 73 are trees, 28 lian as and 19 bushes. There is a slight tendency of a richer understory as the herbaceous cover and the fragments distance decrease, both factors explain richness and abundance. Crown cover and light intensity were not significant to any index analyzed. Tree species were more representative, maintaining the successional process.

76. BIODIVERSITY'S NATIONAL PRIORITY IN A CLIMATE OF EVERYDAY VIOLENCE. BENJAMIN-FINK, NICOLE; Perry, Jim. Department of Fisheries, Wildlife and Conservation Biology, University of Minnesota, McNeal Hall,180, St. Paul, MN.55108, USA, benj@umn.edu.

Israel is subjected to everyday conflict, resulting in violence. Israel's society consists of a wide and fragmented range of value sets in which political and security needs take priority over sustainable development and biodiversity conservation needs. As a result, biodiversity is at considerable risk, especially endemic biodiversity. Our data come from interviews with Israeli scientists, managers of nature park reserves and upper level decision makers. Our results suggest that, there is not a strong link between biodiversity science and policy in Israel. A very small percentage of Israeli scientists report being involved in any aspect of national or subnational decision making. Our data further suggest that a small percentage of landscape management practices incorporate biodiversity management decisions. Biodiversity decision making is imbedded in religious heritage and conservation education, rather than strict biodiversity management needs. In addition, political and security agendas take priority on national decision making agenda. Biodiversity decision-making pattern is on a short time horizons and not sustainable in such a climate of everyday violence. In order to optimize long term biodiversity conservation we suggest that several relatively simple strategies would significantly tighten the link between biodiversity and science and policy.

77. CONSERVATION OF A LARGE FRUGIVOROUS MONITOR LIZARD IN THE PHILIPPINES. BENNETT, DANIEL. School of Biology, University of Leeds, UK.

Frugivory is a rare strategy amongst lizards but in the Philippines Islands a group of large (>9kg) *Varanus* lizards have evolved to be specialized frugivores in dipterocarp forest. Efforts to understand their ecology and promote their conservation have been hampered by their highly arboreal and secretive behaviour. Here I report on the behavioural ecology of a population of *Varanus olivaceus* in fragmented forest on Polillo Island, Quezon Province, Philippines, that have been the subject of a non-destructive and largely non-intrusive study instigated in 1999. Despite the large numbers of fruit types available to animals in dipterocarp forest the lizards feed mainly on fruit from just four genera They act as unique dispersers of *Pandanus* seeds which results in high densities of these plants along hillslopes and ridges, which in turn has important implications of other fauna and flora dependant on Pandanus microhabitats. Their inability to fly means that large frugivorous lizards are more vulnerable to forest fragmentation than sympatric frugivores (birds and bats), but the results of this study indicate that populations can be maintained in disturbed forest if a few key resources are maintained.

78. PROGRESS AND PRIORITIES FOR KEY BIODIVERSITY AREAS. BENNUN, LEON. BirdLife International, Wellbrook Court, Girton Rd., Cambridge CB3 0NA, UK, leon.bennun@birdlife.org.

The cataloguing of Key Biodiversity Areas (KBAs) is progressing rapidly. Having started in Europe, identification of Important Plant Areas has expanded to Africa and is being planned in the Caribbean, Pacific and central and south-east Asia. More than

7,500 Important Bird Areas have now been documented worldwide in 167 countries and territories, including new inventories for Asia (2004) and the Tropical Andes (2005). Alliance for Zero Extinction sites, which hold the last populations of highly threatened species, and form a significant subset of KBAs, have been catalogued gl obally for terrestrial vertebrates. Many other initiatives are also underway, but considerable challenges remain. There is need to test standardised criteria and guidelines across a wider range of taxa, in aquatic as well as terrestrial systems, and for a global mechanism to co-ordinate this. The completeness of KBA networks identified using one or a few taxa needs investigation. Beyond documentation, there is need for building further global recognition of the KBA concept and resourcing for KBA conservation; embedding the KBA approach in national and regional gap analysis and conservation planning; setting priorities among KBAs for urgent conservation action; and moving forward nationally-led processes of constituency-building, safeguard and monitoring for these important sites.

79. COMPAIRING THREE DIFERENT SAMPLING METHOS TO SURVEY BATS IN SOUTHEASTERN BRASIL. BERGALLO, HELENA G.; Esbérard, Carlos E. L. Departamento de Ecologia, IBRAG, Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier 524, 20559-900, Rio de Janeiro, Brazil.

Use of the estimated number of species allows the calculation of how much of the observed represents the local fauna, while the species accumulation curves can be a measure of completeness of any sample or the efficiency of the method used. To determine what methods were more adequate, three methods of sampling bats were used: (i) mist nets opened all night, (ii) mist nets opened six hours each night, and (iii) mist nets opened all night combined with active search for roosts. The surveys are performed in southern portion of Rio de Janeiro state, where 31 species was recorded. The accumulation curves showed that the addition of new species was enhanced by sampling with nets opened 12 hours, if the nights unit was used, but with similar velocity obtained by nets opened six hours each night, if the hours unit was used. The expect number of species for both methods with long sampling periods were over 80% and with survey with roosts sampling and few nights in each local showe d only 67% of the expected species. The method to be used must be chosen based in how much time is available.

80. EFFECT OF PROPAGULE SIZE AND LANDSCAPE STRUCTURE ON MORPHOLOGY AND ASYMMETRY IN INTRODUCED BUSH-CRICKETS. BERGGREN, ÅSA. Department of Entomology, PO Box 7044, Swedish University of Agricultural Sciences, SE-75007 Uppsala, Sweden.

Conservation efforts involving population introductions and translocations have an inherent problem of small initial populations; these founding populations are likely to have reduced genetic variability. This may manifest phenotypically through changes in individual morphology or changing susceptibility to environmental stressors. I examined population and landscape effects on the morphology and fluctuating asymmetry in 584 Roesel's bush-crickets (*Metrioptera roeseli*) from 29 populations established from different propagule sizes. The introduction sites differed in connectivity and amount of surrounding suitable habitat. Individuals were caught up to 9 years after the initial introduction, and five different morphological traits were measured. All introduced individuals originated from the same population and individuals from this source populatio n were also collected for comparison in the analyses. Male body weight and female body length were positively affected by initial population size and degree of connectivity of the introduction patch. Degree of isolation was correlated with asymmetry in male tibias. Small propagule sizes and habitat isolation are both likely to have resulted in decreased genetic diversity, the latter by reducing population sizes through decreased survival. These results show the importance of both large propagule sizes and good connectivity of habitats when introducing populations.

81. WHAT MAKES COMMUNITY-BASED CONSERVATION WORK? BERKES, FIKRET. Natural Resources Institute, 70 Dysart Road, Uinversity of Manitoba, Winnipeg, Manitoba, R3T 2N2, Canada, berkes@cc.manitoba.ca.

Commons research evolved through the critique of the "tragedy of the commons" model to document self-organization and self-regulation capabilities of communities. Common property theory can make robust predictions about conditions for management success in isolated communities. However, it is limited in its ability to deal with most cases of community-based conservation in which the local community is impacted by a diversity of outside factors. How well local-level institutions perform depend on external drivers and linkages with institutions at other levels. Thus, building theory for community-based conservation requires an understanding of commons as complex systems, with attention to scale, self-organization and other characteristics of complex adaptive systems. An international program wi th hundreds of cases, the UNDP Equator Initiative (EI), provides a set of examples to explore conditions of success for integrating conservation with development. We have been examining EI cases for lessons learned, with particular attention to linkages and networks. In particular, we pay attention to institutional interplay in which institutions at different levels interact horizontally (across space) and vertically (across levels of organization). The preliminary results indicate that successful conservation/development projects typically involve partnerships across four levels of organization and a multiplicity of partners with different functions.

82. BIODIVERSITY CORRIDORS AND THE CONSERVATION OF VÁRZEA ENVIRONMENTS. BERNARD, ENRICO; Barbosa, Luis C.F.; Silva, José Maria C. Conservação Internacional Brasil, Escritório da Amazônia, Av. Nazaré 541, sala 310, Belém, PA, 66035-170, Brazil, e.bernard@conservacao.org (E.B.).

The Amazonian várzeas are extremely dynamic, involving large-scale ecological processes and a high biodiversity. In the Brazilian Amazonia, várzeas can cover 500000 km^2, with most of the fishing resources and human populations. The cycling flooding processes significantly shape the geomorphology and exert control over the biota and the landscape use. The extension, complex interactions and the increasing human pressures poses a scientific challenge: How to manage várzeas in a sustainable way? Part of the answer lies in the adoption of a large-scale management system with enough flexibility in the location of zones of use and protection to incorporate the dynamics of the várzeas. Currently, there are 108 conservation units related to várzeas, 35 of strict protection (171356 km^2), 73 of sustainable use (339117 km^2), heterogeneously distributed, most covering just small fraction s of várzeas (24172 km^2 effectively), and import rivers (e. g. Madeira, Javari, and Purús) have no strict reserve at all. We propose a model based on the concept of biodiversity corridors, with focus on connectivity. Corridors should be designed for following strictly the major

migratory routes of várzea animals, such as waterbirds and fishes. Protected areas should be, mostly, of sustainable use, with more flexibility to change their management regimes according to the ecosystem dynamics.

83. HUNTING EFFECTS ON THE VIABILITY OF JACUTINGA POPULATION (*Aburria jacutinga*, CRACIDAE) IN A LAND-BRIDGE ISLAND IN THE ATLANTIC FOREST. BERNARDO, CHRISTINE S. S.; Galetti, Mauro; Brito, Daniel; Cruz Neto, Ariovaldo; Azeredo, Roberto M.A. Laboratório de Biologia da Conservação, Departamento de Ecologia, Instituto de Biociências, Universidade Estadual Paulista, campus Rio Claro, Av. 24-A 1515, Rio Claro, SP, 13506-900, Brazil, christinesteiner@yahoo.com.

The Jacutinga *Aburria jacutinga* is an endemic cracidae of Atlantic Forest and threatened, due to habitat destruction and hunting pressure. The Ilha do Cardoso State Park is an area of Atlantic Forest, located in the southeastern coast of Brazil. In this land-bridge island we estimated a population of 132 individuals (ranging from 99 to 176 individuals) throught 273.05 km line transects. Jacutingas are hunted by inhabitants of the island and people that come from other near cities, although poaching is illegal. The aim of this study was to assess extinction probability of the Jacutinga population at Ilha do Cardoso, by considering different hunting scenarios (0, 10, 20 and 30% of jacutingas killed per year). We used the software VORTEX 9.33. The baseline scenario, which was the most optimistic model, considered low annual mortality rates (10%), high carrying capacity (K=1774 individuals) and high effective population size (Ne=64%). Under the baseline scenario there is 99% of extinction probability if 20% of total individuals are hunted per year. Taking into account unknown factors like inbreeding depression and catastrophes, for example, the extinction probability would likely be higher than the present estimates. The conservation status of *Aburria jacutinga* at Ilha do Cardoso is critical mainly due to its small population size, and even low levels of hunting pressure negatively affects the viability of its population.

84. ASSEMBLING SPIDER DIVERSITY CORRELATED WITH THREE PYSIOGNOMIES OF CERRADO IN ITIRAPINA ECOLOGICAL STATION (IES), BRAZIL. BERTIM, CARLOS. R. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, Rua do Matão 321- travessa 14, 05508-900, Brazil, crbertim@ib.usp.br.

Little is known about spider assemblages of the Cerrado. I tested the hypothesis that species richness is positively correlated with the habitat's structural complexity. I quantified species richness and relative abundance in three different Cerrado physiognomies in IES, between May 2001 and May 2002 using pitfall traps. I recorded 106 species in thirty-two families. Thirty-four species were found exclusively in the only *cerrado sensu stricto*; 18 species in *campo sujo* and 10 species in *campo cerrado*. I found the lowest diversity in *cerrado sensu stricto* (richness level = 69 species and dominant 12%; N = 414), followed by the; *campo cerrado* (49 ssp. and 23%; N = 387) and the *campo sujo* (55 ssp. and 40%; N = 724). Species richness and absolute abundance invariably increased with fragment size and IES shower different size in physiognomies. Rarefaction analyses indicated that the most structurally complex physiognomy, the *cerrado senso stricto*, showed the most diverse fauna (67 ± 1, 5 ssp. and 12%; N=387) and the *campo sujo*, with minor structural complexity, showed the least diverse (44 ± 6 ssp. and 40%; N = 387), corroborating the hypothesis of a positive correlation.

85. MAINTAINING ECOSYSTEM FUNCTIONING: CHANGES IN LAND USE AND EFFECTS ON HYDROLOGY. BEZERRA, LILIANE; Oliveira, Rafael; Klink, Carlos. Departamento de Ecologia, Instituto de Biologia, Universidade de Brasília, Brasília, DF, 70919-900, Brazil, lils@unb.br.

Large expanses of natural Cerrado vegetation have been transformed from a mixture of trees and grasses into planted pastures cultivated with African grasses. Water is a key resource in tropical savannas; thus, the reduction in tree density may affect the availability and the flux of water through Cerrado ecosystems. This study followed the spatial distribution and the plant available water (PAW) temporal dynamics and estimated evapotranspiration (ET) in Cerrado ecosystems of contrasting woody species densities and in a planted pasture with Brachiaria Brizantha in Central Brazil. Seasonal dynamics of plant available water at different soil depths and evapotranspiration in and in the planted pasture exhibited different patterns of soil water extraction that were reflected in different evapotranspiration rates. Pasture PAW storage change - whose activity was almost limited to the rain season (84%) - was greater than in Cerrado ecosystems. Planted pasture annual ET also surpassed that of the Cerrado ecosystems by 18-20%, equaling the total rainfall of the period. Based on this result, we speculate that the current shift in Brazilian savannas to grass-dominated ecosystems may cause a reduction in soil water recharge and in soil plant-available water.

86. SPAWNING AND RECRUITMENT OF THE REEF-BUILDING CORALS, *Pavona clavus* AND *Pavona gigantea* IN CULEBRA BAY, COSTA RICA: LEARNING FROM THE NEXT GENERATION. BEZY, M. BERNADETTE; Cortés, Jorge. Centro de Investigación en Ciencias del Mar y Limnología, (CIMAR), and the Escuela de Biología, Universidad de Costa Rica, San José 2060, Costa Rica, mbezy@biologia.ucr.ac.cr.

Last year (2004) a *Pavona* dominated patch reef in the tropical eastern Pacific was impacted by red tides, anchor damage, cold upwelling and warm waters. Many of these disturbances are natural, presenting a peculiar management problem for a growing tourist area. In this study, reproduction research on *Pavona clavus* and *Pavona gigantea* is used to quantify reef recovery potential and advise restoration. During two of twelve months *P. clavus* spawning was documented. These observations, new to science for this species, demonstrate reproductive capabilities despite compromised reef health. However, recruitment is extremely limited (0.007/m^2); *Pavona* does not appear to be sexually self-replenishing. Survival rates of those colonies that did settle (n=39) vary among species and size classes. This could be a "refuge in size" effect for *P. gigantea*, where zero new recruits (diam. 1-4 cm) survived, and no mid-size recruits (4-8cm) were found; yet, juveniles (8-15 cm) experienced 100% survival. By contrast, 97% *P. clavus* new recruits, 100% mid-size recruits, and 100% of juveniles survived. Therefore, to mitigate natural disturbance impacts in Culebra Bay, conservation should incorporate a known spawning center, and restoration (through nubbin transplantation or recruit cultivation) should employ >10 cm-diameter *P. gigantea* and >1 cm-diameter *P. clavus*.

87. "SHRINKING HOME": HOW DOES HABITAT FRAGMENTATION AFFECT BROWN HOWLER MONKEYS' (*Alouatta guariba clamitans* CABRERA, 1940) LIFESTYLE? BICCA-MARQUES, JÚLIO CÉSAR. Faculdade de Biociên-

cias, Pontifícia Universidade Católica do Rio Grande do Sul, Av. Ipiranga 6681, Porto Alegre, RS 90619-900, Brazil, jcbicca@pucrs.br.

Brown howlers are known for their ability to survive in both intact and disturbed habitats of varying size. Although they have been the focus of a considerable research effort throughout their distribution, whether their ecology and behavior vary accordingly to the size of the available habitat is unknown. Here I present the results of a metanalysis involving 13 long-term researches on the effect of habitat fragmentation on their use of space, diet composition, and activity budget. Specifically, I determined through regression analysis whether logged forest fragment size predicts home range size, daily path length, diet diversity, contribution of leaves, fruits, and flowers to the diet, and time spent resting, feeding, and moving. Though several of these variables showed a large variation, fragment size predicted only the number of plant species used as food sources (r^2 =0.515, n=10, F-ratio=8.494, p=0.019). As forest fragments shrink so do their plant diversity and the howlers' menu. In conclusion, brown howlers cope with increasing habitat fragmentation without showing directional changes in most aspects of their ecology and behavior. However, they are not safe in fragments on a long-term basis because of their higher vulnerability to hunting, predation, diseases, food shortages, and inbreeding depression in these habitats.

88. LEAF-LITTER ANTS AND THE CONSERVATION PRIORITIES IN THE ATLANTIC RAINFOREST OF NORTH-EASTERN BRAZIL. BIEBER, ANA G.; Darrault, Olivier P. G.; Ramos, Cíntia C.; Melo, Keila K.; Leal, Inara R. Departamento de Botânica, Centro de Ciências Biológicas, Universidade Federal de Pernambuco, Recife, PE, 50.670-901, Brazil, gabieber@hotmail.com.

The Atlantic rainforest in the North of São Francisco River, known as Pernambuco Center of Endemism, is considered the most endangered and less known part of this hotspot. Three sites in Northeastern Brazil (Reserva Ecológica de Gurjaú and R. P. P. N. Frei Caneca, in Pernambuco, and Usina Serra Grande, in Alagoas) were chosen for an inventory of leaf-litter ants, and four remnants were selected in each site. We collected ten 1m² leaf-litter samples, in each remnant. Ants were extracted from leaf-litter by using Berlese funnels, identified until genus level and then sorted into morphospecies. Collections were repeated during four months in 2003. A total of 176 species was collected; Frei Caneca's remnants were the most species rich and Gurj aú's remnants were the poorest. A strong positive correlation was observed between ant diversity and altitude and area of the remnant. The remnants of Frei Caneca and Usina Serra Grande presented more species considered as indicators of well-conserved areas. These results show a strong correspondence with inventories realized in the same areas using other organisms, such as ferns, bromeliads, birds and mammals, confirming the importance of ants for performing biodiversity programs. We strongly recommend directing conservation efforts to Frei Caneca and Usina Serra Grande.

89. THE INSTITUTIONS, DYNAMICS AND IMPACTS OF COMMUNITY-BASED AVI-TOURISM CONSERVATION DEVELOPMENT INITIATIVES. BIGGS, DUAN. Percy Fitzpatrick Institute of African Ornithology. University of Cape Town. Private Bag, Rondebosch, 7701. Cape Town, South Africa; Conservation and Ecotourism Development, BirdLife South Africa and the Endangered Wildlife Trust Blue Swallow Working Group.

Integrated Conservation and Development Projects (ICDPs) with a strong community and birding (avi)-tourism component have become increasingly numerous in Sub-Saharan Africa, and particularly in South Africa in recent years. These projects attempt to strengthen conservation and add value to biodiversity by training and developing local birding and eco-guides. The author developed an institutional framework and conducted an analysis of the dynamics and key drivers of two of these initiatives in South Africa. The presence of a motivated individual/s who drive/s and supports the project in the long term is a critical driver of success. Projects were shown to be potentially negatively impacted by external forces, such as projected global climate change impacts and shorter term economic drivers such as exchange rate volatility. An assessment of the economic viability of one such project in South Africa indicated an annual demand of US$ 16189.60 for the services of guides at a site from 2197 potential visitors. An exploratory analysis eight projects in Southern and East Africa indicated an overall perception among stakeholders, project workers and beneficiaries that these projects are successful in achieving the integrated objectives of biodiversity conservation (76.46%), sustainability (92.59%) and empowerment (94.44%).

90. ASSESSING THE IMPACT OF FRAGMENTATION OF *Araucaria angustifolia* FOREST (BRAZIL) IN LANDSCAPE, BIODIVERSITY AND GENETIC LEVELS. BITTENCOURT, JULIANA V. M.; Higa, Antonio R.; Griffths, Geoffrey H. The University of Reading, Department of Geography, Reading, RG6 7AB, UK, sgr02jvb@reading.ac.uk (JVMB, GHG). Federal University of Paraná, Forest School, Av. Lothario Meissner, 3400, 80210-170, Curitiba, PR, Brazil (ARH).

Araucariaforest is one of the most important biomes occurring naturally in southern Brazil. The extensive logging and agricultural expansion of the last decades have resulted in significant fragmentation of the forest cover. The objective of this study is to assess population level genetic structure and dynamics of the *Araucaria angustifolia* in remnant patches, with different levels of human modification. Landscape ecology principles in combination with information on genetic structure and composition of sampled *A. angustifolia* forest, are being used to improve our understanding of the impact of fragmentation and to guide policies for habitat protection and restoration. Temporal analysis of Landsat satellite imagery (1977 and 2003) has shown that the plots studied were originally connected and that the landscape was a matrix of forest interspersed with patches of agricultural land. By the later date in 2002 the opposite was evident, with small patches of forest within a matrix of agricultural land. The effects of selective logging and fragmentation and its longer-term consequences are a priority for the development of effective conservation policies.

91. EFFECTS OF EXOTIC MAMMAL PREDATORS ON ISLAND BIRDS. BLACKBURN, TIM; Cassey, Phillip; Duncan, Richard; Evans, Karl; Gaston, Kevin. School of Biosciences, University of Birmingham, Edgbaston, Birmingham, B15 2TT, UK. t.blackburn@bham.ac.uk (TB, PC). Bioprotection and Ecology Division, P.O. Box 84, Lincoln University, Lincoln, New Zealand and Landcare Research, P.O. Box 69, Lincoln, New Zealand (RD). Department of Animal and Plant Sciences, University of Sheffield, Sheffield, S10 2TN, UK (KE, KG).

Exotic mammal predator species have been introduced to many islands around the world, with significant negative consequences for the native faunas of those islands. I use data on the number of exotic mammals established on a sample of >200 oceanic is-

lands following European colonisation to show that: (1) islands with more exotic predatory mammal species have subsequently lost larger proportions of their native avifauna; (2) the impact of these mammals has been greater on island endemic species than on species with a continental population; (3) the functional diversity of predatory mammal species is not a better predictor of extinction probability than species number; (4) islands with more exotic predatory mammal species have lost more avian phylogenetic diversity than expected, controlling for the number of species extinctions; and (5) exotic bird species populations are less successful at establishing on islands with more exotic predatory mammal species. The conservation imp lications of these results are obvious.

92. REGIONAL SURVEYS MAP THE FOREST ELEPHANT CRISIS IN CENTRAL AFRICA. BLAKE, STEPHEN; Maisels, Fiona; Ilambu, Omari; Bokoto, Bruno; Mkokmbo, Calixte; Boudjan, Patrick; Bene-Bene, Lambert; Williamson, Liz; Bayogo, R. Wildlife Conservation Society, 2300 Southern Boulevard Bronx, 10460, USA.

Anecdotal and limited scientific evidence indicate strongly that central Africa's forest elephants are in the midst of a dramatic decline due to illegal killing for ivory and meat, and habitat fragmentation. The last regional inventory was published over 15 years ago, and current rigorous, science-based field inventories are immediately required to provide unambiguous information for conservation planning at all scales. We report on a region-wide systematic survey of elephants conducted under the auspices of the Monitoring of the Illegal Killing of Elephants Program (MIKE), centered on a suite of 6 critically important protected areas. The abundance and distribution of both forest elephants and human activity were quantified to inform conservation planning and implementation, and as a baseline for long-term monitoring. Field methods involved elephant dung and human sign counts on systematically distributed line-transects, and path of least resistance "reconnaissance" surveys. Analysis involved abundance estimation, distribution mapping from simple interpolations, and advanced spatial modeling. Results demonstrate that 1) the anecdotes were well-founded - forest elephants are in crisis, 2) complimentarity within the suite of survey methods provided compelling results of direct use at site, national, and international levels, 3) appropriate inventory and monitoring are essential to conservation planning and adaptive management.

93. BUILDING AN ALLIANCE OF PHILIPPINES' SUBSISTENCE FISHERS FOR MARINE CONSERVATION. BLANCO, AMADO P.; Auxilio, Perfecto G.; Vincent, Amanda C.J. Project Seahorse Foundation for Marine Conservation, 222 First Street, Happy Valley Subdivision, Guadalupe, Cebu City, Philippines 6000, a.blanco@projectseahorse.org.ph (AB, PGA) Project Seahorse, Fisheries Centre, The University of British Columbia, 2204 Main Mall, Vancouver, B.C., V6T 1Z4, Canada, a.vincent@fisheries.ubc.ca (AV).

Some of the poorest fishers in a poor country are finding their voice through collective action. The story of how their alliance, KAMADA, took shape reflects an evolution of community-based management from the very local to the much more regional. We have spent ten years catalysing marine conservation initiatives in Danajon Bank in the central Philippines. From this work, we have realised that a combination of village-level community organizing and regional alliance building can foster broad participation in fisheries and coastal management. As local people progressed from working within a village, to co-operating across a small island, to collaborating among islands, they undertook larger and more diverse activities. The momentum of this organizing approach re sulted in the formation of KAMADA, a subsistence fishers' alliance operating along the entire 145 km long double barrier reef. It has now established affiliates in 20 coastal villages, assuming responsibility for generating and sustaining local initiatives. KAMADA and its local chapters are committed to sustainable fisheries, no-take marine protected areas, new livelihood options, better coastal law enforcement, improved local governance, and enhanced internal strengths and abilities. They have also managed to attract national media attention to help argue their positions and challenge problem policies.

94. BATS ON THE BRINK: CONSERVATION OF SEYCHELLES CRITICALLY ENDANGERED SHEATH TAILED BAT (*Coleura seychellensis*). BLYTH, ANDREW; Bradford, Timothy; Burthe, Sarah; Craig, Louise; Downes, Nick; Laing, Sinclair; Marshall-Ball, Lorraine; McGowan, Denise. The World Land Trust, Blyth House, Bridge Street, Halesworth, Suffolk, UK, IP19 8AB, andygblyth@hotmail.com.

Coleura seychellensis (Seychelles Sheath-tailed bat) has undergone a severe decline over the past decades. The species is now critically endangered. Ecological and distributional data were collect to allow a conservation action plan for the species. Bats were found only on the west coast of Mahe. No bats were established on Praslin or La Digue.*C. seychellensis* is only found near the coast, where two previously unknown roosts were discovered. Bats used roads and the edges of coastal forest as commuting and foraging areas. Emergence counts confirmed the existence of 19 bats, at three roosts, however these figures are likely to underestimate the real number of bats in each roost. Faecal analysis revealed that *C. seychellensis* consumes prey mainly from the orders Coleoptera, Lepidoptera and Diptera, feeding mainly on Coleoptera. It is thought that *C. seychellensis* feeds upon prey opportunistically. Insect sampling showed a greater insect abundance at bat foraging sites. Human development and the tourism industry threaten the survival of the species. Past pesticide use and predation from the introduced Barn owl may have caused the rapid decline. Protection of foraging habitat and roosts sites is required to save this species.

95. THE MANAGEMENT OF ARTIFICIAL NESTS IN THE CONSERVATION OF THE RED-TAILED AMAZON PARROT (*Amazona brasiliensis*). BÓÇON, ROBERTO; Sipinski, Elenise A. B.; Kawai, Artur.; Rivera, Rafael de. SPVS - Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental, Rua Gutemberg, 296, Curitiba, PR, CEP 80420-030, Brazil, Amazona@spvs.org.br.

The Brazilian Atlantic Forest depicts today about 7% of its original cover. The environmental alterations this biome has suffered have affected the survival of several bird species, among which the red-tailed Amazon parrot (*Amazona brasiliensis*), an endemic and endangered species that nests preferably in natural hollows in dead or living trees. The indiscriminate removal of such trees has interfered with its reproduction, causing pressure on its population. This work intends to install artificial nests for the maintenance of the species population in the region of Guaraqueçaba, Paraná - Brazil. Wooden nests with the dimensions of 79 cm high, 48 cm deep, 15x16 cm of opening diameter and with internal dimensions of 20x16 cm have been built. In the breeding season of 2003/2004, 15 nest-boxes have been installed, with an occu-

pation rate of 86,6%. In the breeding season of 2004/2005, 26 nest-boxes have been installed, with an occupation rate of 54%. These are considered high rates when compared with experiments involving other psittacidae. The success in the occupation of the artificial nests in the reproduction sites of the *Amazona brasiliensis* has proved a viable and efficient strategy in the conservation of the species.

96. A NEW MSC COURSE IN CONSERVATION BIOLOGY AND WILDLIFE MANAGEMENT IN CHILE. BONACIC, CRISTIAN. Fauna Australis, Natural Resources Program, Faculty of Agriculture and Forestry Engineering, Pontificia Universidad Catolica de Chile, Casilla 306, correo 22, Santiago, Chile.

In 2004, a new MSc program was created in the Faculty of Agriculture and Forestry Science of the Pontificia Universidad Catolica de Chile (PUC) named Master of Science in Conservation Biology and Wildlife Management. This two year course is oriented around building up local capacity in Chile by training in applied conservation work, as well as wildlife management. Chile is well-known as an aggressive economy, based on exportation of agriculture, fisheries and forestry products and a traditional approach to conservation, based only within natural protected areas. This MSc course aims to train agronomists, forestryengineers and other professionals to include conservation within the economic equation for sustainable development. Lectures and practical work are aimed to increase understanding of the benefits that a healthy environment could provide for agricultural production. Good agricultural practices, sustainable forestry exploitation, alien species control and private protected areas management are in the forefront of the course syllabus.

97. THE STATUS OF UNIVERSITY AND APPLIED CONSERVATION BIOLOGY TRAINING IN ARGENTINA. BORDINO, PABLO. AquaMarina-Centro de Estudios en Ciencias del Mar, Del Sauce 748 (7167) Pinamar, Buenos Aires, Argentina, bordino@aquamarina.org.

The potential role that Conservation Biology has played in the modern world during the last three decades is just being analyzed and understood in developing countries. Because the lack of economic and human resources, but also a general lack of commitment, the management of natural resources are inefficient in Argentina. As a consequence, academic graduate programs or even undergraduate courses in Conservation Biology are limited to only a few universities. However, an increasing number of researchers, and specially a critical mass of students have shown interest in this discipline during the last decade. Using library and internet resources, and conducting interviews with educational authorities and scientists, the role of local universities to develop applied Conservation Biology was analyzed. In Argentina, a total of 33 universities include programs in natural sciences. Although Ecology and Biodiversity are important issues, only three include Conservation Biology as a discipline in their official programs. Conservation Biology is not currently considered a new science by academia. There exists need to develop pragmatic approaches to the study of the environment in Argentina. The implementation of Conservation Biology within academic programs is a challenge that both the local authorities and the scientific community should face promptly.

98. THE SCIENTIFIC AND POLITICAL EVOLUTION OF A LANDSCAPE SCALE CONSERVATION PROGRAM. Bormann, Lincoln; FREEMAN, EDWARD; Sutton, P. Eric. The Nature Conservancy, 1413 Blvd. of the Arts, Sarasota, FL 34236 USA (LB, EF), bormann@tnc.org; Sarasota County Natural Resources, 2817 Cattlemen Road, Sarasota, FL 34232 USA (PES).

Sarasota County, Florida (1,878 km^2) is an important site for a number of rare ecological communities and species including the Florida scrub jay and panther. However, the county is also one of the fastest urbanizing areas of the U. S. Recognizing the need for conservation of these species and communities, in 1992, a group of citizens first proposed a program to preserve high quality natural areas. This program was developed based on accepted conservation biology principles at the time, but also incorporated the political bias of an elected county commission. Additionally, priority areas were selected without GIS technology or detailed information on some species. The resulting priority map focused on themes such as geographic contiguity and rare community types, but also on maintaining open space in more developed areas. The program has been very successful over its first five years, acquiring or protecting over 6,400 ha, particularly in a primary core area. Over time, however, rapidly increasing land values coupled with a better understanding of natural systems and population dynamics of rare species, have altered the emphasis of the program. Consequently, efforts have shifted from a “scatter shot” approach to one with clearer biological and ecological objectives and more tightly focused priorities.

99. STRUCTURAL CONNECTIVITY EFFECTS OVER THE INCIDENCE OF THREE COMMON ATLANTIC FOREST BIRD SPECIES. BOSCOLO, DANILO; Metzger, Jean Paul. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo - USP, Rua do Matão, trav. 14, nº 321, Cid. Universitaria, São Paulo, Brazil, zip: 05508-900 (DB, JPW), danilob@ib.usp.br (DB).

At highly fragmented landscapes, structural connectivity is reduced, hindering the migration of individuals between remaining patches. This can lead to several unsuccessful recolonization events, increasing local extinction and reducing species incidence and persistence. Our objective was to identify if the landscape´s structural connectivity affects the incidence of three common Atlantic Forest bird species (*Chiroxiphia caudata*, *Pyriglena leucoptera* and *Lepdocolaptes fuscus*) living in fragmented habitat. Two distinct landscapes were chosen. One with higher structural connectivity that presents 30% of forest cover and another one significantly less connected ($p<0.001$), with 14% of forest. The presence of the species was attested by playback surveys at 20 fragments per landscape. Birds were more frequent at the higher connected landscape (91.23% of incidence) when compared to the lower connected one (41.67%). The incidence of *C. caudata* at the second landscape decreased 25% while for each one of the two remaining species it decreased around 60%. Low structural connectivity seemed to directly affect the occurrence of these birds. Even common birds may present restrictions to disperse through the matrix when living in a poorly connected landscape. In these situations, conservation priorities should focus mainly on connectivity restoration in order to allow long term persistenceof the species.

100. LAUNCHING INTERDISCIPLINARY TEAM-BASED PHD TRAINING IN CONSERVATION BIOLOGY AND SUSTAINABLE DEVELOPMENT AT THE UNIVERSITY OF IDAHO AND CATIE. BOSQUE-PEREZ, NILSA; Waits, Lisette P.; Force, JoEllen; Eigenbrode, Sanford; Brunsfeld, Steve; Wulfhorst, Jeffry; McDaniel, Paul; Boll, Jan; Harvey, Celia A.; Finegan, Bryan; Stoian, Dietmar. Department of Plant,

Soil and Entomological Sciences, University of Idaho (NBP, SE, PM);Department of Fish and Wildlife, University of Idaho, Moscow Idaho, D 83844-11 36 USA (LW); Department of Forest Resources, University of Idaho (JF, SB); Department of Biological and Agricultural Engineering, University of Idaho (JB); Department of Agricultural Economics and Rural Sociology, University of Idaho (JW); Tropical Agricultural Research and Higher Education Center, 7170 Turrialba Cartago, Costa Rica (CH, BF, DS).

To achieve biodiversity conservation and sustainable production in anthropogenically fragmented landscapes, scientists need to be trained in a holistic fashion that emphasizes interdisciplinary collaboration. Traditional graduate programs in conservation biology, forestry, and agriculture fall short of this goal as they train scientists with research skills in narrowly defined disciplines and rarely, facilitate integration across disciplines. We present a National Science Foundation funded experiment in graduate education that develops and evaluates an integrative educational model with an emphasis on developing interdisciplinary research skills and knowledge in the biological, physical and social sciences. This educational program involves researchers from seven departments and two colleges at the University of Idaho plus two research areas at the Tropical Agricultural Research and Higher Education Center (CATIE) in Costa Rica. Eighteen PhD students are currently working in 5 interdisciplinary teams addressing research questions in conservation biology and sustainability of agricultural and forestry production in temperate and tropical ecosystems. The structure, challenges and successes of this new graduate program will be highlighted.

101. ECOLOGY AND CONSERVATION OF THE NORTHERN MURIQUI (*Brachyteles hypoxanthus*) AT ESTAÇÃO BIOLÓGICA DE CARATINGA (EBC), MG, BRAZIL. BOUBLI, JEAN P.; Pontual, Francisco; Santos, Fabiana C.; Strier, Karen B. Conservation and Research for Endangered Species, Zoological Society of San Diego, CA, USA, jpboubli@yahoo.com (JPB). Estacao Biologica de Caratinga, MG, Brazil (FBP, FCS). Department of Anthropology, University of Wisconsin - Madison, WI, USA (KBS).

The 990 ha disturbed secondary forest fragment of EBC supports some 226 muriquis, representing the highest known density for the species. We investigate the ecological basis for this high density and describe our habitat regeneration and sustainable development project. Despite its disturbed state, results from our 5 ha botanical sampling show that tree diversity at EBC is relatively high (150 species/ha) including a large number of climax species. Our feeding data, indicate that the high density of muriquis is partly due to muriquis' opportunistic feeding on a combination of leaves and fruits from pioneer and climax species. To insure the continu ed growth of this population, we are planting 16,000 saplings on abandoned pasture areas around EBC and placing a 10 km fence. We have received volunteer help from neighboring farmers that have learned to understand the importance of habitat preservation, not only for the sake of the muriqui, but also for the productivity of their farms. We hope to develop a basis for habitat regeneration in the region that can be used to implement a much larger project of CI-Brasil to connect the largest remaining tracts of Atlantic Forest of Minas Gerais and Espirito Santo by means of regional-scale corridors.

102. GETTING AHEAD OF THE CURVE: IDENTIFYING OPPORTUNITIES FOR PROACTIVE CONSERVATION. BOUCHER, TIMOTHY M.; Jennings, Michael; Molnar, Jennifer L.; Hoekstra, Jonathan M. The Nature Conservancy, Global Priorities Group, 4245 N. Fairfax Drive, Suite 100, Arlington, VA 22203 USA (TB), tboucher@tnc.org. The Nature Conservancy, Global Priorities Group, 530 S. Asbury, Moscow, ID 83843, USA (MJ). The Nature Conservancy, Global Priorities Group, 217 Pine St., Suite 1100, Seattle, WA 98101, USA (JM, JH).

In many of the world's terrestrial ecoregions, the extent of habitat loss is so great and the extent of habitat protection so limited that we risk losing species and even entire ecosystems. To avert such ecological crises, conservation needs to "get ahead of the curve" to protect biodiversity against ongoing habitat loss, fragmentation and associated threats. The best opportunities for proactive conservation are likely to be found in regions where current biodiversity conditions are still relatively good yet there is limited habitat protection and high threats. We summarized indicators of biodiversity condition, habitat protection and degree of threat for terrestrial ecoregions around the world, and juxtaposed these global maps to identify ecoregions where ecological crises may still be averted. We then compared our results with global conservation priorities identified by others (e. g., Global 200, hotspots). Areas of overlap point to regions where proactive conservation could be directed for greatest biodiversity impact around the world.

103. HUMAN-WILDLIFE CONFLICTS IN A FRAGMENTED TROPICAL FOREST LANDSCAPE: COSTS OF LARGE FELID PREDATION ON LIVESTOCK IN BRAZILIAN AMAZONIA. BOULHOSA, RICARDO L. P.; Michalski, Fernanda; Faria, Alexandre; Peres, Carlos A. Instituto Pró-Carnívoros and CENAP/IBAMA, C.P. 10, Atibaia, SP, 12940-970, Brazil (RB). Centre for Ecology, Evolution and Conservation, University of East Anglia, Norwich, NR4 7TJ, United Kingdom (FM, CP). Faculdade de Ciências Biológicas, Universidade Estadual do Mato Grosso, Alta Floresta, MT, 78580-000 Brazil (AF), boulhosa@procarnivoros.org.br.

Carnivores are particularly vulnerable to local extinction in fragmented landscapes due to their large ranges, low density and persecution by humans. This problem is aggravated along tropical deforestation frontiers where large felids often shift to both small and large livestock prey because of increased proximity to human agriculture. Here we examine the causes and economic costs of livestock depredation by jaguars and pumas in a deforestation frontier in the Brazilian Amazonia. We carried out 86 interviews conducted with landowners and local ranchers within a radius of 15 to 75 km from the town of Alta Floresta, MT. Depredation was concentrated on animals with an average age of 5.5 months (94%). We detected an increase in depredation rates during the wet season (48%). Proximity to forested areas was the strongest variable related to felid attacks (75.8%). Properties far removed from the town centre (35-60 km radius) showed higher predation rates than those nearer the town, where forest remnants are scarce and highly fragmented. The average annual loss per livestock-owning property was US$725.50, or 0.80% of each property's net annual income. These patterns of livestock predation can be explained by a combination of landscape variables and livestock management.

104. LINKING FOOD AVAILABILITY WITH MALE FORAGING AND INCUBATION FEEDING OF NORTH ISLAND ROBIN (*Petroica australis longipes*) IN FOREST FRAGMENTS. BOULTON, REBECCA L.; Armstrong, Doug P. Institute of Natural Resources, Ecology Building 624, Massey University, PB 11222, Palmerston North, New Zealand, R.L.Boulton@massey.ac.nz.

The decline of avian species in small fragments has generally been blamed on the increase in nest predation and brood parasitism that birds experience when nesting in these habitats. Recently, strong evidence has emerged that highlights another threat faced by insectivorous species, a reduction in insect availability. Food abundance and availability are important factors affecting the reproductive success of birds, thus these results are of particular concern for species already experiencing low reproductive success due to increased nest predation. We measured invertebrate biomass over several years within a number of different forest fragments for a declining generalist-insectivore, the North Island robin (*Petroica australis longipes*). To test whether or not our measure of food availability was appropriate we measured male foraging efficiency and rates of incubation feeding, behaviours both known to be af fected by food availability. Females altered their nesting rhythm, with shorter on and off-bout periods when males increased incubation feeding rates, however feeding rates were not related to invertebrate biomass or fragment size nor were foraging times and attack rates. We conclude that North Island robins within our study site are not food limited or our measure of food availability was inappropriate to detect such a small effect size.

105. ECOLOGY AND CONSERVATION OF TWO DESMOGNATHINE SALAMANDERS IN SOUTHERN QUEBEC (CANADA). BOUTIN, ANAIS; Lapointe, Francois-Joseph. Departement de Sciences Biologiques, Universite de Montreal, C.P. 6128, Succursale Centre-Ville, Montreal, QC, H3C 3J7, Canada, anais.boutin@umontreal.ca (AB, FJL).

The Mountain dusky salamander (*Desmognathus ochrophaeus*) and the Northern dusky salamander (*Desmognathus fuscus*) are commonly observed in the US, where they are known to hybridize. In Canada, both species have a limited distribution, and the Mountain dusky salamander is listed as threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) since 2001. A recovery plan is underway to protect the habitat of these species and maintain viable populations. This project has been undertaken to determine the environmental factors that limit the abundance of the two salamanders in Quebec in order to propose long-term conservation objectives. The habitat characterization was performed by a monthly survey of 63 sites from May to September 2004. In each case, salamanders were captured and identified, environmental and hydrological variables were measured and a tissue sample was collected for genetic analysis. More precisely we were interested in validating the morphological identification with genetic tools, as well as determining the levels of interspecific hybridization among populations. Multivariate data analysis revealed a significant discrimination between the ecological niches of the Mountain dusky salamander and the Northern dusky salamander. Furthermore, many abiotic factors (organic matter, water flow) explain the abundances of the species observed.

106. DENSITY OF INTRODUCED MAMMALS AND THEIR IMPACTS IN A LAND-BRIDGE ISLAND IN THE ATLANTIC FOREST. BOVENDORP, RICARDO S.; Galetti, Mauro. Departamento de Ecologia, Laboratório de Biologia da Conservação, Universidade Estadual Paulista, Av 24-A 1515, Bela Vista, 13506 900, Rio Claro, SP, Brazil, ricardob@rc.unesp.br.

Introduced species can compete, prey or transmit disease to native species in an area. Islands are fragile ecosystems specialy considering introduced species. Local fauna do not recognize exotic species as predators or competitors. In 1983, 14 mammal species were introduced at Anchieta Island, an 828 ha land-bridge island, located at north of São Paulo state, 400 m from Ubatuba (south-east Brazil). It was transformed in a state park in 1977 and nowadays, 90000 tourists visit the island per year. We estimated the mammal density and population size in a 213 km line transect census, during dry and wet season. The time period was from 6:30 to 11:00 h and from 17:30 and 20:00 h. Data basis were analyzed using the DISTANCE 4.1 program. Mammal groups were entered as clusters and in ungrouped format. Considering 14 mammal species introduced, five became extinct, five became highly abundant and four, are in decline. Anchieta Island has the highest mammal density for Atlantic forests (480.21 ind./km^2), especially mammalian nest predators (204.91 ind./km^2) and herbivores (231.83 ind/km^2). Capuchin monkeys (*Callithrix penicillata*) have been growing, along 21 years, 130 times, and agouti (*Dasyprocta* spp.), 145. Those growing rates are dangerous for the conservation of the island.

107. DO AREA-DEMANDING THREATENED SPECIES OCCUR IN AREAS OF GLOBAL CONSERVATION PRIORITY? BOYD, CHARLOTTE; Brooks, Thomas. Conservation International, 1919 M St NW, Washington DC, 20036, USA, c.boyd@conservation.org.

Area-demanding globally threatened species - species with large home ranges, nomadic species, species that naturally occur at low densities and certain long-distance migrants - require urgent conservation action beyond the site scale. This paper sets out proposed criteria for identifying these species, and the results of an analysis showing which globally threatened birds, mammals and amphibians meet these criteria. Using thresholds based on IUCN Red List criteria, we show that approximately 30% of globally threatened bird species, 20% of globally threatened mammals and less than 5% of globally threatened amphibian species require urgent conservation action at a scale beyond the size of the largest protected areas in the regions where they occur. Finally, we present a map showing where these area-demanding threatened species occur in relation to global conservation priority regions. The bulk of the range of a number of these species falls outside of these conservation priorities, suggesting that conservation action across wider regions may be necessary for their persistence. Nevertheless, the majority of area-demanding globally threatened species do occur in biodiversity hotspots and high-biodiversity wilderness areas, and so conservation in these regions will at least incorporate area-demanding threatened species.

108. MULTI-MODEL INFERENCE PROVIDES STRONG EVIDENCE FOR PERVASIVE DENSITY DEPENDENCE AMONG TAXA. BRADSHAW, COREY J. A.; Brook, B. W. Key Centre for Tropical Wildlife Management, Research School

of Environmental Studies, Charles Darwin University, Darwin, Northern Territory 0909, Australia, corey.bradshaw@cdu.edu.au (CJAB, BWB). Center for Ecological Research, Kyoto University, Otsu 520-2113, Japan (BWB).

Population limitation is a fundamental tenet of ecology, but arguments regarding the relative roles of exogenous and endogenous mechanisms in regulating populations still exist. Ignoring the effects of population density on life-history traits can alter population projections and estimates of extinction risk considerably. Traditional methods for addressing the strength of density-dependent processes have focused on a dichotomous, hypothesis-testing framework, but more recent work has favoured a "strength of evidence" approach. We adopt the latter philosophy, and provide a rigorous and comprehensive evaluation of the relative support for density-dependent and density-independent population dynamics in long-term times-series of 1198 species, using information-theoretic model evaluation. We show that density dependence is a pervasive feature of population dynamics, and this holds across widely different taxonomic groups, but the strength of evidence is variable across species and increases with the number of generations monitored. Thus, continued discussion of density dependence from a dichotomous perspective is misguided. A superior alternative is to use multi-model inference to quantify the relative empirical support for a set of working models that encompass a range of hypothesized population dynamics. Thus, risk assessment models should invariable attempt to incorporate regulatory processes to achieve maximum predictive capacity.

109. HABITAT USE OF TROPICAL SCREECH OWL *Otus choliba* AND BURROWING OWL *Athene cunicularia* ON BRAZILIAN CERRADO. BRAGA, ANA C. R.; Motta-Junior, José C. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo. Rua do Matão, travessa 14, número 101, Butantã, São Paulo, SP, CEP 05422-970, Brazil, kikabraga@ib.usp.br.

Although Strigiformes is a cosmopolitan group, great part of studies about them was done on temperate regions. *Otus choliba* and *Athene cunicularia* are widespread and quite common species in Brazil. Both are present on Cerrado biome which includes part of São Paulo State. The study was developed on the Ecological Station of Itirapina (22º15' S; 47º49' W; 2300ha) where cerrado is the main vegetation form. During the reproduction period of 2002 and 2004, surveys were done using playbacktechnique to estimate owl's abundance on different structural types of cerrado. *A. cunicularia* seems to prefer opened habitats; they answered more to playback on *campo sujo* areas which is grassland with scattered shrubs. *O. choliba* were recorded more on *campo cerrado* habitat, which is an open scrubland with few trees. These results are according to species biological requirements for nidification and foraging. These species shown be specialists on choose of habitat (B_{st}=0,003), what reveals the importance of different structural types of cerrado on conservation biology. This kind of study is necessary to understanding anima l-habitat relations, what is important to create feasible strategies for conservation of Cerrado, a world hotspot. And it brings some more information about Owls on tropical environment.

110. RESPROUTING AS A STRATEGY FOR FOREST RECOVERY AFTER FIRE IN AN AMAZON FOREST IN MATO GROSSO, BRAZIL. BRANDO, PAULO; Nepstad, Daniel; Balch, Jennifer K. Instituto de Pesquisa Ambiental da Amazônia (IPAM), Av. Rui Barbosa 136, Santarém, PA, Brazil, pmbrando@ipam.org.br.

Extensive areas of Amazon forests experience fire every year, resulting alterations of forest structure and species composition. Much of these areas regenerate after fire by different mechanisms, including resprouting. To assess its importance on forest regeneration we mapped over 1200 individuals of 93 species prior to experimental fire in 100 ha of an Amazon Forest in Mato Grosso, Brazil. Two months after the burn, we revisited the site and, for each individual, we addressed: presence or absence of resprouts, leaves scorched, and fire scar. In presence of resprouts, we quantified their number and designated basal or epicormic vegetative growth to each individual. Preliminary results indicate that 21% of the species had at least one individual resprouting induced by fire. However, 78% of these individuals were less than ten cm dbh. On the other hand, 98% of the individuals larger than 20 cm dbh did not present any resprout nor had their leaves scorched. Basal sprouting was slightly superior when compared to epicormic sprouting, 55% against 45%, respectively. We show that resprouting importance as a strategy of forest regeneration is closely related to fire damage, which depends mainly upon species traits, individuals' size, and fire intensity.

111. DO PARKS DEPRIVE TROPICAL COUNTRIES OF GOOD AGRICULTURAL LAND? BRANDON, KATRINA; Gorenflo, Larry J. Center for Applied Biodiversity Science, Conservation International, 1919 M Street, N.W. Suite 600, Washington, D.C. 20036, USA, k.brandon@conservation.org.

At the World Parks Congress, conservationists affirmed the need to substantially expand the global protected area (PA) system. Yet critics argue that even existing PAs are depriving tropical countries of agricultural lands and limiting agricultural productivity and that in the face of increasing global foods demands, such expansion is unacceptable. This paper addresses these critics, examines agricultural suitability in 34 recently redefined biodiversity hotspots and for land in and around protected areas in these regions. Analyses use georeferenced estimates of agricultural capacity, based on soil, terrain, and climate data, matched to 154 cropping scenarios. These were overlaid with data from the World Database on Protected Areas. The analysis compared protected are as to 10-km buffers around them, and to the hotspots they were found within. Findings reveal generally low suitability for most crop categories under intermediate and high input cropping scenarios, with some exceptions, for the areas examined. Results indicate that conservation in biodiversity hotspots usually does not compromise agricultural productivity, particularly in and around protected areas. Implications of these findings for tropical land use planning are summarized.

112. AMPHIBIAN SPECIES ON ISLANDS IN SÃO PAULO STATE, SOUTHEASTERN BRAZIL: IMPLICATIONS TO CONSERVATION. BRASILEIRO, CINTHIA A. Museu de História Natural, Instituto de Biologia, Universidade Estadual de Campinas, Campinas, SP, CEP, Brazil, cinthia_brasileiro@yahoo.com.br.

There are approximately 120 islands in São Paulo State, southeastern Brazil. However, there are only anecdotal records of amphibians in only few of those islands. The aim of this study was to assess the richness of amphibians in 10 of those islands and provide some arguments to protect them. I visited islands between December 2001 and December 2004 (total of 24 trips) to collect amphibians and I also examined the specimens deposited in the

Museu de Zoologia, USP. I have recorded 10 frog species including three undescribed species, *Scinax* spn1 (*perpusillus* group) from Queimada Grande; *Scinax* spn2 (*perpusillus* group) from Porcos Pequena and *Cycloramphus* spn (*eleutherodactylus* group) from Alcatrazes. *Adenomera marmorata* was recorded in nine islands; *Thoropa miliaris* on five and, *Eleutherodactylus binotatus* and *Dendrophryniscus brevipolicatus* were recorded on three islands. Three other species occur only in one island. The endemism and restricted distribution of these species may be an argument to request more protection to these islands from governmental authorities. It is urgent to assess the fauna and flor a from as many islands as possible. This knowledge is essential to claim to Government more protection to these fragile habitats. FAPESP, FUNDAÇÃO BOTICARIO and IDEA WILD support this study.

113. SEED DISPERSAL BY FERAL HORSES ON ASSATEAGUE BARRIER ISLAND, USA. BRAUNSKILL, KESHA; Vulinec, Kevina; Naczi, Robert. Department of Agriculture and Natural Resources, Delaware State University, 1200 N. DuPont Highway, Dover, Delaware 19901, USA, quiche620@hotmail.com.

Assateague Island National Seashore, Maryland, USA, is a barrier island of dynamic sand dunes. Grasses that grow on the island are important for stabilizing these dunes. Conservation of the grass community remains an important part of the seashore's management plan. Among other potential seed dispersers, such as deer, feral horses (*Equus caballus)* have inhabited the island since the 1600's. Managing the horse population is important because of the negative effect grazing has on plant structure, inflorescence, and ultimatel y dune morphology. The role of feral horses in the dispersal and predation of both native and exotic grasses has not been investigated. Currently we are examining seed dispersal and viability of native grasses and exotic plants by feral horses. Our data demonstrate that horses are dispersing seeds of the Poaceae family at an approximate average of 0.76 seeds per gram of dry fecal material. Horses are considered an introduced species in the barrier island ecosystem, thus, seed dispersal by this species may be an additional management concern.

114. ECOLOGY AND MANAGEMENT OF NESTING BLUE-AND YELLOW MACAWS (*Ara ararauna*) IN *Mauritia* PALM SWAMPS. Bravo, Adriana; BRIGHTSMITH, DONALD. Louisiana State University, Department of Biological Sciences, Baton Rouge, LA, USA; Duke University, Department of Biology, Durham NC, USA (djb4@duke.edu).

Most species of large macaws are endangered or declining throughout their ranges. Despite the recent increase in studies of psittacids, information on their reproduction and management is still scarce. In SE Peru Blue-and-yellow Macaws (*Ara ararauna*) nested in dead *Mauritia flexuosa* palms in swamps dominated by this palm species. Macaws selected the tallest dead palms in healthy palm swamps, but used palms of all heights in open dieing palm stands. All nesting palms rose well above the surrounding vegetation, presumably to discourage terrestrial predators. PVC nest boxes hung on *M. flexuosa* palms failed to attract nesting Blue-and-yellow Macaws. A small section of palm swamp was managed to encourage macaw nesting by cutting the tops off of *M. flexuosa* palms and clearing the understory vegetation. The cut palms remained standing from 4 to 7 years and were occupied by nesting macaws at a rate of 24%. The data presented here suggest that cutting five palms a year in perpetuity would produce a stand of approximately 20 standing dead palms useable by macaws. Such a management scheme could be used to increase reproductive success of Blue-and-yellow Macaw populations, concentrate macaw nesting in protected areas and create valuable ecotourism resources.

115. ESTIMATING MINIMUM VIABLE POPULATION SIZE AND EVALUATING RESERVE NETWORK EFFECTIVENESS IN MAINTAINING *Brachyteles hypoxanthus* POPULATIONS. BRITO, DANIEL; Grelle, Carlos Eduardo V.; Boubli, Jean P. Programa de Pós-Graduação em Ecologia, Conservação e Manejo de Vida Silvestre (ECMVS), Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Avenida Antônio Carlos 6627, Belo Horizonte, MG 31270-901, Brazil, dan.brito@terra.com.br (DB) Laboratório de Vertebrados, Departamento de Ecologia, Instituto de Biologia, CCS, Universidade Federal do Rio de Janeiro, CP 68020, Ilha do Fundão, Rio de Janeiro, RJ 21941-590, Brazil (CEVG). Estação Ecológica de Caratinga, CP 82, Ipanema, MG 36950-000, Brazil (JPB).

A reserve network is essential to the protection of native biodiversity. However, internal and external factors may threaten the preservation of biota, thus population viability analyses (PVA) are important tools in reserve design and management planning. A PVA was carried out for the primate *Brachyteles hypoxanthus*, using the computer package VORTEX, to assess: (1) demographic and genetic MVPs, (2) the minimum area of suitable habitat (MASH), and (3) the effectiveness of the reserve network within the Brazilian Atlantic Forest. Populations of 40 and 700 individuals were necessary to achieve demographic and genetic stability, respectively. MASH estimated to contain genetically viable populations reached 11,570 ha. The Brazilian Atlantic Forest has 42 reserves within *B. hypoxanthus* geographic distribution area, and only five of those retained viable populations, whereas 28 were predicted to suffer from genetic decay, seven from genetic decay and demographic stochasticity, and two of them are probably extinct. The model indicates that although the reserve network studied will likely keep *B. hypoxanthus* populations for the next 1000 years, most reserves (35 or 83%) will be facing demographic and/or genetic problems and will probably need management actions to be implemented in order to ensure the persistence of *B. hypoxanthus* populations.

116. PREDICTING EXTINCTION RISK USING LIFE-HISTORY TRAITS. BROOK, BARRY W.; Traill, L. W.; Pardon, L. G.; Bradshaw, Corey J. A. Key Centre for Tropical Wildlife Management, Research School of Environmental Studies, Charles Darwin University, Darwin, Northern Territory 0909, Australia, barry.brook@cdu.edu.au (BWB, LWT, LGP, CJAB). Center for Ecological Research, Kyoto University, Otsu 520-2113, Japan (BWB).

We assigned relative strengths of evidence to an a priori set of five population dynamics models (incorporating either density dependence or density independence) for 1198 species with high-quality, long-term time-series. We then used numerical simulation to derive multi-definitional estimates of minimum viable populations (MVP) - 'threshold' abundances below which extinction risk is unacceptably high. Median model-averaged (based on information-theoretic criteria) estimates of MVP were 1377 for a 90% probability of persistence over 100 years or 1181 for 99% over 40 generations. Generalized linear mixed modelling of six derived composite predictors (threat index, range size, human impact, body size, ecological flexibility and demographics) showed body size to be the most robust correlate of a species' MVP on a yearly

time scale. However, when species-specific variation in generation length was accounted for, no strong correlates emerged. This suggests that estimates of MVP are not amenable to broad-scale ecological generalisations on a generational time scale. Species extinction risk is instead more dependent on the degree to which populations are regulated by density rather than environmental or life-history characteristics.

117. THE INDIAN OCEAN TSUNAMI, BIODIVERSITY CONSERVATION, AND HUMAN WELFARE. BROOKS, THOMAS; Brandon, Katrina; Fonseca, Gustavo; Gascon, Claude; Lacher, Tom; Mittermeier, Russell A.; Supriatna, Jatna. Conservation International, 1919 M St NW, Washington DC 20036, USA, t.brooks@conservation.org (TB, KB, GF, CG, TL, RM); Conservation International, Jalan Pejaten Barat 16A, Kemang, Jakarta 12550, Indonesia (JS).

On 26 December 2004, an enormous earthquake in Indonesia triggered a tsunami that devastated the Indian Ocean nations and killed 200,000 people. Attention has rightly focused on the immediate humanitarian disaster, but as the efforts to stem the crisis gain momentum, it is important to examine its broader implications. Here, we analyze the impacts of the tsunami on biodiversity, and of biodiversity on the tsunami. Tectonic impacts on biodiversity are generally low, and few animals were killed by the great wave, warned, maybe, by ability to hear infrasound. However, the tsunami stressed the region's already-damaged ecosystems: we examine the conservation priority of the areas affected and find that six biodiversity hotspots were directly impacted. Moreover, the tsunami destroyed much conservat ion infrastructure and killed a number of conservation professionals. The flip side of these impacts is the role of the biodiversity conservation in ameliorating the tsunami's effects. Review of existing experimental and observational data, and assessment of eyewitness and remotely sensed information suggests that reefs, mangroves, and lowland forests and hydrology played an important role in reducing tsunami damage. We suggest that biodiversity conservation is an effective tool for reducing the impact of future disasters on human lives and livelihoods.

118. BIODIVERSITY AND CONSERVATION OF EARTHWORMS (AND THEIR ECOSYSTEM SERVICES) IN BRAZIL. BROWN, GEORGE G.; James, Samuel W. Embrapa Soja, C.P. 231, Londrina, PR, 86.001-970, Brazil, browng@cnpso.embrapa.br (GGB). Natural History Museum & Biodiversity Research Center, University of Kansas, Lawrence, KS, 66045, USA (SWJ).

There are approximately 288 known species of earthworms in Brazil, although 800 to >2000 species are estimated to exist, placing Brazil as number one in the biodiversity of this ecologically important invertebrate. At present, most species (87%) are native and only 13% are exotic, invasive worms. Most of the native species show a restricted distribution and high endemicity, while exotic species have extensively colonized mostly disturbed habitats. One species (*Pontoscolex corethrurus*), native to N Brazil, should be considered invasive, as it has spread throughout the country and is the most abundant and well-known Brazilian earthworm. There more than 40 species of giant (>30 cm length, >1cm diam.) earthworms (minhocuçus) in Brazil. Several are harvested and widely commercialized as fish bait. Although prohibited, many families derive their income from worm harvesting and one species is on the IUCN endangered species list; others may also be endangered. Due to their importance for soil properties and processes and services to natural and agricultural ecosystems, conservation and sustainable use of these invertebrates is an imperative. Nevertheless, this is hampered by the lack of knowledge of their biology and ecology as well as the lack of trained taxonomists and earthworm researchers in Brazil.

119. LEPIDOPTERA AS INDICATORS OF VEGETATION, LANDSCAPE, AND THEIR RESPONSE TO DISTURBANCE IN CENTRAL AND SOUTHEASTERN BRAZIL. BROWN-JR, KEITH S.; Freitas, André V. L.; Osses, Francini; Uehara-Prado, Marcio; Ribeiro, Danilo B.; Cordeiro, Luciana; Alonso, Regina; Gifford, D. R. Museu de História Natural and Departamento de Zoologia, Instituto de Biologia, Universidade Estadual de Campinas, CP 6109, Campinas, SP, 13083-970, Brazil, ksbrown@unicamp.br (KSB).

The very wide range of vegetation types in Central and South Brazil (herbaceous to woody formations in the interior cerrado, and denser arboreal formations in the southern sectors of Atlantic Forests) defies simplistic classification by indicator plant species, soils, climate, or hydrology. Standard monitoring of taxonomic/ecological groups including common, conspicuous and well-known mobile Lepidoptera shows that the richness and structure of many diverse and easily recognized taxocenes reflects subtle differences among sites, seasons, and stages of anthropic modification, as perceived by specialized herbivores but not by us. Particularly easy to census are fruit-attracted butterflies (Nymphalidae) and moths (Noctuidae), including indicator species present in all types of vegetation, and larger moths (especially Saturnidae, Sphingidae, Arctiidae) attracted to near-UV light. Statistical analyses show that important factors influencing the community structure of these insects include topography, soil and vegetation mosaics, temperature variation and dry season. With the help of insects to evaluate richness and variation, it should be possible to create "conservation landscapes" including human activities in biologically rich tropical biomes.

120. UPPER PARAGUAY RIVER BASIN GIS DATABASE: PILOT PROJECT. Browne, Dawn; Carbonell, Montserrat; DISCONZI, GISLAINE. Ducks Unlimited, Inc., One Waterfowl Way, Memphis, TN 38120, USA (DB, MC). Regional Environment Program, US Embassy Brasilia, SES-Av. das Naçoes Lote 3, Brasilia DF, 70403, Brazil, disconzigm@state.gov (GD).

The Upper Paraguay River Basin (UPRB) covers approximately 496,000 km^2. Roughly one-third of the UPRB is occupied by the Pantanal and two-thirds is "Planalto". The goal of the UPRB GIS Database project was to contribute to the management and conservation of natural resources of the UPRB through the development of a standardized GIS database and a data distribution network. Phase I (completed in 2003) of the Pilot Project includes a historical change analysis of an area in the lower Pantanal, where the borders of Bolivia, Brazil and Paraguay meet. Phase II (completed in 2004) includes an analysis of impacts on the vegetation by human activities along the Estrada Parque Transpan taneira, Mato Grosso, Brazil, a hydrological analysis of the UPRB, a land cover classification system based on multi-date Landsat satellite imagery and existing regional vegetation classification systems, and the results of several conservation and resource management projects in the UPRB that used the methods and technology established in the Pilot Project. The database now incorporates several hundred GIS and remote sensing datasets, and a map server. The data and results of the UPRB GIS Database are being used in support of

management and conservation measures, and designation of Ramsar sites.

121. COMMUNITY CONSERVATION AGREEMENTS WITH INDIGENOUS AND TRADITIONAL COMMUNITIES. BRUNER, AARON; Neisten, E.; Rice, Richard. Conservation International, 1919 M Street, Suite 600, Washington, DC 20036, USA (a.bruner@conservation.org).

Conventional conservation mechanisms like national parks cannot be applied to areas inhabited by traditional and indigenous communities. CI's Conservation Economics Program is engaged in several projects that seek to address this shortcoming through the use of community conservation agreements (CCAs). Under a CCA, resource users agree to protect natural ecosystems in exchange for a steady stream of structured compensation from conservationists or other investors. In its simplest form, an agreement might be modeled after a timber concession, whereby a logging company pays for the right to extract timber from an area of forestland. Rather than log the concession area, the conservation investor would pay for the right to manage the forest for conservation. With objecti ves including both long-term protection of biodiversity and stimulation of economic development, this new mechanism offers a land-use alternative that conservationists, development agencies, governments, and local communities alike can support. In this symposium, we will elaborate on the rationale and application of the community conservation agreement approach, drawing from our experiences with indigenous communities in the Andes and Mesoamerica regions.

122. CONSERVATION OF SONG DIVERSITY: THE ROLE OF FRAGMENTED ACOUSTIC ENVIRONMENTS. BRUNTON, DIANNE. Conservation & Ecology, Institute of Natural Resources, Massey University, Albany Campus, Private Bag 102-904, North Shore Mail Centre, Auckland, New Zealand. d.h.brunton@massey.ac.nz.

We exist in an increasingly fragmented world, with 'islands' of natural habitat set in 'oceans' of modified landscape. In New Zealand natural habitat fragments and offshore islands provide refuge for endemic and native fauna and are the focus of conservation efforts. An unexplored consequence of fragmentation is modification of the acoustic environment. For birds, sound is a crucial characteristic of social interactions. The aim of this project is to explore the role of acoustic environment in shaping the singing behaviour and song structure of a variety of New Zealand species. The majority of species develop singing behaviour and song recognition abilities early in life, but many species continue to modify their acoustic behaviour based on conspecifics interactions and/or selective mimicry of acoustic components of their environment. Research on the two extant species of the endemic family Callaeidae (saddleback *Philesturnus carunculatus* and kokako *Callaeas cinerea*) shows that populations isolated due to fragmentation develop 'dialects' over short periods of time and for kokako these 'dialects' act as a reproductive barrier when birds from populations are reunited due to conservation efforts. Alternatively, the honeyeater *Prosthemadera novaseelandiae* (Tui) incorporate sounds of other species and has poorer song repertoires in low diversity 'islands'.

123. IMPROVING THE MANAGEMENT OF THE CORUMBAU MARINE EXTRACTIVE RESERVE (BAHIA, BRAZIL): EMPOWERMENT AND COMMUNITY AUTONOMY IN THE DECISION MAKING PROCESS. Brutto, Luiz Fernando G.; Oliveira, Ronaldo F.; MOURA, RODRIGO L.; Dutra, Guilherme F.; Aguiar, Carlos H.; Ramalho, Maria de Fátima G. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, IBAMA, Prado, 45980-000, BA, Brazil. resexmar.corumbau.ba@ibama.gov.br (LFGB, RFO). Conservation International Brazil, Caravelas, 45900-000, BA (RLM, GFD). Instituto Baleia Jubarte Caravelas, 45900-000, BA (CHA). Associação Pradense de Proteção Ambiental, APPA, Prado, 45980-000, BA, Brazil (MFGR).

The Corumbau Marine Extractive Reserve, located in Northeastern brazilian coast, is a multiple-use marine protected area created in 2000, encompassing 895km^2 of coral reefs and adjacent soft bottom. It's main goals include both the protection of natural resources and improvement of traditional fisherfolks' livelihoods. Since the initial discussions about the reserve's creation, fisherfolks got involved in the participatory process of marine resource's management. A partnership between local communities and NGOs, scientists and governmental agencies was established in order to ensure that the reserved seascape generates benefits to local populations at helps preserve the region's unique marine biodiversity. These challenges are dependent on greater awareness -from all stakeholders- to the fact that the decision-making process depends on adequate ap propriation of information, technology, bureaucratic procedures and strengthening of the main usergroup: traditional fisherfolks. Since January 2004, we have been carrying out a project that targets: strengthening communitarian associations and other representative instances; implementation of sustainable economic alternatives (tourism and lower-impact fisheries); education for natural resources management; monitoring of local fisheries and biodiversity. The enhancement and scaling-up of the Deliberative Council roles, as well as a participatory review of the reserve's Management Plan, are another major goals of this initiative. (Fundo Nacional do Meio Ambiente - MMA)

124. ENGAGING FARMERS AND AGRIBUSINESS COMPANIES TO CREATE BIODIVERSITY CONSERVATION CORRIDORS. BUCHANAN, JOHN T.; Barroso, Mario; Prado, Paulo Gustavo; Caldas, Eduardo; Prickett, Glenn. The Center for Environmental Leadership in Business, Conservation International, 1919 M St. NW Suite 600, Washington, DC 20036, USA, j.buchanan@celb.org (JTB, GP). Conservation International - Brazil, SAUS Qd. 3 - Lote 2 - Bl. C - Ed. Business Point - Salas 715-722, Brasília 70.070-934, DF, Brazil (MB, PGP, EC).

Expansion of agricultural activities such as ranching and soy production in the Brazilian Cerrado has resulted in habitat loss and fragmentation that threaten biodiversity. Landscape-scale strategies to conserve biodiversity in the Cerrado overlap with significant areas of private agriculture. Farmer engagement is therefore essential to implementing conservation strategies that integrate protected areas of natural habitat within the agricultural landscape. Conservation International and Bunge Limited initiated a pilot project in October 2003 to engage soy farmers in creation of the Emas Taquari Biodiversity Conservation Corridor. The project is creating a Private Reserve Network within the Corridor by assisting farmers to create private reserves on their properties as required by Brazil's Forestry Code. The emphasis is on identification of reserves that minimize opportunity costs and maximize the biological value of reserves to create connectivity within the

Corridor. As of September 2004, 13 farms representing 24 distinct properties and more than 65,000 hectares of farmland had been mapped and integrated into the Corridor design. The ongoing project has created an important precedent in involving agribusiness companies and farmers in conservation activities. Future project activities will focus on expansion of the Private Reserve Network and adapting the model for agricultural frontier areas.

125. GRADUATE PROGRAM IN CONSERVATION BIOLOGY IN INDONESIA: PRESENT SITUATION AND FUTURE CHALLENGES. BUCHORI, DAMI; Mardiastuti, Ani. Institut Pertanian Bogor, Indonesia, dami@indo.net.id.

Indonesia has been named as one of the megadiversity country in the world, and most of the biodiversity richness can found in the vast tropical rain forest. Unfortunately, this country faces a great threat and problem related to the destruction of the rain forest and decreasing of forested land. Government and universities in Indonesia realized the problem and have started to offer graduate program at School for Conservation and Environmental Management in 1981 for staffs of Ministry of Forestry. Later on, equipped with lecturers graduated in conservation biology or related fields from US/Canada and European countries, universities (i. e., University of Indonesia, Institut Pertanian Bogor) started to offer graduate programs in conservation biology or other expertise associated to conservation, both for Master's and Doctoral degree. Currently, at Institut Pertanian Bogor (Bogor Agricultural University), we have a graduate school offering Master's and Doctoral Program in Forest Resources Conservation, Management of Natural Resources and Environment, and Management of Marine and Coastal Resources. All programs are based on the multidisciplinary science of conservation biology. In developing the graduate program, our biggest challenge is how to modify and improve the knowledge and science of conservation biology suitable for our country. Therefore, the development of knowledge and science of conservation biology in similar tropical countries, coupled with partnership/collaboration with other tropical countries having similar setting and problems are needed in establishing a better and useful conservation biology program in Indonesia.

126. WILDLIFE ROAD MORTALITY IN TRIÂNGULO MINEIRO, SOUTHEASTERN BRAZIL. BUENO, ADRIANA A.; Belentani, Sonia C. S.; Ribeiro, Milton C. Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, Brazil, 05508-900, abueno@ib.usp.br (AAB). Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, 05508-900, Brazil (SCSB, MCR).

Few empirical studies on wildlife road mortality impact were developed in Brazil. So, the aims of this study were to describe the wildlife species susceptible to road-kills and to assess the influence of different landscape attributes on wildlife road mortality. Surveys were conducted along two major roads, located in Triângulo Mineiro, west Minas Gerais State. Quantitative survey involved driving along the road and recording dead animals from March to December 2004. The landscape analysis was conducted using only mammal data from Prata municipality (19°18'S; 48°55'W). A total of 82 carcasses were recorded, mammals accounted for 81.71%, birds 12.20% and reptiles 6.10%. In relation to landscape attributes, two zones were distinguishable: one with more road-kills and higher proportion of forest physiognomies (cerrado 6.0%, gallery forest 12.5% and pine plantation 14.7%) and other with lower number of road-kills (cultivation 28.7% and pasture 57%). The data suggest that areas with higher proportion of forest and lower human disturbance may harbour more biodiversity. However, the maintenance of such areas with no management may not be enough for the persistence of these species. Surely, the employment of signs and driver education are useful to reduce the losses in these priority road zones.

127. IN SEARCH OF A THEORY OF ECOLOGICAL CORRIDORS. BUENO, CECILIA. Universidade Veiga de Almeida, Rua São Clemente 373/501, Botafogo, Rio de Janeiro, RJ, 22260001, Brasil, cecilia.bueno@pobox.com.

Ecological corridors are being designed and implemented in many regions to enhance conservation and provide connectivity. The problem is that managers lack general methodologies to help effective action. Corridor width is a major problem, and often in Brazil not being determined based an ecological rationale. It affects strongly costs and risks, and so ecological sustainability. If not appropriately dimensioned, a corridor can jeopardize conservation objectives. A study was made among published and in press literature, and projects already implemented, including interview and discussion with decision makers and refuge managers, and simulated calculations. Calculations were made also for theoretical and in implementation corridors, in order to propose a general model to estimate a basic corridor width, upon which local considerations can be added. The objective was to use ecological attributes, rather than any other factor. Considerations included some critical aspects, such as: edge effect, target or umbrella species home ranges, fragments size, fragments distance. The result is a proposed mathematical model that estimates an initial corridor width using as input variables: (a) home-range of umbrella or target species; (b) distance between fragments; (c) a tabulated risk rate factor; and (d) a minimum width assumption.

128. PERCEPTIONS OF BIODIVERSITY AMONG LANDOWNERS AROUND A PRIVATE RESERVE: CONSERVATION IMPLICATIONS FOR THE NORTHERN MURIQUI (*Brachyteles hypoxanthus*). BUENO, MARCO A. F. Environmental consultant, SHCES 201 B, apt. 305, Brasília, DF, CEP 70650-212, Brazil, muriqui1984@yahoo.com.br.

Biodiversity is perceived and valued differently by stakeholders who manage it. Although conservation on private land has been neglected as compared to public land, conservationists cannot succeed in protecting biodiversity without interacting with private landowners, for the alarming land use changes on private lands and their effects on indigenous biodiversity. Therefore, conservationists must understand what local perceptions of biodiversity are, why different perceptions exist and which factors influence them. Small landowners´ perceptions of biodiversity and natural resources around Feliciano Miguel Abdala (FMA) Private Reserve, in Brazil's Atlantic Forest, were investigated to test whether they challenge local biodiversity conservation, particularly as regards the northern muriqui monkey (*Brachyteles hypoxanthus*). Semi-structured interviews conducted with 26 landowners raised major themes of interest which were then analysed through a qualitative and interpretivist approach. Results showed that some conservation-oriented perceptions are shared by the majority of landowners, although neither muriquis nor their conservation are considered a top-priority. The survival of the rising mur iqui populations at FMA will depend on promoting local reforestation and a well-grounded understanding of the frames of reference, values and priorities of local farmers.

129. LIVING IN AN EMPTY FOREST: DENSITY AND POPULATION SIZE OF GAME BIRDS AND MAMMALS IN THE ATLANTIC FOREST OF BRAZIL. BUENO, RAFAEL; Galetti, Mauro; Marques, Renato M.; Bernardo, Christine S. S.; Bovendorp, Ricardo S.; Nobre, Rodrigo A.; Gobbo, Sabrina; Steffler, Carla E.; Rubim, Paulo. Laboratório de Biologia da Conservação, Departamento de Ecologia, Universidade Estadual Paulista, C.P. 199, 13506-900 Rio Claro, SP, Brasil, (RSB, MG, RMM, CSSB, RB, RAN, SG, CS, PR), rafabrc@yahoo.com.br. Instituto da Biologia da Conservação (IBC), Av. P13, 293, Rio Claro, SP, Brasil (MG, RMM, RN, SG).

It is crucial, especially in biodiversity hotspots such as the Atlantic forest, the understanding of the factors that determine game density and biomass. We used a distance sampling method to estimate population sizes of a range of game bird and mammal species in 9 Atlantic forest sites and compared with other 13 Atlantic forest areas and 25 Amazon areas. Game density is much higher in the Amazon than in the Atlantic forest. Only the few best protected areas in the Atlantic forest has equivalent densities and game biomass than some Amazon forests. Game density can be explained by forest productivity, but not poaching regime, while game biomass is strongly affected by poaching regime and forest productivity. The long history of human occupation, forest improverishment and poaching in the Atlantic forest may be a warning for the Amazon region. On the other hand, the chronic lack of real protection in the Procted Areas and continued detrimental human activity inside many reserves are the main threats for conservation effectiveness.

130. IS IT HIP? IDENTIFYING STREAM REACHES WITH HIGH INTRINSIC POTENTIAL TO DEVELOP REARING HABITAT FOR PACIFIC SALMONIDS. Burnett, Kelly; Reeves, Gordon; Miller, Dan; Clarke, Sharon; VANCE-BORLAND, KEN; Christiansen, Kelly. United States Department of Agriculture, US Forest Service, Pacific Northwest Research Station, 3200 Jefferson Way, Corvallis, OR 97333, USA kmburnett@fs.fed.us (KB, GR, KC). Earth Systems Institute, 3040 NW 57th St., Seattle, WA 98107, USA (DM). Roaring Fork Conservancy, P.O. Box 3349, Basalt, CO 81621, USA (SC). Department of Forest Science, Oregon State University, Corvallis, OR 97331, USA (KVB).

In the past, decision makers had to rely on limited, site-scale information when planning for freshwater protection and restoration. To help broaden the context of conservation decisions for anadromous salmonids, the Coastal Landscape Analysis and Modeling Study (CLAMS) developed models that characterize the potential of streams to provide high quality habitat for steelhead (*Oncorhynchus mykiss*) and coho salmon (*O. kisutch*). The modeled attribute, termed intrinsic potential, is the geometric mean of classified channel gradient, valley constraint, and mean annual discharge. These components were derived for streams in the Oregon Coastal Province using 10-m digital topographic data. The concept was proposed from an understanding that persistent stream attributes can promote habitat conditions that favor a particular species. Applications include estimating salmonid population abundance prior to European settlement highlighting areas that may contribute disproportionately to conservation; and identifying distinct population segments and c ritical habitat under the US Endangered Species Act. The approach and models can be adapted to any lotic species for which links to persistent stream attributes are known.

131. ECONOMIC IMPORTANCE OF FORESTS TO LOCAL USERS - IMPLICATIONS FOR NATURAL FOREST MANAGEMENT. BUSH, GLENN K.; Plumptre, Andrew J.; Nampindo, Simon; Aguti, Caroline. Department of Economics, University of Stirling, Stirling, FK9 4LA, United Kingdom, g.k.bush@stir.ac.uk (GKB); Albertine Rift Program, Wildlife Conservation Society, PO Box 7487, Kampala, Uganda, aplumptre@wcs.org (AJP, SN, CA).

This study examined key economic relationships between wealth and natural forest use in order to quantify the economic role of Uganda's natural forests in poverty reduction and sustainable economic development. A stratified random sample survey was employed representing forest users surrounding the four major forest types in Uganda. Gross annual household income and consumption was measured from forest and non-forest sources. Across all forest types and wealth groups, households in the target population derived 19% of their overall income from forest with 75% of the value of goods harvested from forests consumed in the home. Amongst wealth groups, poorer households obtained proportionately more of their income from forests than wealthier households, although wealthier households appropriated a greater overall proportion of the value of forest goods. Nationally, the annual contribution of natural forests to household income was calculated at approximately US$190,000,000. These results indicate that reductions in forest use, to sustainable levels, may increase poverty amongst forest users; making households wealthier will not necessarily reduce forest exploitation. Improved coordination between forest management and rural development activities is essential. The forestry sector must continue to receive central government and international assistance to be able to deliver important public goods.

132. ACTIVE TEACHING AND STUDENT-CENTERED PEDAGOGY IN UNIVERSITY-LEVEL TRAINING IN BIODIVERSITY CONSERVATION. BYNUM, NORA; Sterling, Eleanor. Center for Biodiversity and Conservation, American Museum of Natural History, Central Park West at 79th St., New York, NY, 10024, USA, nbynum@amnh.org.

Over the past decade, seminal papers and studies across a broad range of disciplines have questioned whether students are adequately prepared with the problem-solving, teamwork, communication, and knowledge integration skills needed in a number of fields, including biodiversity conservation. Active teaching, or student-centered pedagogy, follows from the constructivist perspective from the field of cognition, in which the learner's prior knowledge, experience and social context are seen as crucial factors in developing understanding and in applying knowledge to new situations. While it is difficult to directly measure the effects of educational interventions, evidence has accumulated over the past 15 years to indicate that active teaching methods, such as collaborative and cooperative learning; conscious attention to moving through the "learning cycle" of exploration, concept introduction and concept application; and ongoing classroom and auto-assessment, have been effective in increasing student mastery of concepts and development of key process skills in a wide variety of classroom settings. A key challenge for future training efforts is to increase access to and support of active teaching methods for teachers and trainers working in resource-limited contexts, and to further develop means for trainers to share successes and challenges of using these tools in the classroom.

133. DEVELOPMENT AND BIODIVERSITY CONSERVATION INITIATIVES WITH INDIGENOUS PEOPLE OF THE UPPER RIO NEGRO. CABALZAR, ALOISIO. Instituto Socioambiental,901 Avenida Higienópolis, Higienópolis, São Paulo, SP 01238-001, Brazil, beto@socioambiental.org.

The upper Rio Negro region is home to 22 Amerindian ethnicities (~30,000 people) that inhabit an extensive mosaic of terra firme forest and scrub forest (Catinga) and whom remain distant from the economic development frontier of Amazonia. The distribution of natural resources determines in large part the location of indigenous communities. The non-predatory use of natural resources by Amerindian groups of the upper Rio Negro has guaranteed until now the integrity of ecosystems. Five ratified Indian (Terras Indígenas) reserves of the upper Rio Negro encompass 10,610,538 hectares of which only 0.5% has been deforested for village sites and gardens. Although the overall situation of the upper Rio Negro Indian reserves appears ecologically sus tainable, there are foci of population growth where ISA (Instituto Socioambiental) and FORIN (Federação das Organizações Indígenas do Rio Negro) are proposing new forms of resource management. This initiative involves development of methodologies for monitoring biodiversity with the particpation of indigenous groups. Inventory methods form part of an effort to conserve fish stocks and agricultural biodiversity.

134. STATISTICAL PHYLOGEOGRAPHY AND MORPHOLOGICAL ANALYSES OF *Xiphorhynchus fuscus* (AVES): INTRASPECIFIC EVOLUTION IN THE ATLANTIC FOREST. CABANNE, GUSTAVO S.; Albuquerque, Jorge L. B.; Miyaki, Cristina Y. Instituto de Biociências, Universidade de São Paulo, Rua do Matão 277, 05508-900, São Paulo, São Paulo, Brazil, gscabanne@yahoo.com (GSC, CYM). Associação Montanha Viva, Av. Rodolfo Andermann 1259, 88560-000, Urubici, Santa Catarina, Brazil. (JLBA).

Species conservation should include the preservation of historically isolated lineages. We studied the genetic and morphological variation of the Atlantic forest bird *Xiphorhynchus fuscus* (subspecies *fuscus* and *tenuirostris*) in order to test predictions concerning the influence of the Paraíba do Sul Valley (PSV) and paleorefuges on this bird's evolution. Study area was the SE Brazil and Misiones (Argentina). We performed nested clade analyses on mitochondrial DNA sequences and principal component and canonical correspondence analyses on morphological characters. Three main genetic lineages were observed: one belonged to *X. fuscus tenuirostris* and the others to *X. fuscus fuscus*. The two *X. fuscus fuscus* phylogroups were parapatric and come into contact next to the PSV. The morphological analyses agreed wit h the genetic analysis. Data is compatible with a main break event along the eastern part of the Minas Gerais - São Paulo states limit, where the PSV stands. But formation of the valley could not have induced the lineages splitting, because the lineages are younger than the valley. This scenario could be compatible with refuge dynamics with three centers of population stability: SE Minas Gerais, SE São Paulo, and west Paraná plus Misiones. Support: FAPESP, WWF, CNPq, CAPES.

135. REPRODUCTIVE BIOLOGY OF *Delomys dorsalis* (HENSEL, 1872) - SIGMODONTINAE - IN AN AREA OF MIXED FOREST WITH CONIFERS, SOUTHERN BRAZIL. CADEMARTORI, CRISTINA V.; Fabián, Marta E.; Menegheti, J. O. Coordenação de Pós-Graduação e Pesquisa, Pró-Reitoria Acadêmica, UNILASALLE, Canoas, RS, 92.010-000, Brazil, titina@via-rs.net. Departamento de Zoologia, Instituto de Biociências, UFRGS, Porto Alegre, RS, 90.540-000, Brazil.

Delomys dorsalis is restricted to the wet tropical and subtropical forests of southern and southeastern Brazil and northeastern Argentina. The reproductive cycle of this species was studied by the histological examination of the reproductive tracts of animals caught in an area of mixed forest with conifers (29º23'S, 50º23'W), in southern Brazil, and from observations on a laboratory group of individuals. Fourteen expeditions were carried out from February 1997 to April 1998, during approximately 3 nights, using 140 live traps set on the ground and on branches between 1.5 and 2.0 m high. Reproductively active individuals were observed year round, although winter was marked by a reduction in breeding activity resulting from recruitment. Females showed a post-partum oestrus and a gestation time between 21 and 22 days. The litter size in captivity ranged from two to four, though pregnant females collected from the field had even five embryos. External reproductive features, frequently used as indicatives of the reproductive status of small mammals in ecological studies, were not accurate and underestimated the number of active animals in the population.

136. HABITAT USE BY TWO BIRD FOREST SPECIALISTS IN ANDEAN *Polylepis* FORESTS. CAHILL, JENNIFER; Matthysen, Erik. Centro de Biodiversidad y Genética, Facultad de Ciencias y Tecnología, Universidad Mayor de San Simón, Cochabamba, Bolivia, jcahill@fcyt.umss.edu.bo.

Polylepis bird forest specialists, *Oreomanes fraseri* and *Leptasthenura yanacensis* are threatened due to the disappearance and disturbance of these Andean forests. Today, remaining isolated fragments are highly heterogeneous due to different degrees of anthropogenic disturbance. In order to establish specific vegetation characteristics for their habitat conservation, we studied their habitat use. The presence of the two species was estimated by point counts in 150 plots (3 fragments) which had the vegetation structure characterized. Through generalized linear models we found that both species use mainly well preserved *Polylepis* fragments (larger and denser). The most specialized species, *O. fraseri* showed two microhabitat characteristics as important for its habitat use. It uses plots with high superior level foliage density of trees and plots with larger trees, regardless of their position (interior or edges). However, use of medium level foliage tree density is greater in the interior than in fragment edges. *L. yanacensis* avoids edges regardless of any vegetation structure and uses plots with high tree density and low medium level foliage density. These results give basis for the type of forests that these species need, those with large and dense fragments, with shapes that minimize edges and containing large trees.

137. POSTDISPERSAL PREDATION ON SEEDS OF *Jubaea chilensis* (ARECACEAE) BY THE INTRODUCED RODENT *Rattus rattus* (MURIDAE) AT LA CAMPANA NATIONAL PARK, CHILE. CALDERÓN, LESLIE L.; Marcelo, Wara; Vásquez, Rodrigo A.; Bustamante, Ramiro O. Departamento de Ciencias Ecológicas, Facultad de Ciencias, Universidad de Chile. Casilla 653, Santiago, Chile (leslore@yahoo.com).

Introduced species may generate several impacts on native communities. An ecological process that could be modified by exotic species is seed predation, affecting the recruitment of native plants. Chile exhibits a great amount of introduced species, most of them world-wide recognized as invasive species. An example

is the black rat (*Rattus rattus*) present on several protected areas in Chile. We analyze seed predation on *Jubaea chilensis*, an endangered species, by *R. rattus* and native rodents (*Octodon degus*) at La Campana National Park. We chose three sites inside the park having individuals of *J. chilensis* and evidencing the presence of rodents. We evaluate the seed predation related to *R. rattus* and *O. degus*, the abundance of rodents, and the habitat structure and disturbance level for each site. Seed predation is significantly higher on sites that have presence of *R. rattus* (40% higher). Although *R. rattus* is less abundant than *O. degus*, its seeds consumption is higher than the associated to the native rodent. *R. rattus* inhabit in tree-layer dominated sites and where human disturbance appears. We suggest that the presence of *R. rattus* could cause negative impacts on the population dynamic of *J. chilensis*, threatening its conservation.

138. VEGETATION MAPPING OF MONA ISLAND RESERVE, PUERTO RICO, USING HIGH-RESOLUTION IMAGERY. CALLE, PAULINA; Meléndez-Ackerman, Elvia; Martínez, Alma; Leimgruber, Peter. Institute for Tropical Ecosystem Studies, University of Puerto Rico-Río Piedras PO Box 21910 San Juan PR 00931-1910 USA (PC, EM-A, AM); National Zoological Park Conservation and Research Center, 1500 Remount Road, Front Royal, VA 22630, USA (PL); paulina_calle@yahoo.com (787) 596-0990.

Vegetation mapping provides critical baseline information (i. e. spatially explicit inventories of vegetation types and their land cover) that can be used for biodiversity monitoring and management in areas of conservation priority. Vegetation mapping using high resolution imagery may provide more accurate representations of local plant community variation-relative to other imagery types such as those from Landsat–especially in areas characterized by high spatial heterogeneity. Mona Island, located between the islands of Puerto Rico and Hispaniola, has been recognized among international scientists as a rare and valuable ecological laboratory. The island has been subjected to the pressures of feral goats, believed to be a major threat to Mona Island's extraordinary biodiversity. We evaluated IKONOS imagery for use in mapping Mona Island vegetation. Image processing techniques will be applied to the imagery in order to classify individual pixels and groups of pixels based on the spectral reflectance characteristics of the vegetation among different locations. Results will be compared with those derived from a prior study that used standard aerial photography mapping methods.

139. COMPENSATION MECHANISMS FOR LEGAL RESERVES IN BRAZILIAN FARMS. CAMPARI, JOÃO. Central South America Savannas Conservation Program, The Nature Conservancy, SHIN CA05, Conj. J, Bloco B, Salas 301-309, Brasília/DF, 71.503-505-Brazil (jcampari@tnc.org.br).

Currently a little over 20% of Cerrado's original vegetation remains in fragments large enough to be viable ecologically and they are being rapidly converted to large-scale agriculture, despite the stringent environmental legislation that disciplines land use. Brazilian legislation mandates that properties conserve headwaters, riparian areas and wetlands as "Permanent Protection Areas" plus 20% more as "Legal Reserve Area/LRA." A license for land clearing can only be obtained once a landowner has had the LRA formally registered. This legislation has been widely ignored and not effectively enforced, primarily due to prohibitive costs of enforcement (government) and costs of compliance (farmers). From the farmer's perspective, there is no trade-off between conservation and production, simply because the law is not enforced, leading to a typical externality problem. To internalize the costs of externalities, we propose the implementation of a freely accessible, Internet-based monitoring system of land cover at the individual property level and (ii) the implementation of the *Cerrado Grassland Exchange/CGE*, a market-based mechanism that would allow farmers to bid for the places that would compensate their environmental liabilities. Conservation efficiency can be attained through the simultaneous use of a (a) flexible, market-based instrument (CGE), (b) a tool associated with information gaps and transaction costs (the Internet-based Monitoring System) and (c) the regulatory framework (existing legislation).

140. IMPORTANCE OF HABITAT AREA AND LANDSCAPE CONTEXT FOR FAUNA RICHNESS IN SEMIDECIDOUS ATLANTIC FOREST. CAMPIOLO, SOFIA. Nucleo de Estudos da Mata Atlantica/DCB, Universidade Estadual de Santa Cruz, Ilhéus, BA, 45650-000, Brazil, campiolo@uesc.br.

I investigated how habitat area and landscape context affect the species richness of ants, butterflies, birds, terrestrials mammals, bats, and termites in semi-decidous Atlantic Forest in Bahia, Brazil (data from Biota da Conquista e Biota de Boa Nova Project). Richness of each biological group from 10 plots was related to fragment size and landscape context. Effects of surrounding landscape were restricted to total habitat area in circles with different radius (=different scales). This resultants coefficients were related with scales. Ants had the strongest significant relation species-area (0.95, $p<=0.05$). Correlation coefficients and scale of analysis were positively correlated for bats and terrestrials mammals and negatively correlated for ants, butterflies, termites, and birds. My results show that different biological groups demands different approaches for regional conservation planning.

141. IMPACT OF FREE-RANGING DOGS (*Canis familiaris*) AND CATS (*Felis catus*) ON WILDLIFE IN A SUBURBAN AREA. CAMPOS, CLAUDIA B.; Verdade, Luciano M. Laboratório de Ecologia Animal, Departamento de Zootecnia, Escola Superior de Agricultura "Luiz de Queiroz" ESALQ-USP, Piracicaba, SP, 13418-900, Brasil, cbcampos@esalq.usp.br (CBC, LMV), + 55 19 34294223.

This study quantified the population of free-ranging dogs (*Canis familiaris*) and cats (*Felis catus*) in rural and suburban areas; described and compared the diet of both species, and estimated their predation pressure on the wildlife, at Campus "Luiz de Queiroz" (22º42´S, 47º38W), of the University of São Paulo (860ha), in Piracicaba, state of São Paulo, Brazil. In July 2002 and January 2003, we surveyed 42 dogs and 81 cats and collected 234 scats. Dogs were more abundant in suburban than in rural environment and cats were more abundant than dogs in suburban environment. 52 items (68.4% animal origin, 15.8% plant origin and 15.8% no food items) were found in the scats and identified by bibliographical references. Invertebrates were the most consumed item followed by ma mmals (50.05 and 25.15%, respectively for dogs; 63.24 and 20.51%, respectively for cats). Both species could be considered opportunistic predators of generalist habit. Niche breadth was 0.4463 (dogs) and 0.4892 (cats) and niche overlap was 0.97. We estimated consumption of mammals between 16.8 and 25.4 kg. year. ind-¹ (dogs) and between 2.0 and 2.9 kg. year. ind-¹ (cats). Such consumption is possibly one of the reasons for the low density of small mammals formerly found in the study area.

142. REGENERATION OF SEASONAL RAIN FOREST IN A PROTECTED AREA IN THE FLOODPLAIN OF THE HIGH PARANÁ RIVER, BRAZIL. CAMPOS, JOÃO BATISTA; Dickinson, Gordon. Instituto Ambiental do Paraná, Av Bento M. Rocha Neto, 16, 87.030-010, Maringá, PR, Brazil, redebio@wnet.com.br. University of Glasgow, Department of Geography and Geomatics, Scotland — UK, gdickinson@geog.gla.ac.uk.

This study analyses patterns of forest regeneration in the floodplain of the High Paraná River, Brazil. The Protected Area of Porto Rico Island, 100 hectares in extent, had been deforested for cattle ranching. Cattle were removed in 1996, the island given protected status and forest allowed to regenerate. We investigated forest regeneration using a series of phytosociological transects along environmental gradients. The locations of the transects were established accurately by use of marked trees and GPS, surveyed in 2002, 2003 and 2004. Phytosociological types, functional groups and diversity indices were established. We compared these data with nearly undamaged natural forest sites. The regeneration showed spatial and temporal patterns indicating three seral stages of development to climax forest, with dominance of disturbance-tolerant pioneer tree species around the island's shore. The regenerating forest was less species diverse than primary forest. However around remaining mature climax forest trees, left to shade cattle, there was more species-diverse climax forest developing. We propose that these trees can be used, with site management, to reproduce forest closer to natural forest than that developing by regeneration alone. This will reduce "time tax" losses.

143. COMPOSITION AND DIVERSITY OF LAND FLATWORMS IN A MOSAIC LANDSCAPE OF *Araucaria* FOREST AND TREE MONOCULTURES. CAMPOS, LUCAS MIRANDA; Santanna, Milene Portal; Baptista, Vanessa dos Anjos; Leal-Zanchet, Ana Maria; Fonseca, Carlos Roberto. Instituto de Pesquisas de Planárias, Centro 2, Universidade do Vale do Rio dos Sinos, São Leopoldo, RS, 93022-000, Brazil, zanchet@bios.unisinos.br.

We compared the abundance, richness and composition of land flatworms between patches of Araucaria Forest and tree monocultures of *Araucaria angustifolia*, *Pinus* and *Eucalyptus*. From January 2003 to December 2004, land flatworms were sampled in 12 one-hectare areas in the Floresta Nacional de São Francisco de Paula (Southern Brazil). In total, 257 individuals of 32 species were collected, being distributed mainly in six genera (*Choeradoplana*, *Geoplana*, *Pasipha*, *Notogynaphallia*, *Rhynchodemus* and *Xerapoa*). Flatworm abundance was at least two times higher in Araucaria Forest than in the other habitats. Furthermore, species richness was higher in Araucaria Forest (14 ± 2.1 SE) than in monocultures of Araucaria (8 ± 0.6), Pinus (5 ± 1.5), and Eucalyptus (2 ± 1.5). Species composition in *Araucaria* Forest was different from all the monocultures. Land flatworms seem to be particularly sensitive to the replacement of their native habitat by monocultures of exotic and even native tree species.

144. LANDSCAPE STRUCTURE, EDGE EFFECTS AND NEST PREDATION IN SOUTHEASTERN BRAZILIAN ATLANTIC RAINFOREST. CANDIA-GALLARDO, CARLOS E.; Develey, Pedro F.; Metzger, Jean Paul. Laboratório de Ecologia da Paisagem e Conservação, IB, Universidade de São Paulo, São Paulo, SP, 05508-900, Brazil, candiagallardo@yahoo.com.br (CECG, JPWM). Birdlife International, Brazil Programme, Barueri, SP, 06474-010, Brazil (PFD).

Numerous studies have linked high forest bird nest predation rates to fragmentation and habitat edges. These evidences mainly come from studies conducted in the northern hemisphere, with low or no support in the Neotropics. Our aim was to test the effects of landscape structure, edge distance and small mammals abundance on artificial nest predation rates, in an Atlantic Rainforest region, one of the world's top five hotspots. We sampled 12 fragments (ranging from 1.4 to 175 ha) and Morro Grande Forest Reserve (9400ha). We did not find any significant effect of fragmentation or edge on nest predation. Nevertheless, we found a positive relation between big-eared opossum (*Didelphis aurita*) abundance and nest predation. These findings corroborate most studies conducted in the Neotropics, which do not give support to the "edge effect on nest predation hypothesis". Our results indicated that, at least in the study region, the major nest predators (*e. g.* opossum) do not avoid forest interiors; instead they may even prefer them. If this hypothesis is correct, even forest interior nests could suffer high predation rates. To avoid unusual high rates of predation in fragmented landscapes, efforts should be done to identify factors affecting predators abundance.

145. ANALYSIS OF THE GENETIC DIVERSITY AND POPULATION STRUCTURE IN *Amazona brasiliensis* (PSITTACIFORMES: AVES) USING MICROSATELLITE LOCI. CAPARROZ, RENATO; Martuscelli, Paulo; Sipinski, Elenise A. B.; Miyaki, Cristina Y. Universidade Católica de Brasília, Campus II, SGAN, Quadra 916, Módulo B, Av. W5 Norte, 70790-160, Brasília, Distrito Federal, Brazil (renatocz@yahoo.com.br) (RC). Rua Gravatá, 387, Quinta da Boa Vista, 07600-000, Mairiporã, São Paulo, Brazil (PM). Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental, Rua Gutemberg, 296, Batel, 80420-030, Curitiba, Paraná, Brazil (EABS). Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, 277, Cidade Universitária, 05508-090, São Paulo, São Paulo, Brazil (CYM).

The Red-tailed Amazon (*Amazona brasiliensis*) is an endangered parrot endemic to the Atlantic forest in southeastern Brazil. Field observations identified differences in the vocalization between parrots from southeastern São Paulo state (SP) and northeastern Paraná (PR). In order to investigate if there is a relation between the vocal difference and the genetic structure of this species and also to evaluate its genetic diversity, we studied eight microsatellite loci from 12 birds from Ilha Comprida (SP) and 21 from four islands in Guaraqueçaba (PR). All the loci were moderately polymorphic (average of 9.1 alleles/locus) and were under the Hardy-Weinberg equilibrium. Moderate and similar levels of heterozygosity were observed in the samples from all the localities studied (range 0.64-0.71). Birds from the various islands in Guaraqueçaba (PR) did not show significant genetic differentiation, but they were different from the parrots from Ilha Comprida (SP) (F_{st}=0.11; P < 0.001). This result suggests that amazons from these two localities presented some level of isolation in the past and this could be related to the vocal variation. However, more studies are necessary to evaluate if these groups are currently isolated and that information could be very useful for conservation purposes.

146. A LONG-TERM ETHNOBIOLOGICAL REFLECTION ON THE CONSERVATION BIOLOGY OF THE FISHES IN LAKE TITICACA. CAPRILES, JOSE; Domic, Alejandra. Department of Anthropology, Wash-

ington University in St. Louis, St. Louis, MO 63130, USA, jcaprile@artsci.wustl.edu. Carrera de Biologia, Universidad Mayor de San Andres, La Paz, Bolivia, alejandradomic@biociencias.org.

In this paper, we present a synthesis of the available information on the human use of fish in Lake Titicaca, south-central Andes. First, we present a diachronic history of the human exploitation of fishes in light of recent archaeological information as well as classical and current ethnographic literature. Second, we discuss the biological and ecological information about Lake Titicaca fishes focusing on the endemic killifish genus *Orestias* currently considered endangered. Third, we make a strong reflection on the importance of understanding long-term ecological processes of human-nature interactions. We conclude that the available information still has many gaps in relation to the biology and ecology of the fish populations as well as long-term impacts of human fisheries on them, particularly in relation to recent threats.

147. WHAT PERCENTAGE OF NATIVE CERRADO AND ATLANTIC FOREST REMAINS IN THE TRIANGULO MINEIRO REGION OF BRAZIL? CARDOSO, EDIVANE; Haridasan, Mundayatan. Departamento de Ecologia, Instituto de Biologia, Universidade de Brasília, Brasília, DF, 70.919-970, Brazil, (edivane@unb.br).

The Triangulo Mineiro region includes native Atlantic forest segments in the major valleys of Rio Grande and Paranaiba rivers in addition to the predominant cerrado vegetation in most of the area, according to recent classifications of native vegetation. We estimated the extent of destruction of original native vegetation in 32 municipalities of this region by analyzing Landsat 7/ETM+ (R5G4B3) images of 2001 with a resolution of 120m. Of the original total of 5.12 million ha, only 1.32 million ha were found to be conserved in the native state. The remaining native vegetation included 153000 ha in hydromorphic soils (*veredas and campos úmidos*), 527000 ha of open woodlands (*campo sujo* and *cerrado ralo*), 87000 ha of dense woodland (*cerrado denso*) and 556000 ha of forest formations (*cerradões*, gallery forests, semideciduous and deciduous forests). Thus 25.8% of the native vegetation was still conserved in the Triangulo region in 2001. The cerrado vegetation in well drained deep soils have suffered most destruction because of agriculture, cultivated pasture, reforestation with eucalyptus and pine, besides the construction of hydroelectric projects and urban expansion.

148. CHALLENGES IN CONSERVING GENETIC DIVERSITY IN FRAGMENTED RAINFORESTS OF NORTHEASTERN BRAZIL. CARNAVAL, ANA CAROLINA O. Q. Field Museum of Natural History, 1400 S. Lake Shore Dr, Chicago, IL 60605, USA, carolcarnaval@hotmail.com.

To study patterns and levels of genetic variation across forested landscapes in northeastern Brazil, I applied tools of phylogeography to local frogs using mitochondrial (cyt-b and ND2) and nuclear markers (c-myc proto-oncogene). I found considerable genetic structure among populations of *Proceratophrys* and *Eleutherodactylus*. Results for *P. boiei* were congruent with the view that naturally isolated forest enclaves within the *Caatinga* act as refuges, in which demes undergo differentiation. Structure extends to the lower levels of geographic sampling; in *P. boiei*, I detected genetic differentiation among breeding assemblages within continuous habitat. I found evidence of genetic isolation by distance among human-made fragments with mitochondrial and nuclear markers. However, pronounced mtDNA breaks among neighboring populations indicate that isolation by distance is not solely responsible for genetic patterns. Comparisons among co-occurring *Hyla albomarginata*, *H. branneri*, *P. boiei*, and *Scinax nebulosus* showed that patterns and levels of genetic diversity are influenced by taxon-specific habitat requirements. Most genetic differentiation in local populations reflects fragmentation events that predate human-driven habitat destruction. Moreover, *Eleutherodactylus* and *P. boiei* show genetic patterns consistent with hypotheses of biotic responses to Pleistocene climate changes. Knowledge of this strong historical component is necessary and timely for local conservation planning.

149. MONITORING THE EFFECTS ON MACROINVERTEBRATE BIODIVERSITY OF TWO FOREST MANAGEMENT TECHNIQUES ON TROPICAL FORESTS. CARRERA, CARLOS; Bersosa, Fabián. Museo Ecuatoriano de Ciencias Naturales, Rumipamba Nº 341 y Av. de los Shirys, Casilla Postal 17-07-8976, Quito -Ecuador, carrera@mecn.gov.ec,+593-22449824 (CC). Charles Darwin Foundation, Casilla 17-01-3891, Entomología SICGAL fbersosa@fcdarwin.org.ec (FB).

Forest management affects the abundance, richness, and composition of aquatic macroinvertebrates without regarding of the management form (mechanized or manual). Three streams were sampled in the Northeastern Ecuadorian tropical forests. First stream had the effects of the mechanized management; the other two underwent the impact of a semi-mechanized or manual management. Three sampling areas were taken for each stream, the first 50m above, in the second onsite and the third below of the management area. Surber sampler nets were used to collect macroinvertebrates. Additional variables taken were temperature, physical conditions of the river and its surroundings. In addition, pH, alkalinity, conductivity, dissolved oxygen, turbidity, and hardness were taken. Samplings were made before the forest management and after the same one in dry and rainy seasons during two years. Even though the abundance reduction is stronger between the high quality index groups (Ephemeroptera, Plecoptera, and Trichoptera), the abundance, and relative richness also diminished. This reduction was associated directly with changes in factors physical chemistry and structure of the stream surrounding area. Soon after the forest management happened, some recovery on macroinvertebrate richness occurred, but not a recovery of the initial state.

150. THE NATIONAL SCIENCE FOUNDATION TEACHING FELLOWSHIP PROGRAM AT THE UNIVERSITY OF MAINE, USA: HANDS-ON SCIENCE IN THE PUBLIC SCHOOL CLASSROOM. CARRIER, CHARLOTTE; Gott, Lauree; Miller, Kathryn M. Bucksport Middle School, Bucksport, Maine, 04416, USA, Charlotte.Carrier@umit.maine.edu (CC). Veazie Community School, Veazie, Maine, 04401, USA (LG). Department of Biological Sciences, 5722 Deering Hall, University of Maine, Orono, Maine, 04469, USA (KMM).

The future of conservation biology depends heavily upon public awareness and understanding of environmental issues. This is a direct result of the quality of the science and mathematics education received by students in our public school systems. The National Science Foundation Teaching Fellowship Program (NFS GK-12) at the University of Maine is an outreach program working to enhance the quality of science education in public schools. The NSF GK-12 program brings exceptional graduate students studying science, math, and engineering into the public school classroom, where they provide expertise, equipment, activities and role

models that would not otherwise be available to teachers and students. Experimental and inqui ry-based learning is enforced, and as a result the students become more confident, literate, and proficient in the sciences. These future adults will make up a society that will be better able to answer the increasingly complex questions that arise as technology advances. The NSF GK-12 program also provides professional development for mentor K-12 teachers through participation at professional science conferences and graduate education credits. Ultimately, the NSF GK-12 program strengthens the scientific and communication links between the K-12 educational system and the University-based scientific community, and enriches the science curriculum of public school systems.

151. ENVIRONMENTAL CERTIFICATION OF MATO GROSSO CATTLE RANCHES. CARTER, JOHN. Aliança da Terra.

Brazilian legislation requires that 50 to 80% of private properties in the Amazon forest region be maintained as forest reserves, restricting the area of land that is available for conversion to cattle pasture or agricultural fields. Many cattle ranchers are reluctant to comply with this legislation, and enforcement is difficult across the vast agricultural frontier of the region. A new non-governmental organization, the "Alianca da Terra" (Land Alliance), is helping cattle ranchers come into compliance with the law. The goal is to develop a system of environmental certification by which the beef produced by ranchers that are good stewards of natural resources has greater access to markets and, perhaps, higher beef prices.

152. BIOTIC SEED DISPERSAL DECREASE IN SECONDARY ATLANTIC FORESTS OF RIO DE JANEIRO STATE, BRAZIL. CARVALHO, FABRÍCIO ALVIM. Laboratório de Ciências Ambientais (LCA/CBB), Universidade Estadual do Norte Fluminense (UENF), Campos dos Goytacazes, RJ, 28015-620, Brazil, fabricioalvim@yahoo.com.br.

The objective of this study was to check the differences in the proportion of tree seed dispersion syndromes between secondary and mature forests in the submontane ombrofilous Atlantic Forest of the Rio de Janeiro coastal lowland, Brazil. Lists of species of nine secondary and five mature forests were used. Dispersion syndromes were determined through literature data. Biotic seed dispersal mode (zoocory) prevails in the sixteen forests analyzed (range from 64% to 87%). Significant differences were found between the two forest types (t test, $p<0,05$), and the proportion of biotic dispersion were greater in mature forests (83,2% versus 67,8%). Secondary forests show a decrease in the proportion of tree species dispersed by large-bodied frugivorous vertebrates, belonging to Lauraceae, Myrtaceae and Sapotaceae. It was verified that, as the composition of the seed disperser fauna appears to be one of the major filters for the seedling recruitment in succesional forest landscapes, the absence of adequate associated fauna is a risk to natural forest regeneration and colonization of new secondary forest patches. Thus, programs of restoration and management of secondary forests in this region must take in account the disperser-plant interactions to successful conservation and maintenance of these forest ecosystems.

153. MAMMALS POPULATION RECOVERY IN PRIVATE RIPARIAN RESERVES IN MATO GROSSO. CARVALHO JR, OSWALDO; Nepstad, Daniel. IPAM-Instituto de Pesquisa Ambiental da Amazonia Av Nazaré, 669 Belém, Pará, Brasil 66035-170 (oswaldo@ipam.org.br); Woods Hole Research Center, P.O. Box 296, Woods Hole, MA, 02543, USA (DCN).

Private riparian forests reserves (PRR) are important to protect headwaters, aquatic resources and forests connection with strong implications in conservation. In northeastern of Mato Grosso state, Brazil, with a fast and high deforestation rates pushed by agriculture and cattle ranching these reserves will be important to maintain local biodiversity. To understand the role of large mammals on the functioning and restoration of these areas, firstly we are sampling species composition and abundance and comparing with adjacent terra firme forest (TFF). At PRR, *Tapirus terrestris* (tapir) and *Agouti paca* (paca) were the most abundance species, while at TFF were *Cebus apella* (capuchin monkey) and *Tayassu pecari* (white lipped peccary). Although the abundance of species was different between PRR and TFF, the composition was quite similar showing a potential of these areas to maintain local biodiversity.

154. A STOCHASTIC MODEL OF SPECIES TURNOVER: THE ROLE OF INVASION AND EXTINCTION IN STRUCTURING DIVERSITY. CASSEY, PHILLIP. School of Biosciences, University of Birmingham, Edgbaston, UK p.cassey@bham.ac.uk.

It has been widely documented that the dual processes of human assisted extinction and invasion will leave a long-lasting legacy on the earth's biodiversity. Nevertheless, the exact nature of this legacy is hotly debated, as are the exact causes of current extinction rates and the effects of species invasions. I present a single state stochastic model for determining the shape of functions of species turnover among different nested scales under simple models of biotic homogenisation. When globally rare species are more susceptible to extinction, regional diversity decreases. However, when endemism is high and species distributions aggregated, diversity increases at all scales other than global. These results are compared to empirical patterns from oceanic island bird distributions.

155. CONDITIONS FOR COMMUNITY-BASED MANAGEMENT: THE PIRARUCU FISHERY AT THE MAMIRAUÁ RESERVE, AMAZON. CASTELLO, LEANDRO; Viana, João Paulo; Watkins, Graham. Instituto de Desenvolvimento Sustentável Mamirauá, Tefé AM, Brazil, and College of Environmental Science and Forestry, State University of New York, 1 Forestry Drive, 242 Illick Hall, Syracuse NY, United States of America, lcastell@syr.edu (LC). Gerência de Gestão de Recursos Pesqueiros, Diretoria de Conservação de Biodiversidade, Ministério do Meio Ambiente, Brasilia, Brazil (JPV). Iwokrama International Centre for Rainforest Development and Conservation, Georgetown, Guyana (GW).

Little knowledge exists about the conditions determining "successful" community-based management (CBM). In an ecosystem characterized by marginalization of local fishers, poorly-developed government institutions, and open-access natural resource use regime in the Brazilian Amazon, a model now exists for the CBM of pirarucu (*Arapaima gigas*). Pirarucu is a giant and obligate air-breathing fish that is vulnerable to extinction. At the Mamirauá Reserve, every year local fishers assess the population of pirarucu by counting the fish at the moment of aerial breathing and then use the data to determine fishing quotas for the next year. The Mamirauá Institute mediates negotiations between the fishers and the government and assists in the selling of the catch. The fishers commit to obeying size, season, and quota

regulations and earn exclusive rights over the local pirarucu. In virtually all of the 30 communities and 2 cities running this model, fishers engaged in the process and had profits doubled and pirarucu populations recovered by doubling in numbers every year. One condition for "successful" CBM appears to be the matching and assignment of the responsibilities of each stakeholder group with the appropriate levels of capacity and scale.

156. ISLANDS AS AN ALTERNATIVE TO CAPTIVE BREEDING: THE HIHI STORY. CASTRO, ISABEL; Armstrong, Doug P. Ecology Institute of Natural Resources, Te Kura Mātauranga o ngā Taonga ā Papatuanuku, Massey University, Private Bag 11222, Palmerston North, New Zealand, m i.c.castro@massey.ac.nz.

New Zealand's wildlife has suffered from the ravages of introduced mammalian predators and habitat destruction that followed human arrival. The main conservation strategy to safeguard endangered wildlife has been translocations to small islands where introduced mammals have been eradicated and/or where the habitat has regenerated. Sometimes, the translocated organisms survive in these new habitats without further human intervention. However, despite multiple translocation attempts (Hen, Cuvier, and Kapiti Islands) a frugivorous/nectarivorous forest bird, the hihi, was unable to establish. Intensive research on further translocated populations (Kapiti, Mokoia and Tiritiri Matangi Islands) showed that habitat quality, food and disease were implicated in Hihi's inability to establish. Thus management was developed to maintain the populations in situ. Nest boxes, supplementary feeding, and disease control/prevention are now part of hihi management at all translocation sites, as we have not found a site where a hihi population can survive on its own. While mainland areas become ready to hold wild endemic animals, small islands offer an opportunity to intensively manage species avoiding at the same time much of the cost associated with captive rearing and allowing animals to maintain natural behaviours by living in the wild. Other species treated this way include kakapo and kiwi.

157. TEMPORAL VARIATION IN BREEDING SUCCESS OF THE HUMBOLDT PENGUIN *Spheniscus humboldti* AT PUNTA SAN JUAN, PERU, 2000-2003. CASTRO, NADIA; Roca, Milena. Universidad Nacional Agraria La Molina, Av. La Universidad s/n, La Molina, Lima, Peru, nadia_cci@fastmail.fm. Proyecto Punta San Juan, Unidad de Ciencias de la Conservacion, Universidad Cayetano Heredia, Av. Armendariz 445, Miraflores, Lima, Peru.

The Humboldt Penguin *Spheniscus humboldti* is an endemic bird of the Peruvian current and a vulnerable species; hence the reproduction may affect decisively the viability of the population. This process depends frequently on the food availability, so we studied the effect of the variation of oceanographic parameters (indicators of food availability such as sea temperature, fish landings and CPUE index of Peruvian anchovy *Engraulis ringens*, main prey of the studied species) on the reproduction and chicken growth of penguins in Punta San Juan, the largest breeding colony of Peru, during a 4-year period (2000-2003). Although the mean fledging weight and fledging succ ess did not vary between years, a "bad" year is characterized by higher sea temperature, more abundant but more disperse food, lower hatching and breeding success and lower growth rate. Since penguins seem to be so sensitive to oceanographic variations and since a large part of the Peruvian anchovy stock is captured by the industrial fishery, competition for food may be a risk for their conservation.

158. QUANTITATIVE TOOLS TO ASSIST THE CONTROL OF ISLAND INVADERS: MODELING THE COMPETITOR RELEASE. Caut, Stéphane; Casanovas, Jorge G.; Virgos, Emilio; Lozano, Jorge; COURCHAMP, FRANCK. Ecologie, Systématique and Evolution, Université Paris-Sud XI, 91405 Orsay Cedex, France, stephane.caut@ese.u-psud.fr, franck.courchamp@ese.u-psud.fr (SC, FC). Depto. Ciencias del Medio Ambiente, Universidad de Castilla-La Mancha, Avda. Carlos III s/n, E-45071 Toledo, Spain. gcasanovas@eresmas.co (CJG). Instituto de Investigacion en Recursos Cinegéticos, CSIC-UCLM-JCCM, C/ Libertad 7 A, E-13004 Ciudad Real, Spain. evirgos@escet.urjc.es (VE).

The best response to the effects of biological invasions is almost always to control, and when possible eradicate, the alien population. In many cases, the elimination of the alien invasive species is followed by a rapid and often spectacular recovery of the invaded communities. However, the sudden removal of the alien species may generate further dysfunction, resulting in similar or greater damage to the ecosystem. We present here one such unexpected chain reaction. We built a mathematical model to study the impact of control on the interaction between two introduced competitors (higher competitor; rats *Rattus rattus* and lower competitor; mice *Mus musculus*). Analysis of this system shows that the lower competitor benefits from the simultaneous control of both competitors as soon as its indirect positive effect (the removal of their competitors) exceeds its direct negative effect (their own removal). This process, which we called "the competitor release effect", may arise eve n if both competitors are controlled simultaneously. Thus, mice may increase during non-specific rodent control, even though some are visibly killed. This competitor release effect is proportionate to the strength of control, meaning that mice may increase dramatically during non-specific control programs aiming at rat eradication in presence of mice.

159. USING FREELY AVAILABLE DATA TO ANALYZE CONSERVATION PRIORITIES. CAVALCANTI, ROBERTO B.; Agosti, Donat. Conservation International, Information Technology Division, 1919 M St. NW #600, Washington DC 20036 USA. Departamento de Zoologia, Universidade de Brasília, 70910, Brasília, DF Brasil.(RBC); American Museum of Natural History (DA).

Conservationists, scientists, government agencies, the private sector and the general public worldwide amassed impressive datasets on species, protected areas, biodiversity information and human and natural environmental data that are freely available. Most gap analyses and conservation priority setting exercises could not be done without such data. Global datasets on land cover (satellite imagery) and protected areas (WDPA) provide a first level cut for gap analyses. Economic and population data published by government agencies, nonprofits and research institutions enable mapping of threats and conservation urgency. Species data is available through several consortia. The main obstacle to refining conservation priorities is more often the lack of primary data rather than its accessibility.

160. FACTORS INFLUENCING LIVESTOCK DEPREDATION BY JAGUARS IN THE SOUTHERN PANTANAL, BRAZIL. CAVALCANTI, SANDRA M. C.; Gese, Eric M. Department of Forest, Range, and Wildlife Resources, Utah State University, Logan, UT, 84322-5230, USA, cavalcanti1@yahoo.com. USDA, National Wildlife Research Center, Utah State University, Logan, UT 84322-5230, USA.

In the southern Pantanal, killing of livestock is the major source of conflict between humans and jaguars, but the extent of these depredations and the impact on local ranchers is poorly understood. Jaguars are killed for depredation control without evidence of which cats are killing livestock. This study investigated interactions between jaguars and cattle, to determine the factors influencing depredation. We collected information on jaguar movements and habitat use, and examined depredation rates and patterns. Kill sites were mapped and correlated with environmental variables. We gathered a dataset of over 400 prey killed by individual cats. For each of these, we collected information on the species, identity of the predator, date and time, predominant vegetation, season of the year, and reproductive status of the predator. Predation patterns were examined to determine if jaguars preferentially prey on particular species or in specific areas. Individual jaguars utilized large home ranges, but their areas overlapped to a great extent. Native to domestic prey ratios varied among individual jaguars, as well as frequency of native prey they killed. Native and domestic prey were killed at different rates during different seasons. Understanding the feeding ecology of jaguars will be important for their long-term conservation.

161. POPULATION GENETIC STRUCTURE OF THREE ENDANGERED SPECIES OF *Encholirium* (BROMELIACEAE) AND IMPLICATIONS FOR EX SITU CONSERVATION. CAVALLARI, MARCELO M.; Forzza, Rafaela C.; Zucchi, Maria I.; Oliveira, Giancarlo C. X. Departamento de Genética, Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, 13400-970, São Paulo, Brazil, marcelocavallari@yahoo.com.br (MMC; MIZ.; GCXO) Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, Rio de Janeiro, 22460-030, RJ, Brazil (RCF).

Encholirium is an endangered Brazilian genus of Bromeliaceae. The aim of this work was to generate baseline information to the conservation of three *Encholirium* species endemic to the rocky mountains of Cadeia do Espinhaço, Minas Gerais State, through its populations genetic analyses. *E. pedicellatum* and *E. biflorum* are known by only one population, both occurring in non-protected territories, being critically endangered. *E. subsecundum* is more widespread, and some of its populations are protected by Conservation Units. Five RAPD primers generated approximately 60 polymorphic bands for each species. Few RAPD profiles were expected due to the clonal habit, apparently rare seedling recruitment and small population size. However, a single RAPD profile for every individual sampled was revealed (except for one clone found in *E. biflorum*). The results of an AMOVA showed that the populations of *E. biflorum* and *E. pedicellatum* presents, respectively, 16.06% ($P < 0.001$) and 8.44% ($P < 0.001$) of the total genetic diversity attributable to genetic differences among patches of the population. In *E. subsecundum*, 14.52% ($P < 0.001$) of the total genetic diversity resided among populations. Optimal sampling strategies to compose germplasm banks were delineated.

162. COUNTRYSIDE BIOGEOGRAPHY OF NEOTROPICAL MAMMALS: CONSERVATION OPPORTUNITIES IN AGRICULTURAL LANDSCAPES OF COSTA RICA. CEBALLOS, GERARDO; Daily, Gretchen; Pacheco, Jesús; Suzán, Gerardo; Sánchez-Azofeifa, Arturo. Instituto de Ecologia, Universidad Nacional Autónoma de México, A. P. 70-275, México, D. F. 04510, México (GC, JP, GZ). Center for Conservation Biology, Stanford University, Stanford, CA, U. S. A. (GD, ASA).

The future of mammal diversity in the tropics depends largely on the conservation value of human-dominated lands. We investigated the distribution of non-flying mammals in five habitats of southern Costa Rica: relatively extensive forest, coffee plantation, pasture, coffee with adjacent forest remnant, and pasture with adjacent forest remnant. Twenty six native species recorded in our study plots. Species richness and composition varied significantly with habitat type but not with distance from the extensive forest. Interestingly, small forest remnants (<35 ha) contiguous with coffee plantations did not differ from more extensive forest in species richness and were richer than other agricultural habitat types. Small remnants contiguous with pasture were species-poor. When clearing started, the study region likely supported circa 60 species. Since then, at least 6 species (10%), 1 family (4%), and 1 order (11%) have gone extinct locally. Although there is no substitute for native forest habitat, the majority of native, non-flying mammals use countryside habitats. Moreover, if hunting ceased, we expect that at least one of the extirpated species could be reestablished in this landscape, maintaining and restoring diversity in the ecosystem.

163. THE VULNERABILITY OF AQUATIC ECOSYSTEMS OF THE NAPO RIVER BASIN TO ANTHROPOGENIC DISTURBANCES, ECUADORIAN AMAZON. CELI, JORGE; McClain, Michael. Department of Environmental Studies, Florida International University, 11200 SW 8th St., Miami, 33199, FL, USA, jceli002@fiu.edu.

Aquatic ecosystems exhibit different vulnerabilities to anthropogenic disturbances as a function of ecosystem characteristics and the nature of disturbances. Determining the vulnerability of aquatic ecosystems to existing threats is an important prerequisite for effective management of biodiversity. In this study we examined the main aquatic ecosystems of the Napo river basin in Ecuador. The Napo is Ecuador's largest river basin and has a high diversity of aquatic habitats and biota extending from the high Andes to the lowland Amazon. Widespread development in the basin threatens to degrade aquatic ecosystems and their environmental services. We stratified the basin into six Ecological Drainage Units and 53 ecosystems. Ecosystem condition was assessed by analyzing the streamside zone, physical form, water quality, aquatic life, and hydrology. We also identified and mapped the main threats, which were habitat conversion/degradation, land development, mining/oil industries, and water diversion. We are currently examining the relationship between threats and health of aquatic systems using multivariate analysis in order to develop a model to assess vulnerability. These results will be presented, along with guidelines to improve the sustainable use of natural resources in the region.

164. RECOVERY AND CONSERVATION STATUS OF CRESTED IBIS (*Nipponia nippon*). CHANGQING, DING; Liu, Dong-ping; Zhai, Tian-qing; Zhang, Yue-ming. Institute of Zoology, Chinese Academy of Sciences, Beijing 100080, China (DCQ, LDP) cqding@mx.cei.gov.cn; Shaanxi Crested Ibis Conservation Station, Yangxian 723300, China (ZTQ, ZYM).

The Crested Ibis (*Nipponia nippon*) is an endangered species in the world. When the wild population was re-discovered in China in 1981, there were only seven individuals. After 24 years of conservation, the wild population size has been increased to about 360. In the early period of *in-situ* conservation, when the population was rather small, safeguarding the nests and nesting trees, prohibiting hunting and using fertilizers and pesticides, providing

supplemented foods for wild birds, rescuing injured and sick birds and preventing from predators are key protecting activities. In the recent years, with the development of population size and the extension of distribution area, it is difficult to continue the former specific conservation activities. In the other hand, the local people don't want to contribute to conservation at the cost of their economy development. Rice paddyfields are important feeding areas to Crested Ibises. In order to provide more non-polluted feeding areas, since 2003, the local people have been arranged to plant organic rice and the conservation station helped them to achieve "Organic Food" certificate of authority. The high price of organic rice compensated for the reduction of harvest. This mutual benefit way was proved cost-effectively.

165. BUY A FISH SAVE A TREE - SAFEGUARDING A SUSTANABLE WILD ORNAMENTAL FISHERY AND ALLEVIATING POVERTY IN THE RIO NEGRO BASIN, AMAZONIA, BRAZIL (PROJECT P). CHAO, NING L.; Silva, Marcio Pinheiro da. Universidade Federal do Amazonas; Departamento de Ciências Pesqueiras Universidade do Amazonas - Projeto Piaba Av. Gal. Rodrigo Otavio Jordão Ramos, 3000 69700-000 Manaus - AM, Brazil (NLC).

Ornamental fishery has been the principal livelihood for riverine communities of the middle Rio Negro basin, since the discovery of cardinal tetra (*Paracheirodon axelrodi*) in the 1950s. Those fishes are small with short life span and highly adapted to the water cycle of the region. An annual catch of 20-60 million has provides 60% of local income revenue to thousands families throughout the trade processes. The production is mainly depended on t he international market demand and strongly influenced by the variation of water levels. Is the fishery sustainable? We have found: (1) A single species, cardinal tetra, constitutes over 80% of total catch; any significant changes in its stock or large scale cultivation of these native fishes can eliminate the wild-caught ornamental fishery, which would be disastrous to the local socioeconomic orders and the fate of the ecosystem. (2) Species richness (fish diversity) is much greater than previously known, the role of river channel as a barrier and refuge for floodplain fish is evident. (3) Strong El Niño events (1984 and 1998) have greatly altered the duration of drought and on fishery catch for 2-3 years. (4) The spreading of invasive and exotic species in the region is on going agencies.

166. FOREST FRAGMENTATION AND CORTISOL LEVELS IN RED COLOBUS MONKEYS. Chapman, Colin A.; WASSERMAN, MICHAEL D.; Ziegler, Toni E. Department of Anthropology & McGill School of Environment, McGill University, 855 Sherbrooke St. West, Montreal, Quebec, Canada, H3A 2T7 (CAC). Department of Environmental Science, Policy, & Management, Division of Insect Biology, University of California, 137 Mulford Hall #3114, Berkeley, California, 94720-3114, USA, mwasserm@nature.berkeley.edu (MDW). National Primate Research Center & Department of Psychology, University of Wisconsin-Madison, 1220 Capitol CT, Madison, Wisconsin, 53715, USA (TEZ).

With habitat loss posing a major threat to species worldwide, an understanding of whether fragments can be used to protect endangered habitats and species is of critical importance. This is especially true for tropical forests and the primates living in them. Determining how primates respond to fragment-living is crucial for their conservation. Outside Kibale National Park, in western Uganda, there is a series of forest fragments that is ideal for studying this problem. The primate populations in these fragments have been monitored over the past ten years and fragment attributes have been quantified. During June and July 2003, we collected 225 fecal samples from 13 red colobus groups living in ten fragments and Kibale. We then measured cortisol metabolite levels and tested for relationships between these hormone levels and fragment attributes. We found a meaningful trend between cortisol metabolite levels and fragment area, as well as distance to next nearest fragment. Since chronic stress has been shown to depress an animal's ability to survive and reproduce, and measuring cortisol metabolite levels is an effective index of stress, these findings provide much-needed insight into how fragment-living influences primate physiology.

167. DEFINING LOCALLY IMPORTANT SPECIES AND COMMUNITIES, LESSONS LEARNED IN VENTURA COUNTY, CALIFORNIA. CHATTIN, ELIZABETH; Rubin, Lorraine; Drill, Sabrina; Magney, David. Ventura County Planning Division, 800 S. Victoria Avenue, Ventura, CA 93009 (EC, LR). elizabeth.chattin@mail.co.ventura.ca.us. Drill, Sabrina. University of California, Cooperative Extension, 4800 E. Cesar Chavez Avenue Los Angeles, CA 90022 (SD). David Magney Environmental Consulting, P.O. Box 1346, Ojai, CA 93024 (DM).

The Ventura County Planning Division, California assesses impacts to biological resources from proposed land use entitlements during the environmental review process, which is implemented according to the California Environmental Quality Act (CEQA). Locally Important Species and Communities (LISC) are considered a significant biological resource according to the County's General Plan; however, we discovered that a lack of a working definition for LISC has resulted in inconsistent review and protection of these resources. Prior to undertaking the task of revising our definitions and practice, we researched the definitions used by other local jurisdictions and found these definitions were equally va gue. As many rare, declining species and communities are not currently regulated by state and federal agencies, local jurisdictions should ensure that adequate policy is in place and carried-out to protect these resources. The Planning Division recently revised the definition and list of animal and plant species by enlisting the aid of local area biologists and planners. We will briefly describe how we developed our definition; revised our plant list from 1500 species to less than 400; plan to update our list of species and communities, and utilize this working definition during the CEQA process.

168. COMMUNITY COMPOSITION OF THE CARABID BEETLES IN SPRUCE/FIR SKY ISLAND AND THE INDIRECT CONSEGUENCES OF THE BALSAM WOOLY ADELGID INFESTATION. CHAVEZ, CARMEN; Browne, Robert. Wake Forest University, Department of Biology, PO Box 7325, Winston Salem, NC 27109, USA, chavmd3@wfu.edu.

Spruce/Fir forests of the southeastern Appalachian Mountains (USA) are a rare and relict habitat type found only as "sky islands" on the tops of mountains. Over the last 20 years, infestations of the invasive balsam wooly adelgid (*Adelges piceae*) have caused increased mortality of the Fraser Fir trees, such that approximately 80% of adult trees have die. We are studying the Carabid beetle community in these isolated sky islands in order to investigate changes in community structure through time and the effects of invasive balsam wooly adelgid pest. We hypothesized that dead trees would offer more physical habitat for the carabid beetles, which prefer the bark of dead trees. We sampled carabid beetles in 9 spruce/fir forests in two consecutive years (2003-04). Our

results showed a change in the community composition through time, based on historical records and museum information, with a decrease in the occurrence of the once-common 'boat-backed beetles' (*Scaphinotus* spp.). The balsam woody adelgid infestation, which has a direct negative impact on the Fir population, is also having indirect impacts on the populations of other organisms and as a consequence is causing a reduction in species diversity.

169. JAGUAR ECOLOGY AND CONSERVATION IN THE CALAKMUL BIOSPHERE RESERVE SOUTHERN MEXICO. CHAVEZ, CUAUHTÉMOC; Ceballos, Gerardo; Amín, Miguel; Zarza, Heliot; Manterola, Carlos; Rivera, Antonio. Laboratorio de Ecología y Conservación de Fauna Silvestre, Instituto de Ecología, UNAM, 3er Circ. Ext, junto al Jardín Botánico, Ciudad Universitaria Apdo. Postal 70-275, México, D.F. 04510. cchavez@miranda.ecologia.unam.mx (CC, GC, MA, HZ) Unidos para la Conservación, A, C., Ave. 1° de Mayo No. 249, Col. San Pedro de Los Pinos, México D. F (CM, AR, FZ).

The Calakmul biosphere reserve is the largest tropical forest protected area north of Amazonia. We have been studying the ecology of jaguars since 1997 to evaluate its long-term conservation trends. Jaguars have been radio-collared to determine population density, movements, and habitat use. Prey availability and use has been eval uated through censuses and scat analysis. Population density is, on average, one individual per 15 km². Both males and females have overlapping ranges. Population size is around 500 jaguars in the reserve and around 1000 animals in the reserve and adjacent forests. Although jaguars are distributed throughout the region, they do show habitat preferences. There is a large overlap of jaguar´s preferred prey and the species kill by subsistence hunting. We have developed a probabilistic model to evaluate the regional risk of extinction of jaguars related to population size, habitat and prey availability. Our results show that jaguars in this region have high probabilities of long-term survival if present conditions can be maintained. Highest threats are related to habitat destruction, prey depletion, illegal hunting, and diseases.

170. FIELD-BASED TRAINING FOR DECISION MAKERS AND PROTECTED AREA MANAGERS: THE EXPERIENCE OF THE ORGANIZATION FOR TROPICAL STUDIES IN LATIN AMERICA. Chek, Andrew; Brandon, Katrina; Castaño Betancur, Leandro; STASHKO, ED. Organization for Tropical Studies, Box 90630 Durham, North Carolina, 27708-0630 U.S.A (achek@duke.edu); (estashko@duke.edu); Center for Applied Biodiversity Science, Conservation International, 1919 M Street NW, Suite 600 Washington, DC 20036 USA; Organization for Tropical Studies, Apartado 676-2050, San Pedro, Costa Rica.

The Organization for Tropical Studies (OTS), a consortium of over 60 institutions, provides field-based training to high-leverage audiences affecting biodiversity conservation: decisionmakers and protected areas and wildlands (PAW) managers. Decisionmakers are elected officials, their advisors, and senior managers from government, private and non-profit sectors who are active at national scales and who make or influence policy, set strategic directions, and/or allocate resources in ways affecting conservation. PAW managers direct public or private sites or systems of areas, or production areas with a conservation mandate. OTS has trained more than 900 decisionmakers (including US congressional staff) and over100 PAW managers from the US, Latin America and the Caribbean. Courses emphasize hands-on, field-based training balanced with key literature and policy lessons, and immersion in natural settings. Decisionmaker courses stress the value, benefits, and linkages of biodiversity to other sectors, key concepts of conservation science, policy issues and tradeoffs. PAW courses address those topics and also include site and management planning, community engagement, fundraising, outreach and education, administration and monitoring among others. Courses have had measurable outcomes. A critical need exists to dramatically expand courses throughout the tropics to reach all needed constituents within a given political timeframe to achieve results favoring conservation.

171. FECAL CORTICOSTEROID CONCENTRATION X TOTAL FECAL CORTICOSTEROIDS. WHICH MEASURE REFLECTS BETTER THE TOTAL AMOUNT OF CIRCULATING HORMONE? CHELINI, MARIE O. M.; Souza, N. L.; Cortopassi, S. R. G.; Oliveira, C. A. Laboratório de Dosagens Hormonais, Departamento de Reprodução Animal (MOMC, CAO), marodile@usp.br, Departamento de Patologia (NLS), Departamento de Cirurgia (SRGC), Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo, Av. Prof. Dr. Orlando Marques de Paiva, n. 87, São Paulo, Brazil, CEP: 05508-000.

Non-invasive techniques to monitor reproductive or stress hormones in captive and free-ranging wildlife offer great advantages and are now widely used. However, we remain naïve about factors that may influence the accuracy of these techniques. The aim of this study was to evaluate the relevance of cortisol fecal metabolite concentration to assess physiological stress response. Ten adult female Syrian hamsters were ovariectomized and all feces voided by each of them collected daily during five days before and five days after surgery. Cortisol fecal metabolites were extracted and quantified by radioimmunoassay. We determined per gram fecal corticosteroid concentrations, total 24h fecal output and total 24h fecal corticosteroid production. Surgery affected considerably fecal output and using "per gram" vs. "total" corticosteroids yields different conclusions: while concentrations increased significantly immediately after the ovariectomy and decreased on the subsequent days, "total" excreted corticosteroids varied in a symmetrical pattern. Then, the relative, per-gram measure of hormones may not reflect the total amount of circulating hormones because these measures are comparable only if the volume of material in which the hormone is contained is the same between the two groups.

172. PLANT SPECIES RICHNESS IN A REAL SOURCE-SINK METACOMMUNITY. CHEN, XIAOYONG; Zhang, Guangfu; Xu, Gaofu; Zhang, Xin. Department of Environmental Sciences, East China Normal University, Shanghai 200062, China, xychen@des.ecnu.edu.cn.

A source-sink metacommunity is the combination of persistent communities and extinction-prone communities linked by recolonization. Theoretical studies indicated that species richness in the source-sink metacommunity may be maintained by dispersal - competition trade-off and heterogeneous habitats. However, no empirical data was available. Tongqiao islands in Qiandao Lake with a annual waterlevel fluctuation of about 10 meters is a typical source-sink community. Islands higher than the highest waterlevel provide persistent habitats for terrestrial communities and serve as source communities, while islands with the altitude between the highest and lowest water-levels provide temporary habitats and serve as sink communities. Species richness on islands were significantly related with the relative altitude. Due to the significant relationship between relative altitude and island area, a significant relationship between species richness and area. 42.9% species on the temporary islands were wind-dispersed species, fol-

lowed by water-dispersed species. No gravity-dispersed species was found on the temporary habitats, while 9.2% species on persistent habitats were dispersed by gravity. About half (49%) of plants on temporary islands were dispersed from persistent islands of a distance less than 200 m and long distance dispersal (>800m) contributed 11% of the dispersal to temporary islands.

173. BUILDING A COMMON GROUND: RAINFOREST CONSERVATION AND INDIGENOUS TERRITORIAL AUTONOMY. CHERNELA, JANET. Department of Anthropology, University of Maryland, 1111 Woods Hall, College Park, MD 20742, USA, chernela@umd.edu.

A common ground for the goals of indigenous peoples and conservation is not found, it is created through a collaborative process. Inclusion and partnering are complex processes, carrying potential for mutual misunderstanding. The complexities are compounded if the goals of the entities are not the same and systems of meanings differ. If international conservation NGOs mistakenly assume universal values and dedicate too few resources to considering the positions, values, and sets of meanings that indigenous entities bring to the negotiating table, they will fail in fair and effective partnering. Shared understandings and mutual benefit between participants are contingent achievements accomplished through a collaboratively constructed common ground. The exercise requires investment in time, finances, and intellectual resources.

174. THE CONCEPT OF COMMUNITY AND NATURE CONSERVATION PROGRAMS: EXPERIENCES FROM THE BOLIVIAN CHACO. CHICCHÓN, AVECITA; Painter, Michael. Wildlife Conservation Society, Bronx, NY, USA, mpainter@wcs.org (MP).

The role played by conservation programs that are implemented with the collaboration of local populations is a critical issue in discussions about the relationship that exists, or should exist, between the goals of promoting economic development that contributes to improving the quality of human life and promoting the conservation of biological diversity. While there is a consensus that local participation is an important element in conservation programs, in many cases there is also dissatisfaction with the results. On the one hand, there are questions about whether such collaboration really contributes to improving the quality of life of program participants, and, on the other, there are questions about whether collaboration with local people really results in significant contributions to biodiversity conservation. Among the factors that have contributed to unsatisfactory results has been the tendency of many activities with local populations to define their actions in terms of work with communities, attributing to them levels of homogeneity and solidarity that do not exist and, which, in many cases, have not existed historically. As a result, different observers have recommended that the concept of work with communities be replaced by an institutional focus that identifies entities characterized by compatible interests and builds shared agendas based on those interests. This has been the focus utilized by the conservation program in the Bolivian Chaco, which has been jointly implemented by WCS and the Capitanía de Alto y Bajo Izozog. This program has achieved positive results related to biodiversity conservation and improving the quality of human life. Of particular importance, the program's focus has enabled it to respond relatively effectively to challenges related to both sets of issues that have originated outside of the area that is the program's geographic focus.

175. ON TERRITORIAL ACTIVITIES OF TWO INTRODUCED GROUPS OF EUROPEAN BISON (*Bison bonasus*) IN "ORLOVSKOJE POLES'JE" NATIONAL PARK (CENTRAL RUSSIA). CHIKUROVA, EVGENIYA; Mizin, Ivan; Abramov, Yevgenij. Applied Ethology Working Group, Institute of Ecology and Evironment, Rus. Acad. Sci., 34, Vavilova st., Moscow, 119071, Russian Federation, savraska81@mail.ru (CE). "Orlovskoje Poles'je" National Park, Orel Province, Russian Federation (MI, AY).

There were 65 European bison introduced in the "Orlovskoe Poles'je" National Park (Central Russia) in the 1996 - 2000 years. These animals composed four herds. Two of them left the Park's territory and went to the "Kaluzhskie zaseki" State Reserve themselves. Actually, two herds live in the Park, named Avdeevskoje (32 bison) and Alekhinskoje (21 bison). We observed the differences between these herds (direct ethological observations after the herds). Avdeevskoe herd consist of several clusters. During winters, the herd uses the area of ca 1.5 km as a feeding place (artificial feeding place), except for a cluster of youngest males, which can go on distance of 4 km. During summers the herd use an area of ca 10-12 km. Bison in this herd use human pathways and roads for movements and layings. Alekhinskoe herd is presented by one close cluster and one single male. During winters, the herd uses the area in forest and fields between villages (ca 10-15 km), sometimes live the Park territory and move to the neighborhood Province (Br'ansk), crossing the railway. During summers, the herd uses the area of ca 20 km in forest and is practically invisible for an investigator. The herd uses its own pathways; it does not use human roads. Bison use natural borders, like rivers, to avoid the investigator's attention.

176. EFFECTS OF LANDSCAPE STRUCTURE ON MOVEMENT OF THE DRAGONFLY *Leucorrhinia hudsonica* IN WESTERN NEWFOUNDLAND, CANADA. CHIN, KRISTA; Taylor, Philip D.; Jonsen, Ian. Department of Biology, Acadia University, Wolfville, Nova Scotia B4P 2R6 Canada (KC, PDT), krista.chin@acadiau.ca. Department of Biology, Dalhousie University, Halifax, Nova Scotia B3H 4J1 Canada (IJ).

Past studies have demonstrated effects of landscape composition and configuration on important population processes such as movement, so we investigated effects of clearcutting on landscape-scale movement behavior of a peatland dragonfly (*Leucorrhinia hudsonica*) in western Newfoundland, Canada. We conducted a mark-release-recapture experiment to determine if movement rates between peatlands are a function of intervening habitats (forest or clearcut matrices) or other physical landscape features. Daily rates of movement among peatlands ranged from 0.4 - 9.3% (n = 1738). Models were fit using an AIC approach. Models that included the matrix were superior to models that did not. Results indicated that there was significantly more immigration into larger peatlands, peatlands separated by shorter distances, and peatlands that had a lower average pH. However, the matrix was not found to be a significant co-variate affecting dragonfly inter-peatland movement. As previous work in the system has shown large-scale effects of matrix on dragonfly abundance and existing literature suggests that matrix habitat does affect odonate movement, this result was unexpected. Reasons for this difference might include: 1) *L. hudsonica* inter-peatland movement is not affected by the matrix; or 2) the amount of continuous matrix between peatlands was not large enough to detect any effect.

177. RECONCILING THE NEEDS OF INDIGENOUS PEOPLES WITH THE MANAGEMENT OF BIOLOGICAL DIVERSITY. CHO'C, GREGORIO. P.O. Box 127; Jose Maria Nunez Street; Punta Gorda Town; Toledo District; Belize Central America Tel: (501) 722-0103; Fax: (501) 722-0124.

The Sarstoon Temash Institute for Indigenous Management (SATIIM) is a community based indigenous environmental organization working in the far south of Belize, in a region in the Toledo District that lies between the Sarstoon and Temash Rivers. SATIIM co-manages, with the Belizean Forestry Department, the 42,000 acre Sarstoon Temash National Park (STNP). The national park was declared by government in 1994 on lands traditionally used by the Garifuna and Maya communities who live in the area. There was no community consultation process before the creation of the park. What is now SATIIM began in 1997 as the Sarstoon Temash National Park Steering Committee, which was formed after the comm unities around the park came together to stake a claim in the management of the land and natural resources in and around the park. Many villagers opposed the declaration of the park and viewed it as confiscation of their lands, but others saw the creation of the park as an opportunity for the indigenous communities to continue to safeguard and manage the area. Residents who saw this opportunity formed the steering committee and began a long process of discussion with their neighbours, slowly persuading people that the communities could benefit directly and indirectly from the national park if they organized and controlled its management.

178. DEVELOPING CONSERVATION GIS CAPACITY FOR LATIN AMERICA: VIEWING THE WORLD AT DIFFERENT SCALES. CHRISTEN, CATHERINE; Leimgruber, Peter. Smithsonian's National Zoological Park, Conservation and Research Center, 1500 Remount Road, Front Royal, VA 22630, USA, christenc@si.edu.

Geographic Information Systems (GIS), Global Positioning Systems (GPS) and remote sensing provide powerful conservation tools. Using these technologies effectively, conservation biologists can collect spatial data to quantify landscape patterns, predict outcomes of landscape changes, model habitat suitability, and analyze animal movements and home ranges. In Latin America, training in these technologies' conservation applications is scarce, but demand is high. Our Conservation GIS Laboratory's hands-on curriculum focuses on geospatial technologies' practical applications for conservation, with lab and field exercises based on real-world research. Our 2004 course for Latin Americans and U. S. Latinos trained fifteen fellows (from 650 applicants). All trainees completed a post-course evaluation. However, true training impact must be measured through longer-term developments in research and conservation projects, so our tracking includes periodic research updates from all 2004 trainees. The 2005 fellowship course, a collaboration with University of Puerto Rico, integrates 3- and 6-month on-site follow-ups, both to measure progress and to provide essential project-based support. To expand the capacity building, we are planning to collaborate with Latin American institutions to initiate a regional network of training nodes offering low-cost applied conservation GIS training and follow-up to conservation groups, wildlife managers, and university students.

179. LARGE TREES AND THEIR IMPORTANCE FOR THE CONSERVATION OF WETLAND BIRDS IN THE PANTANAL OF BRAZIL. CHRISTIANINI, ALEXANDER V.; Cestari, César. Departamento de Zoologia, Instituto de Biologia, Universidade Estadual de Campinas, Campinas, SP, C.P. 6109, 13.083-970, Brazil, avc@unicamp.br (AVC). Departamento de Zoologia, Insituto de Biociências, Universidade Estadual Paulista, C.P. 199, 13.506-000, Rio Claro, SP, Brazil (CC).

The Pantanal harbors a rich fauna with numerous threatened species. The abundance of birds is especially attractive for thousands of ecotourists that visit the Pantanal every year. However, landscape change is increasing in the area. The need for higher cattle production in smaller areas has being achieved by deforestation and selective logging. We investigated whether the diameter and height of trees determine the selection of nest sites by wetland birds. We monitored the reproduction of a large mixed species colony of wetland birds along the Rio Negro basin, south Pantanal, during one year. We compared the traits of trees used as nest sites by herons, cormorants, and anhingas with the general tree community that runs along the river. Sampling of trees was done in six 50 x 50 m plots located at random in the riverine forests. Wetland birds showed a marked preference for large trees that occur just along non-disturbed portions of the riverine forests. The conservation of non-disturbed patches of riverine forests should be a priority in bird conservation programmes, what will also contribute to keep the appealing of wetland birds for ecotourism in the Pantanal.

180. CONSERVATION STRATEGIES OF ENDANGERED TREE SPECIES IN CENTRAL BRAZIL. CIAMPI, ANA Y.; Vieira, Daniel L. M.; Nakasu, Erich T.; Machado, Flavia R. B.; Salomão, Antonieta N.; Sevilha, Anderson C.; Scariot, Aldicir. Laboratório de Genética Vegetal, aciampi@cenargen.embrapa.br (AYC, ETM, FRBM). Laboratório de Ecologia e Conservação (DLMV, ACS, AS). Laboratório de Fisiologia de Sementes (ANS). Embrapa Recursos Genéticos e Biotecnologia, Parque Estação Biológica Final Av. W/5 Norte, Brasília, DF,70.770-900, Caixa Postal 02372, Brazil.

Amburana cearensis "umburana" and *Cedrella fissilis* "cedro" are endangered species because of their valuable timber. Although they are widespread in South America, they have naturally low-density populations. In Central Brazil cedro and umburana occur in paths of rich soils that are almost entirely deforested to cattle farms. We implemented a conservation plan *in situ* and *ex situ* for these species to maximize the genetic diversity. The area was the Paranã River basin (60,000 km^2), a great concentration of rich limestone derived soils region, consequently with high potential density of cedro and umburana and high deforestation rates. We collected seeds and leaves from 96 umburana and 137 cedro trees, at a maximum distance of 190 Km among trees. The adults showed high genetic diversity (0,79 umburana and 0,82 cedro) and were useful to form a bank of germoplasma. Seeds are conserved in cold chambers in EMBRAPA Recursos Genéticos e Biotecnologia; seedlings were planted for a permanent stock in Embrapa experimental station, and in three areas designated to restore the tropical deciduous forest of the Paranã, gently ceded by farm owners. Cedro and umburana are being extinct with their habitats in Central Brazil and only the creation of Reserves can preserve them.

181. SEASONAL VARIATION OF A HYPERSEASONAL CERRADO IN EMAS NATIONAL PARK, CENTRAL BRAZIL. CIANCIARUSO, MARCUS V.; Batalha, Marco A.; Silva, Igor A. Department of Botany, Federal University of São Carlos, São Carlos, SP, P.O. Box 676, 13565-905, Brazil, mcianciaruso@email.com.

Hyperseasonal savannas are characterized by the alternation of two contrasting stresses, drought and waterlogging. In South America, the largest savanna region is the Brazilian cerrado, in which there are few hyperseasonal areas. Our aim was to study temporal changes in species density, plant density, basal area, cylindrical volume, diversity, and evenness, in a hyperseasonal cerrado at four different seasons in the year. We placed randomly ten 1 m^2 quadrats in a 1-ha area, in which we sampled all vascular plants. We used one-way analyses of variance to test for differences among the seasons. We found in all seasons high cover values of the cespitose grass *Andropogon leucostachyus* Kunth, which is the dominant species in the hyperseasonal cerrado. Waterlogging caused a decrease in species density, diversity, and plant density, but not in evenness, basal area, and cylindrical volume. The low values of species and plant densities in the waterlogging period may indicate the non-adaptation of most cerrado species to waterlogged conditions. The many savanna plant responses to environmental perturbations may explain the persistence of savanna communities within a broad range of environmental variation. Waterlogging may act as an environmental filter, restricting the number of cerrado species able to stand that condition.

182. CREATION AND APPLICATION OF THE EDUCATIONAL PROGRAMME FOR SUSTAINABILITY FOR THE CHILDREN FROM VILCHES ALTO. CISTERNAS, JAVIERA; Prohens, Fernanda. Vergara 429 B, Santiago, Región Metropolitana, Chile, lulucisternas@yahoo.com.

The National Reserve "Altos de Lircay" located in central Chile, is a vegetational transition zone, with endemic species and high biodiversity. In the protected area, there is a town called "Vilches Alto" where a group of students from the Universidad de Chile have developed for the last three summers an educative module for the children of Vilches. This experience plus other studies in this place are the basis for the foundation of the Educational Programme for Sustainability for the Children from Vilches Alto 2005-20 09 (PESNIVA), where in the main objective is to create an harmonic relation with the enviroment. The Programme methodology establishes the development of contents that includes the sensitivity, perception and valuation process, in which the learning occurs with a mediator support. This strategy was proved in the town's school and then contextualized at the programme's units. PESNIVA is a guide document, that has allowed the formation of active thinkers able to give sustainable solutions to enviromental issues. Their annual evaluations have generated the feedback for the process, making sure of the continuous improvement of the programme.

183. BRICKS AND MORTAR- GETTING THE MIX RIGHT. EXPERIENCES IN BALANCING SKILLS AND CONCEPTUAL UNDERSTANDING IN CONSERVATION TRAINING. Clark, Chris; Copsey, Jamie; RATSIMBAZAFY, JONAH. International Training Centre, Durrell Wildlife Conservation Trust, Les Augres Manor, Trinity, Jersey JE3 5BP, UK. chris.clark@durrell.org, jamie.copsey@durrell.org.

The Durrell Wildlife Conservation Trust has provided conservation training since 1977. The initial focus on capacity building the worlds zoos through keeper training meant that practical training was a key component from the beginning. The recognition that a balance between introductory theory, specialist knowledge and practical application is vital to equip people not only to take away information after training but to employ it effectively in their field of work has been central to ongoing course development. The Diploma in Endangered Species Management has been run at the ITC since 1985. Currently the DESMAN course comprises Lectures 101¼ hrs (20%), Interactive sessions 110½ hrs (22%), Project time 127¾ hrs (25%), Workshops 45 hrs (9%), Practical Work in the zoo 128½ hrs (25%). We are applying the lessons learnt to the development and structure of new courses such as the Island Species Led Action course run for the first time in 2004. This course comprises Lectures 30 hrs (40%), Interactive sessions 40½ hrs (54%), Workshops 4¾ hrs (6%). The success of these courses demonstrates the value of maintaining the balance between theory and practice even when they are reduced from a 16 week to a 10 or 12 day duration.

184. FUTURE TRENDS IN AMAZON BASIN DISCHARGE AND FLOODPLAIN INUNDATION. COE, MICHAEL T.; Costa, Marcos Heil. Woods Hole Research Center, P.O. Box 296 Woods Hole, MA, 02540, USA, mtcoe@wisc.edu, (MTC), Departamento de Engenharia Agricola, Universidade Federal de Viçosa, Brazil.

Observational evidence indicates that in tropical regions river discharge generally increases with increasing deforestation. We have recently begun using numerical models to investigate future scenarios of river discharge and flooded area as a result of realistic estimates of deforestation. Simulations have been performed to investigate the sensitivity of the Amazon River system to scenarios representing land cover for the period 2000 to 2050. Two different trajectories of deforestation are investigated: 1) Business as Usual (BAU); and 2) Governance (GOV) under which land cover changes are limited by applied governance rules. In our simulations, deforestation, primarily on the main southern tributaries, increases discharge by 10-15% during the wet season in the GOV simulation with 20-30% of the individual basins deforested. With BAU, the discharge during the wet season increases by 20-25% compared to the modern simulation. Similarly, the flooded area of the basin increases wi th increasing deforestation; for the southern tributaries, the total flooded area during the wet season increases by 15% with GOV and 30% with BAU. The simulations clearly indicate that differences in the trajectories of deforestation are likely to significantly impact the future hydrology of the Amazon River basin.

185. SPATIAL DESIGNATION OF CONSERVATION PRIORITIES FOR GOLDEN LION TAMARINS (*Leontopithecus rosalia*) IN THE ATLANTIC FOREST OF RIO DE JANEIRO. COELHO, DANA; Godoy, Fabiano; Schroeder, Wilfrid; Skolnik, Benjamin. Sustainable Development and Conservation Biology Program, Department of Biology, University of Maryland, College Park, MD, 20742-4415, USA, dcoelho1@umd.edu.

More than 20,000 animal species and 1.6 million plant species reside within Brazil's Atlantic Forest. In places, biodiversity exceeds 450 species/ha. This coastal area is also home to 70 percent of Brazil's population, creating potential for conflict between humans and wildlife. Small endemic populations, like the golden lion tamarin (*Leontopithecus rosalia*), face significant risk due to habitat loss - especially from population growth, urban and agricultural development, fire, and forest fragmentation. Population viability analyses predict the need for 2,000 individuals on 25,000 ha of protected land in order to maintain a stable golden lion tamarin population. Current conservation strategies are connecting forest fragments and isolated populations using corridors. This study looks primarily at Silva Jardim and Casimiro de Abreu

in Rio de Janeiro state, the locations of the largest golden lion tamarin population. It also makes recommendations for successful conservation plans that account for social characteristics. Priority conservation areas were identified using spatial and temporal analyses (GIS and Remote Sensing) based on biological, geographical, and meteorological data. Analysis of municipality-level IBGE census data revealed a need for education and employment within the local populations, especially for youth and women. These needs could be satisfied by inclusive and community-focused conservation planning.

186. VERTEBRATE ROAD-KILLS IN TWO HIGHWAYS CROSSING THE MATA ATLANTICA BIOSPHERE RESERVE IN SOUTHERN BRAZIL. COELHO, IGOR P.; Kindel, Andreas; Coelho, Artur V. P. PPG-Ecologia UFRGS, Porto Alegre, RS, 91501-170, Brazil, ipfeifercoelho@yahoo.com (IPC); Departamento de Ecologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, 91501-170, Brazil (AK); Laboratório de Microeletrônica, Instituto de Física, UFRGS, Porto Alegre, RS, 91501-170, Brazil (AVPC).

Animal mortality due to vehicle collisions is one of the main impacts posed by road networks to ecosystems and only recently this impact is receiving more attention. In this work, we describe the composition, spatial and temporal patterns of vertebrate (except amphibians) road kills at the two largest highways (BR-101 and RS-389) crossing the northern coastal plain of Rio Grande do Sul. Between jan/2003 and jan/2004, once a month, a section of 90 km in each of those highways was monitored. Modified K and STAC statistics were used to evaluate spatial clustering of the events. A total of 877 vertebrates was registered (3,4 ind/10km), without significant variation of mortality between seasons. Vertebrate mortality was non-randomly distributed and presented greater aggregation intensity in scales of 10 km (BR-101) and 20 km (RS-389). The hotspots of road-kills in each highway had been located. These information, associated with analyses involving the species composition, will be used for recommending the establishment of wildlife passages and/or speed reducers. Relating these data with information about vehicle traffic, highways trace and adjacent landscape composition and structure will be important for supporting future regional road planning policies.

187. THE CHALLENGE OF PRESERVING VARZEA BIRDS: ECOLOGICAL SPECIALIZATION WITHOUT ENVIRONMENTAL CONSTANCY AND LOCAL ENDEMISM WITHOUT GEOGRAPHIC BARRIERS. COHNHAFT, MARIO; Naka, Luciano N.; Fernandes, Alexandre M. Instituto Nacional de Pesquisas da Amazônia - INPA, Coleções Zoológicas, Campus II, C.P. 478, Manaus, AM 69083, Brazil, mario@buriti.com.br.

The floodplain forests of Amazonian muddy-water rivers contain an endemic avifauna with very specific microhabitat specialization, associated mostly with primary successional stages. To colonize such constantly moving habitats in the face of natural riverine dynamics, varzea birds must be excellent dispersers. If, on the one hand, this trait should help protect their populations against the effects of local anthropogenic habitat alteration, it should also increase long-distance gene flow among populations and reduce the probability of local endemism. Counterintuitively, however, our recent field work revealed the presence of distinct areas of avian endemism within the varzea along the Brazilian Amazon River, loosely delimited by major tributaries. Conservation of varzea birds, then, requires not only large reserves to guarantee the presence of all microhabitats in their constantly changing mosaic, but also widely distributed reserves to represent all areas of endemism. The apparent resilience and tolerance to alteration of varzea species should permit their coexistence with human populations in such conservation contexts as "sustainable development" and "extractivist" reserves. However, major alterations to natural hydrology and water quality such as caused by hydroelectric dams, especially in upstream regions, could endanger the entire varzea avifauna and all its areas of endemism at once.

188. WHEN IS AN EXTINCT SPECIES REALLY EXTINCT? COLLEN, BEN. Institute of Zoology, Zoological Society of London, Regent's Park, London, NW1 4RY, UK, ben.collen@ioz.ac.uk.

The loss of the last remaining individual of a species is almost impossible to detect. Sadly, many species are known from only a small number of chance sightings or a handful of specimens, with only limited data available on their habitat requirements and likely range. Further, when species become rare, they may persist unseen for an unknown period, so time of last sighting may be a poor indicator of actual time of extinction. Using sighting and specimen records however, it may be possible, to infer the likely extinction date of a species. Using a technique called optimal linear estimation, we test in a number of vertebrate taxa, whether you can reliably infer when a species has finally become extinct. We discuss whether it is possible this technique can inform the 'Extinct' category of the IUCN Red List, and if we can infer causes of contemporary and historical extinction patterns, to give us a truer picture of how the current patterns we observe, arose.

189. RELATEDNESS AND MATING STRUCTURE IN THE CERRADO TREE SPECIES, *Tabebuia aurea* (BIGNONIACEAE). COLLEVATTI, ROSANE G.; Braga, Aline C. Pós-Graduação em Ciências Genômicas e Biotecnologia, Universidade Católica de Brasilia, SGAN916, Mod. B., Brasília, DF. 70790-160, Brazil, rosanegc@pos.ucb.br.

The Cerrado fragmentation has been changing the original landscape affecting population dynamics and long term species viability. We are interested in understanding mating structure and gene flow of the tropical Cerrado tree species *Tabebuia aurea*, to understand the fragmentation effect on population dynamics, and generate useful information for conservation strategies. At the Ecological Station of Aguas Emendadas leaves of 162 mapped individuals and at least four fruits from 24 adults were sampled. At least eight seeds per fruit were germinated for DNA extraction. All individuals and seeds were genotyped using 11 microsatellite loci. A high and significant inbreeding coefficient showed an excess of homozygotes resulted from mating between closely relati ves. Nevertheless, relatedness analysis indicated that a small number of individuals are closely related, with mean relatedness not significantly different from zero. Additionally, parent-offspring or full-sib pairs were frequently found closely together. The analysis of half-sib families indicated a high outcrossing rate but with a high frequency of mating between nearest pair of individuals. Although this species is pollinated by bumblebees, the big-bang flowering pattern may favour low distance gene flow. The maintenance of large populations may be important for long term species viability, providing pollen from unrelated individuals potentially increasing heterozygosity.

190. PHYLOGEOGRAPHY AND CONSERVATION GENETICS OF THE TROPICAL BRAZILIAN TREE SPECIES *Caryocar villosum* AND *C. microcarpum* (CARYOCARACEAE). Collevatti, Rosane G.; Gribel, Rogerio; Leite, Sue A. A.; LEOI, LELIA C.T. Pós-Graduação em Biotecnologia Genômica, Universidade Católica de Brasília, Brasília, DF, 70.790-160, Brazil, rosanegc@pos.ucb.br. Instituto Nacional de Pesquisas na Amazônia, INPA, Manaus, AM, 69.011-970, Brazil.

Caryocar villosum and *C. microcarpum* are low density Amazonian emergent tree from "terra-firme" and "igapó" forests, respectively, and threatened because of Amazonian fragmentation. We are interested in study population genetic structure, gene flow and phylogeography of tropical tree species to generate useful information for conservation strategies. We report the phylogeography of C. *villosum* and *C. microcarpum* based on the sequencing of a chloroplast non-coding region between *trn* T and *trn* F genes, and test the hypothesis that Negro River is a geographic barrier to populations of both species. In *C. microcarpum*, nine different haplotypes were found among 36 individuals, being seven haplotypes distributed on the right and two on the left margins of the river. Considering *C. villosum*, the differentiation among 32 individuals distributed on the both margins was not confirmed. Chloroplast based network showed distinct clusters, supporting the hypothesis of a possible geographic barrier for populations of *C. microcarpum*. Our results indicate that different maternal lineages may have colonized the margins, or differentiation may be due to population isolation after the river basin has attained its current size. However, polymorphism inside the groups tended to be higher than among the groups, indicating some homoplasy in network, probably due to independent mutations.

191. SCIENCE CAPACITY IN THE NATURE CONSERVANCY: CURRENT STRENGTHS, GAPS, AND APPROACHES TO MEETING EMERGING CONSERVATION NEEDS. COMENDANT, TOSHA; Weins, John; Kareiva, Peter; Sanjayan, M. The Nature Conservancy, 4245 N. Fairfax Dr. Suite 100, Arlington, VA, 22203 USA, tcomendant@tnc.org.

Configuring the capacity needed to address emerging conservation science issues is a considerable challenge for environmental organizations. Inevitably, there is time lag between recognition of crucial issues and mobilization of necessary staff. We formed a series of science assessment teams in 2003-4 to evaluate capacity strengths and critical gaps in state programs of The Nature Conservancy, as well as programs in China, Indonesia, and the Pacific Islands. Our findings are based on group discussions during regional meetings, presentations on science projects and priorities, working group reports, disciplinary expertise surveys, and individual interviews. We found that The Nature Conservancy is well positioned to address threats to terrestrial systems, whereas expertise in freshwater and marine conservation generally lags behind the needs. There is a time lag in the ability of large conservation organizations to effectively develop the skills and capacity to deal with emerging threats. For example, the magnitude of climate change as a global threat has yet to be met by a dedication of resources and capacity necessary to incorporate this issue into conservation planning, policy, and implemention of climate-sensitive decisions. We discuss approaches The Nature Conservancy is taking to solve internal capacity issues and build the capacity in partner organizations.

192. MONITORING TREE POPULATIONS IN SPECIES-RICH FORESTS. Condit, Richard; JOHN, ROBERT; The Center for Tropical Forest Science Working Group. Center for Tropical Forest Science, Smithsonian Tropical Research Institute Unit 0948, APO AA 34002-0948 (RC). Department of Plant Biology, 505 S. Goodwin Avenue, University of Illinois, Urbana, IL 61801, robertjc@uiuc.edu (RJ).

An old and basic ecological principle is stability. Are communities tightly-regulated assemblages, in which individual species maintain constant abundances through time? Alternatively, a neutral perspective would predict that abundances fluctuate randomly. With a network of large tree censuses at a dozen sites in the tropics, we offer empirical tests of these hypotheses. At each site, every individual in at least 16 hectares of forest has been located, identified, and measured at least twice over at least five years. Our approach to analyze these data is Bayesian, using inverse modeling to estimate community-wide distributions of mortality and population fluctuation. All forests are less stable than a neutral prediction - communities change more than they would due to random mortality and recruitment. Most large population changes were declines, rather than increases, and conspicuous declines were caused by drought-induced or fire-induced mortality in several forests. Some large increases and large decreases were associated with disturbance - species which require canopy openings. On the other hand, a substantial number of species in every forest changed very little in abundance.

193. THE INTEGRATION OF PUBLIC HEALTH IN CONSERVATION MEDICINE: CURRENT IMPEDIMENTS AND POSSIBILITIES. CONFALONIERI, ULISSES. National School of Public Health, FIOCRUZ Av. Brasil, 4036/703 21040-361 Rio de Janeiro RJ; School of Veterinary Medicine, Universidade Federal Fluminense Rua Vital Brasil Filho, 64 Niterói RJ, Brazil, e-mail: pmags@ensp.fiocruz.br.

Conservation Medicine literature (CM) has focused mostly on conceptual issues; the teaching of CM in Veterinary courses and on infections in free-ranging wild animals and their importance for conservation. Public Health (PH), one of the three main pillars of CM, has been, so far, of much less importance in structuring this new discipline. Some factors responsible for this situation, especially in developing countries, are: 1- the human epidemiological profile is dominated by chronic diseases rather than by infections; 2- zoonotic diseases endemic in humans (Chagas; Lyme; leishmaniases; leptospirosis; schistossomiasis etc) have been addressed by PH solely from the point of view of the protection of humans (anthropocentric approach); 3- Current major human infectious diseases (dengue; malaria) are not zoonotic and/or have no linkages with natural ecosystems; 4- Little concern of PH with disease and toxicological dynamics in natural systems, due to the urban concentration of the human population. To foster PH/CM integration, research and training in Public Health should be able to: 1) emphasize the zoonotic nature and world-wide impacts of many of the emerging diseases (HIV; SARS; Chicken flu; West Nile Virus); 2) stress the importance of wild animals as indicators of global chemical pollution (eg endocrine disruptors); 3) provide epidemiological tools to address conservation problems (eg. population viability analysis); 4) show that human and animal populations currently share exposures to global toxic and biological hazards; 5) demonstrate the need for integrated epidemiological surveillance systems covering wild and domestic animals and the human population.

194. THE IMPORTANCE OF KNOWING YOU LIVE INSIDE A BIOSPHERE RESERVE, A COMMUNITY-BASED EXPERIENCE AT EL TRIUNFO, CHIAPAS, MEXICO. CONTRERAS, OSWALDO; Butler, Paul; Perez, Fanny; Manzanero, Rafael. Natxalli AC, Tenochtitlan No. 4056, Col. Jardines del Sol, Zapopan, Jalisco, México 45050 natxalli@yahoo.com.mx. (OC) RARE 1840 Wilson Blvd., Suite 204 Arlington, VA 22201 USA (PB, RM) Dirección de la Reserva de la Biosfera El Triunfo, Palacio Federal 3er piso, 2ª Oriente Norte No. 227, Centro 29000 Tuxtla Gutiérrez, Chiapas, Mexico (FP).

In Latin America, people and high value natural resources coexist in Biosphere Reserves. Nevertheless, it is very common to find inhabitants don't know they live inside one. In 2000, a Conservation Education Campaign using the Rare *Pride* methodology at El Triunfo Biosphere Reserve strongly reached local inhabitants to increase awareness about their natural resource values, sustainable management and pride of living inside a Biosphere Reserve. This educational campaign used the Quetzal (*Pharomacrus moccino*) as the flagship species to reach people. A monitoring survey showed how before the implementation of the Quetzal Campaign 27% of local inhabitants (young and old) didn't know they lived inside the Reserve. After one year of implementing the Quetzal Campaign 57% of the people were aware of cohabitati ng in a natural protected area. Results show the immense usefulness of an educational campaign involving community-based social marketing. At present, the Quetzal Campaign prevails increasing local awareness for sustainable development (sustainable coffee, fire prevention, water conservation) at El Triunfo Biosphere Reserve in a participatory way after a five-year nonstop program.

195. LEAF-CUTTING ANTS NESTS IN FOREST FRAGMENTS: A THREAT TO SHADE TOLERANT SPECIES? CORRÊA, MICHELE M.; Bieber, Ana G.; Tabarelli, Marcelo; Wirth, Rainer; Leal, Inara R. Departamento de Botânica, CCB, Universidade Federal de Pernambuco, Recife, PE, 50.670-901, Brazil, correamm@uol.com.br (MMC, AGB, MT, IRL). Dep. of Plant Ecology & Systematics, University of Kaiserslautern, P.O. box 3049, 67653 Kaiserslautern, Germany (RMW).

The construction and maintenance of nests by leaf-cutting ants create understory gaps, which modify vegetation structure and light intensity at ground level. Here, we test if nests of *Atta cephalotes* reduce the proportion of shade tolerant species in forest fragments. We hypothesized that these species present lower frequency near ant nests because of their low light requirement. We selected eight equal-sized nests at the edge and eight in the interior of a 3.500-ha fragment of Atlantic forest in Serra Grande, Alagoas. For each nest we established four plots: (1) over the nest, (2) contiguous to the first plot, (3) 5 m far from the second plot, and (4) 20 m far from the third plot. We identified all trees from 1.5 to 10 cm DBH and gro uped species as shade tolerant or intolerant. The proportion of shade tolerant species was positively correlated with distance from the nest but only in colonies of the forest interior. The forest vegetation around edge nests was not affected, probably because the proportion of shade tolerant species is naturally lower in this habitat. In a fragmented environment the decreased abundance of shade tolerant species caused by *Atta* nests threats the few remnants of primary forest.

196. A RELIABLE NON-INVASIVE METHOD FOR TAXONOMIC DETERMINATION OF FOXES FROM URUGUAY USING FECAL DNA. Cosse, Mariana; Maldonado, Jesús E.; Duarte, José M. B.; LEIZAGOYEN, CARMEN; González, Susana. División Citogenética-IIBCE -UA Facultad de Ciencias Av. Italia 3318 11600 Montevideo-Uruguay mcosse@iibce.edu.uy (MC, SG). Genetics Program, NMNH, Smithsonian Institution. 3001 Connecticut Ave. NW. Washington, DC 20008 USA (JEM). UNESP Via de Acesso Paulo Donato Castellane, s/n14884900-Jaboticabal, SP- Brazil (JMBD). Parque Lecocq, Luis Batlle Berres Km 19.200 - SantiagoVázquez, Montevideo-Uruguay (CL).

The crab-eating fox (*Cerdocyon thous)* and the pampas fox (*Pseudalopex gymnocercus)* are the only two South American fox species known to presently occur in Uruguay. Documenting their presence and abundance is the first step in designing conservation plans and in understanding their population ecology. The objective of this study was to develop a method that would allow us to determine the occurrence and distribution of foxes from areas throughout Uruguay. We describe a fast and reliable method that utilizes non-invasively collected samples from feces. We designed a primer set that amplifies a short (232 bp) fragment of the mtDNA control region. This fragment co ntains an Ssp I digestion site unique to *C. thous*. Successful PCR-RFLP products showed a clear single band for *P. gymnocercus* and a double band for *C. thous* in 2% agarose gels. We analyzed fifty samples from different Uruguayan locations. Our results showed that 75% of the samples that were screened were identified as *C. thous,* suggesting that this species has a wider distribution and would be more abundant than *P. gymnocercus*.

197. THE DIVERSITIES OF MAMMALS AND GAP ANALYSIS IN THE SERRA DO ESPINHAÇO MOUNTAIN RANGE AS AN AID IN DEFINING OUTCOMES FOR THE CONSERVATION OF RUPESTRIAN FIELDS. COSTA, BÁRBARA M. A.; Fonseca, Gustavo; Paglia, Adriano; Costa, Leonora P.; Leite, Yuri L. R. Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Av. Antônio Carlos, 6627 Cep:31270-901 Belo Horizonte, MG, Brazil tafinha@gmail.com (BMAC, GABF). Conservation International do Brasil (APP). Universidade Federal do Espírito Santo - PPGBAN (BMAC, LPC, YLRL). Center for Applied Biodiversity Science, Conservation International, Washington, DC, USA (GABF).

The Serra do Espinhaço mountain range stretches from the south of Minas Gerais to the southwest of Bahia, encompassing the Atlantic Forest, Cerrado, and Caatinga biomes. Rupestrian fields, as a predominant form of vegetation in this region, have a unique importance to the local fauna and flora. Yet, knowledge concerning the diversity and distribution regarding taxonomic groups remains incomplete. The objective of this work is to evaluate the composition and distribution of the mammals found within the different types of vegetation along the Serra do Espinhaço, and to identify any gaps in knowledge. In order to achieve this objective data is being compiled based on scientific collections and a bibliographic review, for the different regions of the Espinhaço range. Currently, a total of 87 species of mammals and 36 gap areas have been identified for the southern, central, and northern regions of Minas Gerais. Within this list there are endemic species of both the Atlantic Forest and Cerrado, also 97% of the gap areas are located in the central and northern part of the Espinhaço range. This study will eventually direct additional efforts in the field and will

identify with greater precision the outcomes of conservation for this region.

198. FOLIVORES MONKEYS, FOREST FRAGMENTS AND URBAN SPRAWLING, A CASE STUDY IN THE METROPOLITAN AREA OF BELO HORIZONTE, MINAS GERAIS, BRAZIL. COSTA, CLAUDIA GUIMARÃES; Assunção, Maíra de Lourenço; Resende, Saulo R. O. Museu de Ciências Naturais da PUC Minas, Av. Dom José Gaspar, 290, Prédio 40, 30.535-610 / Centro Universitário do Leste de Minas Gerais (Unileste, MG) cacau@pucminas.br or claudiagc@unilestemg.br (MLA) Curso de Ciências Biológicas da PUC Minas Betim. (SROR) Sete Soluções e Tecnologia Ambiental, Belo Horizonte, MG, Brazil, saulo@sete-sta.com.br.

Conservation efforts are difficulted by political or economical issues, and strategies for developed countries may not be appropriate for the tropical under development world. Efforts to minimize environmental impact of different undertaking such as real state development are extremely necessary. This development is taking place at the metropolitan region of Belo Horizonte city, in a Protection Area (APA Sul). This project has the goal of monitoring a primate species, *Callicebus nigrifrons*, evaluating it's status in three different periods; before, during and after the development starts in order to obtain a long term dataset. The monitoring is conducted using a census method by play-back on the surrounding and the real state development area. Four groups of *C. nigrifrons* were found in three different forest fragments. We encountered a group of four individuals on the forest fragment A, a group of three on forest fragment B, and two groups on the forest fragment C with four individuals and one adult female respectively. The data on vegetation conditions (physiognomy, structure and connectivity) appears to support the mantainance of the groups. The monitoring will continue in 2005-2006 making possible an evaluation and comparison of the species status in different periods of the development implantation.

199. PRIVATE PROTECTED AREAS IN BRAZIL AND THE FEASIBILITY OF A PROGRAM FOR THE ATLANTIC FOREST. COSTA, CLAUDIA M. R.; Herrmann, Gisela. Valor Natural Association, Rua Acarau 205/01, Belo Horizonte/MG, 30.380-020, Brazil, claudiacosta@valornatural.org.br (CMRC, GH). PhD Program in Ecology, Conservation and Wildlife Management, Federal University of Minas Gerais, Caixa Postal 486, Belo Horizonte, MG, 30161-970, Brazil (GH).

Fragmentation is the main cause of loss of biodiversity of the Atlantic Forest, a hotspot reduced to 8% of the original area. Although the protected area network is one of the best strategies to save the Atlantic Forest less than 2% of this biome is under restricted protection. Besides that, the majority of forest remnants are small and isolated and most of lands are in private hands. According to recent studies, these small areas have a fundamental role as stepping stones in the biological corridors, and all efforts have to be made in order to protect them as private reserves. Here we analyze the evolution of private reserves in Brazil. In 15 years since this category was officially recognized, 656 reserves were created. The majority (67% or 443 reserves) are in the Atlantic Forest, covering 99,028 hectares. We discuss the reasons, challenges, distribution and importance of these reserves and give a brief survey of institutional, economic and legal factors driving the increa se. In spite of the few benefits the creation of these reserves has gradually increased and could be a key mechanism to help design a network of sites to maintain the biodiversity and natural processes in the long term.

200. EFFECTS OF LARGE-SCALE CHANGES IN LAND COVER ON THE DISCHARGE OF THE TOCANTINS RIVER, SOUTHEASTERN AMAZONIA. COSTA, MARCOS HEIL. Departamento de Engenharia Agricola, Universidade Federal de Viçosa, Viçosa, MG, Brazil, mhcosta@ufv.br.

Studies that relate changes in land cover with changes in river discharge at the small scale (~1 km^2) are abundant. These studies generally indicate that deforestation causes an increase in the annual mean discharge. However, previous studies that evaluated the effects of changes in land cover in larger river basins (> 100 km^2) usually have not found similar relationships. Here we analyze a 50-year time series of discharge from the Tocantins River at Porto Naçional (175,360 km^2), as well as precipitation over the drainage area during a period where substantial changes in land cover occurred in the basin (1949-1998). The analysis indicates that while precipitation over the basin is not statistically different between the periods 1949-1968 and 1979-1998, the annual mean and wet season discharge are about 25% and 28% (respectively) greater in the second period, when agriculture had increased from 30% to 49% of the basin. Further analyses present additional evidence that the change in vegetation cover altered the hydrology of the region.

201. META-ANALYSES OF DATA SERIES FROM MULTIPLE SOURCES. CÔTÉ, ISABELLE M.; Gardner, Toby; Gill, Jennifer A.; Watkinson, Andrew R. Centre for Ecology, Evolution and Conservation, School of Biological Sciences, University of East Anglia, Norwich NR4 7TK, UK email:i.cote@uea.ac.uk (IMC, JAG, ARW). Centre for Ecology, Evolution and Conservation, School of Environmental Sciences, University of East Anglia, Norwich NR4 7TK, UK (TAG, ARW). Tyndall Centre for Climate Change Research, NR4 7TJ, UK (ARW).

An important hurdle to evaluating whether we are will meet the 2010 biodiversity target is the limited availability of time-series of data on the area and state of natural habitats. While some habitats can be monitored on a large scale through remote sensing, many cannot. Moreover, remote sensing may not be suitable for habitats in which ecological degradation precedes areal loss. We offer meta-analysis as a method which allows the integration of information derived from small-scale, short-term studies into a large-scale, long-term picture of ecological change. Using a large dataset from Caribbean reefs, we examine the performance of different metrics to measure rate of change in various benthic components. We then compare the rates of change in coral cover obtained in meta-analyses of studies using a variety of methods and of data generated by coordinated surveys using standardised methodologies. Meta-analysis allows us to determine the accuracy of large-scale survey programmes based on volunteer effort, to generate for the first time estimates of change in coral cover for all regions of the world, and to assess quantitatively our progress (or lack thereof) towards the 2010 target. We believe that this method can be applied to any habitat that is regularly surveyed in the course of ecological or conservation research.

202. PLANNING FOR IMPLEMENTATION: MAINSTREAMING NATURE CONSERVATION INTO LAND-USE PLANNING. COWLING, RICHARD M.; Welz, Adam; Pierce, Shirley M.; Lombard, Amanda T.; Knight, Andrew T.; Rouget, Mathieu. Department of Botany and Terrestrial Ecology

Research Unit, University of Port Elizabeth, P.O. Box 1600, Port Elizabeth, 6000, South Africa; rmc@kingsley.co.za (RMC, SMP, ATL, ATK). Kirstenbosch Research Centre, South African National Biodiversity Institute, Claremont 7735, South Africa (MR). Department of Botany, University of Cape Town, Rondebosch 7701, South Africa (AW).

While the numbers of conservation assessments continue to grow, the rate of implementation remains low. This is because most assessments do not consider the needs and knowledge of their clients. In South Africa's Thicket biome, a conscious effort has been made to develop assessment products that are both user-friendly and user-useful for local government officials, who are responsible for implementing changes in land use. However, in most cases, these officials lack the capacity and will to incorporate biodiversity concerns into spatial plans. The burden of ensuring this invariably rests with a small and fragmented biodiversity sector. We present an alternative approach that involves the identification and mapping of natural features (natural capital) that are essential for the sustainability of other sectors (agriculture, tourism, water supply etc.). Mobilizing stakeholders to ensure that these features are safeguarded in local spatial plans is an effective way of ensuring that biodiversity is mainstreamed into land use planning. Of critical importance is that the responsibility of ensuring the achievement biodiversity goals is spread across many sectors, and not just the biodiversity one. We illustrate our approach using a case study where biodiversity concerns have been mainstreamed into the water management, tourism and agriculture.

203. BEYOND BORDERLINES: PERSPECTIVES ON CONSERVATION. COWLING, RICHARD M.; Knight, Andrew T.;. Department of Botany and Terrestrial Ecology Research Unit, Nelson Mandela Metropolitan University, P.O. Box 77000, Port Elizabeth, 6031, South Africa; rmc@kingsley.co.za.

Effective conservation is founded upon consilience, drawing on diverse knowledge traditions in the natural and social sciences. We discuss this perspective by highlighting four issues that have confronted us during our careers as conservation scientists over the past five years. We place these issues within a framework that depicts a continuum of conservation activity from data collection to the establishment of learning institutions. Firstly we argue that the debate about forms of data used for conservation assessments is enriched by the requirement to use spatial surrogates, especially ecosystem services, whose conservation is underpinned by strong stakeholder support and relevance. Secondly, we propose that in order to overcome the pervasive "knowing-doing" gaps between assessment and planning, and planning and implementation, conservation planning should integrate three components: systematic assessment, implementation strategy development, and stakeholder involvement. Thirdly, these components form part of an interactive continuum that requires ongoing participation by all actors, including stakeholders, enablers and natural scientists. Severing the research-implementation continuum seriously compromises the effectiveness of conservation action. Fourthly, we discuss the importance of social learning institutions as an ultimate outcome of the conservation activity continuum, and stress the significance of personal emotional intelligence in their effective functioning. We illustrate these issues with examples for systematic conservation planning projects in South Africa.

204. MAPPING NATURAL CAPITAL VIA STAKEHOLDER INVOLVEMENT. Cowling, Richard M.; WELZ, ADAM. Department of Botany, University of Cape Town, Rondebosch 7701, South Africa, awelz@botzoo.uct.ac.za (AW). Department of Botany and Terrestrial Ecology Research Unit, University of Port Elizabeth, P.O. Box 1600, Port Elizabeth, 6000, South Africa; rmc@kingsley.co.za (RMC). (awelz@botzoo.uct.ac.za).

Ecosystems can be conceptualised as 'natural capital', providing vital goods and services to the human economy. Resource, environmental and ecological economists have developed several means for the valuation of natural capital, many fairly complex and requiring detailed specialist knowledge of the systems under study. The values so derived, however, aren't always compelling to land-use decision-makers in South Africa, not often equipped or motivated to incorporate ecology into planning. Despite progressive national conservation legislation, much valuable biodiversity continues to be lost. In order to emphasise users' dependence on healthy natural ecosystems, and create new champions for biodiversity protection outside the traditional conservation sector, we are developing a simple framework for mapping and valuing natural capital via local stakeholder involvement. This work takes place at a municipal scale, as many land-use decisions are made at this level of government. Natural capital is to be identified by its beneficiaries. Values will be calculated according to information given by them, reflected in clear and simple terms, and mapped in a manner and on a scale useful to local planners. The information will be structured to be fed easily into legally-required Spatial Development Frameworks and Integrated Development Plans.

205. A EUCLIDEAN DISTANCE-BASED HABITAT USE ANALYSIS OF THE ENDANGERED FLORIDA PANTHER. COX, JOHN J.; Larkin, J. L.; Maehr, D. S. University of Kentucky Department of Forestry Lexington, Kentucky, USA 40546-0073.

At fewer than 100 individuals, the Florida panther remains one of the world's most endangered mammals. Although panthers have been monitored for over two decades, the species occupation of remote and inaccessible habitat has restricted observations to hours with sufficient daylight for telemetry flights, and thus the biology of the species during nocturnal hours remains largely unknown. Previous habitat analyses of the panther have recently been criticized as being diurnally-biased and only representative of daytime bedding activity and for use of inappropriate landcover data. We analyzed over 58,000 panther radiolocations from 1981-2003 using a Euclidean distance-based analysis, a technique that tests for non-random habit use by utilizing linear distances of observations to vegetation types. In addition, we matched location data to the nearest landcover data and randomly selected an equivalent number of locations for each cat from both diurnal and crepuscular times, the latter a period of peak activity. As compared to random locations, panthers were found at greater than expected distances from urban and open areas and closer than expected distances to forested habitats regardless of time period ($p < 0.05$). Our findings indicate that Florida panthers prefer forests during both active and inactive periods of the day.

206. THE ADAPTIVE MANAGEMENT OF IMPACTS AS A STRATEGY FOR THE SUSTAINABLE USE OF THE PIRARUCU IN THE AMAZON BASIN. CROSSA, MARCELO. Instituto de Pesquisa Ambiental da Amazônia - IPAM; Av. Rui Barbosa 136 CEP: 68.005-080 Santarém, Pará crossa@ipam.org.br; Del Aguila Chaves, Javier. Instituto Nacional de Recursos Naturales - INRENA, Ricardo Palma 113 Iquitos, Peru, jadelach@viabcp.com.

Floodplains are essential to the conservation of Amazon aquatic biodiversity. The degradation and fragmentation of habitat along the Amazon River, combined with increasing fishing pressure, have depleted stocks of pirarucu (*Arapaima gigas*), a species that can reach 2.85 meters length and a weight of 200 kg. The pirarucu has a boney tongue, must breathe air and builds nests and cares for young until they reach 30-40cm. The species is considered to be sedentary, but they do undertake trophic migrations and/or disperse during large floods. The first studies of pirarucu fisheries, ecology and population dynamics were begun in the early 1990's. These studies indicate that the species reacts positively to protection of lakes and thanks to the potential for monitoring these stocks, it has become a key species for fisheries management. Participatory research and collective management plans are being developed, although new studies are needed to consolidate these advances and contribute to new management strategies. In this paper we discuss the concept of adaptive management of impacts as a strategy for guiding management processes, with emphasis on user participation in the development, implementation, monitoring and revision of management systems.

207. BIODIVERSITY CONSERVATION AND SUSTAINABLE RESOURCE USE IN NORTHEASTERN MADAGASCAR: MAKIRA FOREST CONSERVATION AREA PROJECT. Crowley, Helen; Meyers, David; HOLMES, CHRISTOPHER; Sesy, Soja; Jaozandry, Jean Jacques. Wildlife Conservation Society, International Conservation, B.P. 8500 Soavimbahoaka, 101 Antananarivo, Madagascar, wscmad@wanadoo.mg (HC, DM). Wildlife Conservation Society, Project Makira, Tanambao, Maroantsetra, Madagascar, makira@uuplus.com (CH, SS JJJ).

The Madagascar government plans to triple its protected area network from 1.7 million hectares to 6 million hectares within 5 years to ensure that 10% of Madagascar's surface area is managed for biodiversity conservation. The Makira Conservation Site is an important first step in this expansion as it encompasses 350,000 hectares of pristine rainforest in northeastern Madagascar. Makira will become the largest protected area in the country and part of the Antongil conservation landscape: a landscape of forest, marine and coastal habitats. It has been estimated that this landscape could contain 50% of Madagascar's biodiversity. Makira includes priority conservation zones and regulated multiple-use areas, and is surrounded by forests in which resource management responsibilities have been or are being transferred to communities via contracts with the government. This combination constitutes a new approach to the seemingly conflicting issues of biodiversity protection and sustainable resource use in Madagascar. To date, resource management transfers have been carried out in ten communities; influencing the livelihoods of 10,500 inhabitants and covering 50,000 hectares of agricultural and forested land. This paper will outline the process used to zone the conservation area and establish community management, and how these processes fit with national level conservation planning.

208. AN EVALUATION OF THREATENED SPECIES CATEGORIZATION SYSTEMS USED ON THE AMERICAN CONTINENT. CUARON, ALFREDO D.; de Grammont, Paloma C. Durrell Wildlife Conservation Trust, Reforma Agraria 400-8, Fraccionamiento El Pueblito, Col. San José del Cerrito, Morelia, Michoacán 58431, México, alfredo.cuaron@durrell.org (ADC). Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México, Apartado postal 27-3 (Santa María Guido), Morelia, Michoacán 58089, México (PCG).

Endangered species lists are important conservation tools. These lists should be prepared using categorization systems that objectively assess species extinction risk. To determine which threatened species categorization system is the most appropriate and the virtues and limitations of systems used in America, we evaluated 25 categorization systems from 20 countries. These systems included examples of international lists, most national systems, and some systems independently proposed by academics. We based our assessment on 15 characteristics that categorization systems should have, in terms of categories, criteria, and other relevant issues, in order to evaluate species conservation status objectively. Of all evaluated systems, the current World Conservation Union system is the most suitable for assessing species extinction risk. Most categorization systems, but particularly national systems, have serious deficiencies and need to be improved substantially. We recommend gover nments distinguish three types of lists: (1) threatened species lists constructed following a sound categorization system; (2) lists of species of conservation priority; and (3) lists that serve as normative tools. Additionally, the information used to categorize species should be explicit and available to the public. To make the most of threatened species lists in conservation, it is imperative that all countries use the same categorization system.

209. CONSERVATION OF ISLAND SYSTEMS: LINKING INSTITUTIONAL AND ECOLOGICAL PROCESSES IN THE MARINE-TERRESTRIAL INTERFACE. CUDNEY-BUENO, RICHARD; Donlan, C. Josh. School of Natural Resources, Biological Sciences East # 104, University of Arizona, Tucson, Arizona 85721, USA (RCB). Centro Intercultural de Estudios de Desiertos y Océanos, Apartado Postal # 52, Puerto Penasco 83550, Socora, Mexico (RCB).Department of Ecology and Evolutionary Biology, Corson Hall, Cornell University, Ithaca, NY 14853-2701 USA cjd34@cornell.edu (CJD). Island Conservation, Center for Ocean Health, 100 Shaffer Road, Santa Cruz, CA 95060 USA (CJD).

Island conservation is often conceived primarily as actions taken to protect species and processes directly associated with a permanently exposed landmass in a marine environs, usually via the removal of non-native species. As a result, the adjacent marine environment is often either neglected when designing island conservation strategies, or is considered under very different institutional and disciplinary contexts. This disjunction has contributed to a lack of vision linking the ecological, social, and political components of marine and terrestrial processes in the management and conservation of island ecosystems. Here, we argue that more systemic approaches to island conservation are needed, ones that effectively incorporate biophysical and human linkages in the marine-terrestrial interface. These approaches should be incorporated from the planning phases of any conservation measure to subsequent monitoring activities and facilitation of buy-in and involvement of island users. We provide evidence supporting this premise based on recent work and lessons learned from island conservation efforts in the Gulf of California, Mexico.

210. CONSERVATION INCENTIVES FOR PRIVATE COMMERCIAL FARMERS IN SOUTH AFRICA'S SUBTROPICAL THICKET BIOME. CUMMING, TRACEY. Department of Environmental Science, Rhodes University, P.O. Box 94, Grahamstown,6140, South Africa.

The outright purchase of private land for conservation is not sociopolitically or economically viable as a sole means of safeguarding biodiversity in South Africa. Conservation incentives have proven to be a useful tool in aiding landscape level conservation on private land. Although utilized in other parts of the country and around the world, incentive-based conservation is not yet being practiced in South Africa's Thicket biome. Research was conducted primarily through interviews to investigate the potential feasibility of an incentive programme for commercial stock and crop farmers in th e Fish Kowie Mega Conservancy Network, which falls within the Eastern Cape. Major pressures on the biome were land transformation, alien invasive vegetation and a lack of holistic environmental management by landowners. Issues of concern for farmers where financial pressures; inferior agricultural extension services; personal security; stock theft; problem animals and the control of alien invader plants. Potential incentives were designed to address the pressures on Thicket, as well as the concerns of landowners. Incentives that proved to be the most favoured amoung landowners were management and information assistance, followed by financial assistance. NGO's were favoured as an implementing agency. In general, there was landowner support for an incentive programme in the area.

211. THE DARK SIDE OF THE "ECOTOURISM" IN A HOTSPOT NATIONAL PARK OF THE ATLANTIC RAINFOREST, BRAZIL. CUNHA, ANDRÉ A. Laboratório de Vertebrados, Departamento de Ecologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro - Ilha do Fundão, RJ, 21.941-590, CP 68.020, Brazil. cunha@biologia.ufrj.br.

Tourism based on nature is increasing worldwide. However, recreation disturbance causes negative impacts on various components of different ecossystems. I compare large vertebrate richness and abundance, water quality and visitor perception between a visited (VT) and a nonvisited (NV) trail at the Serra dos Órgãos National Park, in a highly endemic and human populous area of the Atlantic rainforest hotspot. Richness and abundance of diurnal species were lower at VT, the woolly-spider-monkey (*Brachyteles arachnoides*) nowadays occurs only at NT. Fecal and total coliformes were three to ten times higher at VT. Litter, erosion, and mud were the most disgusting sign of degradation according to the visitors experiences. These aspects need to be incorporeated in the planning and monitoring of tourism based on nature to allow sustainability and biodiversity conservation of the Atlantic rainforest.

212. ADVANCES IN THE KNOWLEDGE AND THE CONSERVATION OF THE MARSH DEER (*Blastocerus dichotomus*) IN THE DELTA OF THE PARANÁ RIVER, ARGENTINA. D'ALESSIO, SANTIAGO; Lartigau, Bernardo; Herrera, Pablo; Aprile, Gustavo. Proyecto Ciervo de los Pantanos. Asociación para la Conservación y el Estudio de la Naturaleza (ACEN). Gral. Rivas 945 (1661), Bella Vista, Prov. Buenos Aires, Argentina, pcp@acen.org.ar.

Marsh deer is a globally threatened species that finds in Paraná River Delta its southern limit of geographical distribution. Marsh Deer Project used this deer as flagship species for conservation actions in Paraná River Delta area. In an integral project of conservation the following activities were developed: 1) study of distribution and relative abundance; 2) analysis of high-priority areas for conservation; 3) investigation of the local perception of the problem; 4) study of a discovered floating habitat used as shelter; 5) conservation education; 6) rural residents' training and 7) meetings with government authorities for the creation of protected areas. The populations of marsh deer seems to be distributed in four nucleus, one in the a rea of the front of advance in Buenos Aires, two in areas of timber companies in Campana, and the fourth in islands of the southeast of Entre Rios province. The main conservation problems for marsh deer in the study area are poaching, increased in the periods of flood, and habitat loss because of the drainage of the islands. Among the changes generated in the region highlights the declaration of the study area as Biosphere Reserve Delta del Paraná, that protects one of the main subpopulations localized.

213. ECOLOGY OF THE SOUTHERN BAMBOO RAT (*Kannabateomys amblyonyx*) IN THE PARQUE ESTADUAL ITAPUÃ (STATE PARK OF ITAPUÃ), RS, BRAZIL. DA SILVA, ROGER; Vieira, Emerson M. Lab. de Ecologia de Mamíferos, Centro de Ciências da Saúde, Universidade do Vale do Rio dos Sinos, São Leopoldo, RS, 93022-000, Brazil, 0926278@cirrus.unisinos.br.

The Southern bamboo rat *Kannabateomys amblyonyx* is endemic from the Atlantic Forest. This rodent is specialized on bamboos, both introduced and native species, feeding on their stems and leaves and also using bamboos as shelters. In this study we investigated the natural history and described behavioral patterns of the species in the PEI, next to Porto Alegre city, RS, Brazil. Seven adult individuals wer e equipped with radio-collars and tracked. We observed parental care, an uncommon fact among rodents. Although the population of the *K. amblyonyx* seems to be locally stable, this population might show problems related to small population size. The estimate carried through in the Park, indicates that the Southern bamboo rat meets in a population size small and, probably, its populations has been kept for entrance of individuals that migrate of external populations. This small population size strengthens the hypothesis of that the population can persist in the area of study through a metapopulation dynamics. We believe that, because of this factor, and also due to the strict relationship of this species to the bamboos (specialized habits), its restrict distribution to the disturbed Atlantic forest, also hunting pressure, *K. amblyonyx* may become a vulnerable species in RS State.

214. VARIABLE MICROSATELLITE MARKERS FOR THE BLACK HOWLER MONKEY *Alouatta caraya*: A TEST OF FOUR HETEROLOGOUS *LOCI* DEVELOPED FOR *Alouatta belzebu*. DALTOÉ-INGLÊZ, ANA P.; Schneider, Maria P.C.; Gonçalves, Evonnildo C.; Saraiva, Patrícia; Klautau-Guimarães, Maria N.; Silva, Artur L.C.; Oliveira, Silviene F. Departamento de Genética e Morfologia, Instituto de Ciências Biológicas, Universidade de Brasília, Asa Norte, Brasília, DF, 71919-900, Brazil. (ana_inglez@yahoo.com.br) (APDI, PS, MNKG, SFO). Departamento de Genética da Universidade Federal do Pará, Belém, PA, 76075-900, Brazil (ECG, ALCS, MPCS).

The analysis of polymorphic genetic markers is necessary to assess the genetic variability of natural populations to develop effective conservation strategies. *Alouatta caraya* is a highly dispersed New World monkey species witch distribution abridges all Latin America. The present study describes the variability of four microsatellite *loci* developed and tested initially for a closely related

species: *Alouatta belzebu*. The entire sample is from Porto Primavera, São Paulo, Brazil and was obtained in a special animal rescue program during the formation of an artificial lake. Genomic DNA from 30 specimens was isolated from blood leukocytes using a standard phenol-chloroform protocol. Microsatellite markers were amplified by PCR and anplicon analysis was carried out in an ALFexpress™ II automated DNA sequencer. The resulting genotypic data was analyzed with the popgene package. Three *loci* were polymorphic, with allele number ranging between 1-12 alleles. Intrapopulational variability was measured in terms of the mean number of alleles per locus (*Na* =5.500, SD=4.7958), effective number of alleles (*Ne* =3.400, SD=2.3016), and observed (*HO* =0.3217, SD=0.2896) and expected (*HE* =0.5405, SD=0.3949) heterozygosity under Hardy-Weinberg equilibrium. Observed heterozygosity ranged from 0.0000 to 0.6897. Comparing with previously described data to *A. belzebu* populations from Tucuruí-PA, Brazil, the studied population presented lower variability.

215. BIODIVERSITY AND URBAN NATURE PRESERVE DESIGN IN NEW YORK CITY. DANOFF-BURG, JAMES. Department of Ecology, Evolution, and Environmental Biology, Center for Environmental Research and Conservation, Columbia University, New York City, NY, 10027, USA, jd363@columbia.edu.

This study focuses on understanding the impact of urban conservation parcel shape, size, location, and surrounding land use on understory community structure of uncultivated herbaceous plants and ants in Manhattan, New York City. Manhattan has around 5% of its area set aside as Forever Wild tracts, where little to no management occurs. Both the understory herbaceous plants and ants in these areas are a mixture of native and introduced species. The basic conclusions of island biogeography as extended to terrestrial fragment-islands are well supported in conservation parcels that are located in more remote areas, but have not been well evaluated in settings as urbanized as New York City. These ideas were addressed in urban settings using ant and plant biodiversity data drawn from 256 samples taken in 21 sites distributed across 6 of the large parks in uptown Manhattan. Most of the base conclusions of island biogeography are supported, but unexpected patterns in the distribution of native and introduced species also result due to this urbanized setting. The implications of these patterns will be discussed for urban park management.

216. BREEDING BIOLOGY OF KELP GULLS (*Larus dominicanus*) IN GUARARITAMA ISLAND, BRAZIL. DANTAS, GISELE P. M.; Morgante, João S. Departamento de Biologia/ Genética, Instituto de Biologia, Universidade de São Paulo, São Paulo, SP, 05508-090, Brazil, giselebio@yahoo.com.br.

Kelp Gulls is a generalist species and it is widespread in Southern Hemisphere. The rise of antropic activities have increased the availability of food resources and has resulted in an expansion of the Kelp Gulls populations. This population expansion is associated to the displacement of others seabirds species. Studies of breeeding biology are the basis to understand population dynamics. This aim works to evaluate breeding success of Kelp Gulls at Guararitama island, São Paulo, Brazil. We recorded egg laying dating, hatching success, number of chicks fledged. A total of 195 eggs was found in the 95 nests. Kelp Gulls showed two peaks of laying. The earlier breeders showed more sucessful (X^2= 10,09 p<0,001). Three -eggs nests contain the optinun number of eggs fot hatching success (X^2= 67,43. p< 0,001). Forty days after the hatching, the chicks was fledged. The chicks grow up very fast [weight (g) = 60 + 22,58 * age (days)]. The population control of kelp Gulls is mainly on the eggs and chicks, through of the predation. This population showed a great breeding success (66,15% of eggs and 68,21% of chicks). However, it is necessary datas of other areas to create a good managenment program for this species.

217. GENETIC STRUCTURE OF TWO POPULATIONS OF HIPPEASTRUM MORELIANUM: CONSEQUENCES OF DIVERSE PLANT-POLLINATOR INTERACTIONS IN HUMAN DISTURBED HABITAT? DARRIGO, MARIA; Franceschinelli, Edivani; Buzato, Silvana. Departamento de Ecologia, Instituto de Biociencias, Universidade de Sao Paulo, Sao Paulo, SP, CEP 05508-900, Brazil, mrdarrigo@yahoo.com.br (MD, SB).

We studied two populations of *Hippeastrum morelianum* (Amaryllidaceae) in south-eastern Brazil, in order to verify whether human disturbed population diverge on genetic structure from a non-disturbed one. These two populations are under different anthropic pressures, as indicated by the proportions of woodland habitat within the study areas. *H. morelianum* is a self-incompatible species and relies on nocturnal and diurnal pollinators for fruit and seed set. We found differences between both populations concerning observed heterozygosity, as well as in its distribution in each population. The human disturbed population had lower heterozygosity, bigger genetic differences and loss of alleles due to the fixation of two loci. We concluded that these results might be associated to pollen shortage caused by alterations in the plant pollinator interaction and sexual reproduction. Even though *H morelianum* individuals have a long life expectancy, thus retarding changes in their genetic structure, there have been strong signs of genetic erosion in its populations with growth of endogamy and genic drift. FAPESP: 99/12703-7.

218. FRESHWATER KEY BIODIVERSITY AREAS IN AFRICA. DARWALL, WILLIAM R. T.; Smith, Kevin G.; Vié, Jean-Christophe. IUCN - The World Conservation Union, 219c Huntingdon Road, Cambridge, UK, will.darwall@ssc-uk.org (WRTD, KGS). IUCN - The World Conservation Union, Rue Mauverney 28, Gland 1196, Switzerland (J-CV).

Freshwater ecosystems are one of the most threatened due to major impacts from introduced non-native species, habitat alteration, loss, and destruction, water pollution, and water withdrawal for irrigation and other urban and commercial uses. Given the scale of the problem it is necessary for conservation planners to identify and prioritise those “Key Biodiversity Areas” where the limited resources available for conservation might be most effectively applied. A number of workshops were held to build on those existing methods for terrestrial systems in developing a methodology for identification of Key Biodiversity Areas in inland waters. It was found that the site selection criteria developed for terrestrial systems were not always directly transferable to aquatic systems. Although the basic site selection criteria were largely the same as those applied to terrestrial KBAs it was found necessary to develop taxon-specific quantita tive thresholds for their application to freshwater biodiversity. Quantitative thresholds were therefore proposed for freshwater molluscs and fishes. These thresholds and were tested on a biodiversity data set compiled for Eastern Africa inland waters. Preliminary results find that the quantitative thresholds required to capture similar levels of biodiversity in terrestrial and aquatic ecosystems (molluscs and fishes) are significantly different. These findings confirm the need to use taxon-specific site

selection criteria where applying the KBA methodology across a wide range of taxonomic groups.

219. THE CONSERVATION OF TWO CRITICALLY ENDANGERED DRY FOREST BIRDS; NICEFORO'S WREN AND CHESTNUT-BELLIED HUMMINGBIRD. DÁVILA, NICOLÁS; Parra, Jorge Enrique; Beltrán, Marcela; Delgadillo, Alexandra. Fundación ProAves Colombia, Bogotá, Calle 8 # 3-12, Tel. (57)(1)843617 - 3348553, Colombia, ndavila@proaves.org, nicodavila@hotmail.com, Investigador, Proyecto Chicamocha.

Niceforo´s wren (*Thryothorus nicefori*) and Chestnut-bellied hummingbird (*Amazilia castaneiventris*) are both critically endangered species, endemic to the dry valleys of the eastern cordillera of Colombia. Their current distributions are likely to be highly restricted and their remaining forest habitats are under intense anthropogenic pressure. There were not studies to determine its status, natural history and habitat preference. Our aim was to assess the current status of these species. Our objectives were: (1) to map the current distribution along of the Chicamocha Valley; (2) to identify aspects of natural history; (3) to describe their habitats characteristics, and (4) to recognize the major threats to this species. We reported twelve new records for *A. castaneiventris* and ten new records for *T. nicefori*, increasing its knowing range distribution. In addition, we recorded habitat characteristics, the first nest, vocalizations, and the major anthropogenic pressures. The area where we found *A. castaneiventris* presents several habitat fragmentation. Nevertheless, it exploits different kind of floral resources suggesting its tolerance to human activities. In contrast, *T. nicefori* was found along streamsides where riparian tangled vegetation remains, showing a remarkable vulnerability to human activities.

220. HABITAT ASSOCIATIONS AND GENETIC DIVERSITY OF THE MARITIME SHREW, *Sorex maritimensis*. DAWE, KIMBERLY L.; Stewart, Donald T.; Herman, Thomas. Department of Biology, Acadia University, Wolfville, Nova Scotia, B4P 2R6, Canada (kldawe78@hotmail.com).

The maritime shrew, *Sorex maritimensis*, recently elevated to species status, is endemic and limited in distribution to eastern Canada. Our limited knowledge of the species suggests it is a wetland habitat specialist. These habitats are highly fragmented in Eastern Canada, signifying potential vulnerability to water level shifts expected from global climate change. This study aims to determine the habitat associations and genetic diversity of the maritime shrew to evaluate conservation priorities for the species. We modeled habitat variables at spatial and temporal scales using generalized linear mixed models and tested for genetic structure between mtDNA sequences using nested clade analysis. Habitat models indicate that maritime shrew presence is related to structure and composition variables typical of wetland habitats, particularly vegetation community and proximity of water. Low levels of genetic structure were detected between the populations studied. Two large clades were identified however, likely related to historic geographic isolation. Results suggest that maritime shrews prefer wetland habitats but indicate that current gene flow is maintaining genetic diversity across the known species distribution. Conservation efforts should focus on maintaining marshland habitats and further studying the response of the species to changing water levels in these habitats.

221. COMMUNITY SENSITIZATION AND SOCIAL DEVELOPMENT IN CELESTÚN BIOSPHERE RESERVE, YUCATÁN, MEXICO. de la Gala Méndez, José; Quijano Farjat, Mauricio; MIGOYA VON BERTRAB, RODRIGO. Comisión Nacional de Areas Naturales Protegidas, Reserva de la Biosfera Ría Celestún, SEMARNAT, Av. Pérez Ponce 120 Col Itzimná, Mérida, Yucatán 97100, Mexico, delagala@conanp.gob.mx (JGM); Niños y Crías A.C., Calle 33D No. 503 X 6 y 72 Col. Reparto Dolores Patrón, Mérida, Yucatán 97070, México, mquijano@ninosycrias.org.mx, rmigoya@ninosycrias.org.mx (MQF, RMVB).

In 2002, Celestún Biosphere Reserve had an outgoing Director who identified local inhabitants as ignorant, uneducated barbarians. That year 2 new stakeholders were incorporated: a new Reserve Director and the Niños y Crías NGO. This Director recognized the community's knowledge about natural resource use and promoted social participation using 2 organisms as communication mediators: the Environmental Education Board (EEB) and the Social Development Council to propose, discuss and evaluate environmental issues to be solved, and to integrate and diversify already existing productive activities with new ones, in an effort to reach sustainable development. The Solid Waste Management*Pride* Campaign was coordinated by Niños y Crías. Its results showed an increased community interest for a cleaner environment, which improved their health, economy and pride about protecting local biological species. The EEB also surged from the Campaign. In 2004, members increased from 6 to 19; a group of women collected and sold 73 tons of PET; Integral Solid Waste Regulations were approved by the township and 12 productive activities were created for future sustainable development (ie. interpretive trails, shrimp and brine shrimp aquaculture, apiculture, commercial flower production, fish skin and marine shell handcrafts, traditional salt pond rural tourism and others.

222. EVALUATION OF THE APPLICABILITY OF RAPD SYSTEMS TO ASCERTAIN GENETIC DIVERSITY IN *Peripatus acacioi* (PERIPATIDAE; ONYCHOPHORA). DE LAAT, DAIANE M.; Carvalho, Maria Raquel S.; Fonseca, Cleusa G. Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, 31270-901, Brazil, (laat@icb.ufmg.br).

RAPD molecular markers are utilized for analysing genetic variability in populations in which only few or no molecular markers are available. This is the case for *Peripatus acacioi*, a species under protection at the Tripuí Ecological Station, municipality of Ouro Preto, Minas Gerais, Brazil, for which genetic information is scarce. For an initial evaluation of the genetic diversity of this species, essential to the development of conservation strategies, DNA samples from four individuals were taken at random and tested by RAPD, with thirteen primers. Usually, RAPD amplified fragments are visualized in ethidium bromide-stained agarose gels. However, due to the low amplification yield, RAPD fragments were separated in polyacrylamide gels stained with silver nitrate. A large number of bands was observed. Fifty-five among all amplified bands proven to be reproducible both in terms of presence and intensity. From these, 27 were variable and 28 were constant. The average number of bands per gel was 4.2. Nine of the 13 primers tested allowed the identification of constant and variable bands among these four individuals. RAPD analysis of genetic variation using silver-stained polyacrylamide gel electrophoresis provided measures of band sharing among the individuals, being applicable in population genetic studies of the *P.*

acacioi.

223. AQUATIC INSECTS IN VÁRZEA LAKES: ARE THERE CONCORDANT BIOGEOGRAPHIC PATTERNS AMONG ECOLOGICALLY DIFFERENT GROUPS? DE MARCO JR., PAULO; Nessimian, Jorge L.; Hamada, Neusa; Ferreira Jr, Nelson. Laboratório de Ecologia Quantitativa; DBG; Universidade Federal de Viçosa, 36570-000; Viçosa, Minas Gerais Brazil; pdemarco@ufv.br.

The Várzea floodplains are a major components of the Amazon basin. However, there is little little information about its insects, a group that represent different ecological guilds and thus could be useful as indicators of ecosystem function. We collected aquatic insects associated to the floating macrophyte *Eichhornia crassipes*, in 26 sites along the Várzea of the Amazon River in order to use this data to discuss the use of aquatic insects as a component to determine conservation priorities in Várzea. We used data from Odonata, Ephemeroptera, Hemiptera, Coleoptera and Trichoptera to determine patterns on species compositio n, richness and beta diversity, assuming that these groups vary greatly in ecological characteristics including predators that use very different habitats, herbivores with very distinctive particle size selection and also collectors. We capture ca. 350000 specimens with 178 taxa and 61 new records. There is a substantial variation in the response of those groups but the main concordant biogeographic patterns are the existence of a difference in composition and diversity among sites before and after the rio Negro in the middle Amazon, and a possible distinction of the areas near the estuarine, after the Tapajós River.

224. LIVESTOCK DEPREDATION BY CARNIVORES IN BRAZIL: A GOVERNMENTAL PROGRAM PURSUING SOLUTIONS FOR A NATIONAL PROBLEM. DE PAULA, ROGÉRIO C.; Boulhosa, Ricardo L. P. CENAP/IBAMA, Rua João Soares do Amaral, 112, Atibaia, SP, 12.941-600, Brazil, rogerio@procarnivoros.org.br.

Brazil is worldwide known as one of the richest countries concerning biodiversity. It is also one of the emerging countries with a high development rate. Likewise several areas around the world, economical development has leading to consequences in wildlife conservation, so that conflicts between wildlife and people throughout the country are common due to the expanding of contact zones between them. The most impacting conflicts are related to predators preying upon livestock. Although pumas and jaguars are the most problematic carnivores that lead to conflicts with humans, of the 26 species of carnivores occurring in Brazil, 17 have been recorded as responsible for livestock depredation. By observing 10 years of data recorded, 87% of the conflicts registered were involving large cats, and only 4% were related to 15 other carnivores species. Additionally, records show that Brazil's central and southeast regions have the highest numbers of conflicts. Until recently, punctual actions were conducted. Nowadays, new efforts have been made to find new solutions for the HWC throughout Brazil. Solutions such as ranch activities related to wildlife tourism, regional damage control programs, among others, are presenting positive results on balancing livestock losses. Presently, close to 85% of the attacks reported are resolved.

225. HOW MANY PELICANS ARE TOO MANY? A CONSERVATION DILEMMA IN THE WESTERN CAPE (SOUTH AFRICA). DE PONTE MACHADO, MARTA. Avian Demography Unit, University of Cape Town, Private Bag 7701, Rondebosch, Cape Town, South Africa, mdeponte@adu.uct.ac.za.

Pelicans were a rare sight in the Western Cape (South Africa) only 20-30 years ago. Today there are 600 breeding pairs, and a single breeding site: Dassen Island. However, Great White Pelican population is in decline worldwide. Current expansion in the region is due to reduction of disturbance and higher availability of food. Up to 1500 pelicans have been recorded feeding on a single farm in the WCape. Chick's regurgitates show that most of the food intake is not fish but chicken offal. Evidence suggests that St Lucia 's population (KwaZulu-Natal, South Africa) is isolated from the western ones. Remote tracking, population genetics and a colour-ringing program aims to clarify movements, breeding and ecological parameters. The conservation dilemma is whether to continue the artificial supply of food to the pelicans. Its discontinuity will surely reduce the population increase, but the immediate response of a hungry population of pelicans could be to increase the predation on seabird species!

226. THE APPLICATION OF REMOTE SENSING IN SUPPORT OF ECOSYSTEM MANAGEMENT TREATIES AND IN TRANSBOUNDARY CONTEXTS. DE SHERBININ, ALEXANDER; Porzecanski, Ignacio; Tolisano, Jim. CIESIN at Columbia University, Palisades, NY, USA, adesherbinin@ciesin.columbia.edu (AD). School of Natural Resources and Environment, University of Florida, Gainesville, FL, USA, igna@ufl.edu (IP). Pro-Natura USA, New York, NY, USA, tolisano@peoplepc.com (JT).

Given its synoptic view, remote sensing is particularly well suited to ecosystem management treaties and conservation in transboundary contexts. A number of initiatives have been launched, including the European Space Agency's Treaty Enforcement Services using Earth Observation and the NASA NGO group in support of the Convention on Biological Diversity, which seek to apply remote sensing to treaty-specific needs. This paper will provide an overview illustrated by a number of case studies in which remote sensing was used in support of environmental treaties such as the Ramsar Convention and the Convention on Biological Diversity, as well as its use in transboundary conservation contexts such as "Peace Parks." Reference will also be made to a project on the Brazil/Uruguay border to test remote sensing applicati ons for conservation of habitat in wetland complexes surrounding Laguna Merin, Latin America's second largest freshwater lake in terms of surface area.

227. LOCAL MARINE RESOURCE USE AND CONSERVATION IN NORTHEASTERN NEW CALEDONIA. DE SILVA, NAAMAL. Center for Applied Biodiversity Science, Conservation International, 1919 M Street, NW, Suite 600, Washington, DC 20036, USA. (n.desilva@conservation.org).

The government of New Caledonia 's northern province intends to establish a community based marine protected area in the northeast of the territory's main island, which boasts some of the most diverse and intact coral reef ecosystems in the world. Conservation International was invited to conduct a rapid assessment of marine resource use, local interest in conservation, and the health and biodiversity value of the area's reefs. During the socioeconomic study, extended focus group interviews were conducted in 22 coastal settlements, between November 25 th and December 14 th of 2004. Data were gathered on fishing techniques, overall marine resource use, and perceptions regarding the marine environment. Marine resources are mainly harvested for subsistence

use, and fishing is confined to near-shore areas. Most respondents felt fish stocks had declined over time; some Tribes use periodic closures and reserves to manage fisheries. Taboos also provide *de facto* protection in some areas. Significantly, all respondents were enthusiastic regarding local marine resource management and biodiversity conservation, and most favored increasing tribal and institutional regulation of marine resource use. Paradoxically, the same respondents often ignored or were ignorant of existing environmental regulations. Increased environmental education and capacity building will prove key to successfully managing these reefs.

228. THE CONSERVATION IMPLICATIONS OF HABITAT AND BIOGEOCHEMICAL ALTERATIONS IN SMALL LOWLAND AMAZONIAN STREAMS CAUSED BY DEFORESTATION. Deegan, Linda A.; NEILL, CHRISTOPHER; Krusche, Alex V.; Ballester, M. V. R.; Gessner, Alaide; Victoria, Reynaldo L.; Haupert, Christie L. The Ecosystems Center, MBL, 7 MBL St., Woods Hole, MA 02543 USA, cneill@mbl.edu, (LAD, CN, CLH). Centro de Energia Nuclear na Agricultura, Universidade de São Paulo, Avenida Centenário 303, CEP 13416-000, Piracicaba, SP, Brazil (AVK, MVB, RV). Universidade Federal de São Carlos, Dept. de Hidrobiologia, Caixa Postal 676 CEP 13565-905, São Carlos, SP, Brazil (AG).

We investigated how clearing of tropical forest for pasture in Rondônia influenced stream flow characteristics, benthic habitat, dissolved oxygen and nutrient concentrations, and diversity of aquatic invertebrates and fishes. Replacement of forest by pasture increased transient water storage and increased the relative proportion of benthic habitats dominated by grass and organic matter, leading to an increase in respiration rates and a decrease in dissolved oxygen. Solute and stable isotopic tracer experiments showed that nitrogen moves very long distances in small forest streams. In contrast, riparian grasses retain large amounts of nitrogen in pasture streams and low oxygen prevents nitrate formation. The net result is greater nitrogen retention in pasture streams compared with forest streams. This alters downstream nutrient movement and may influence aquatic primary production in larger rivers. Deforestation results in declines in both invertebrate and fish numbers and div ersity. Crustacea, Ephemeroptera and Odonata dominated the invertebrates in forest streams while Coleoptera and Chironimidae dominated in pasture streams. Fish species diversity was reduced from approximately 35 to 2 species. The magnitude of the changes in physical and chemical conditions that follow forest clearing suggests that deforestation may be dramatically altering habitat quality over many thousands of kilometers of stream channels.

229. LAND USE CHOICES: BALANCING HUMAN NEEDS AND ECOSYSTEM FUNCTION. DEFRIES, RUTH; Klink, Carlos; Cavalcanti, Roberto B. Department of Geography, University of Maryland, College Park, MD 20817, USA, rdefries@mail.umd.edu. Universidade de Brasilia; Brasilia DF, 70, 919-900, Brazil, klink@unb.br. Conservation International, Washington DC, USA, r.cavalcanti@conservation.org.

Land use provides food, timber, and other ecosystem goods essential for human needs but also has many unintended ecological consequences. These consequences include habitat loss, reduced watershed protection, and other ecosystem functions essential for conservation. The Cerrado is currently undergoing massive and rapid transitions to mechanized agriculture and pasture. Land use decisions currently underway have a major influence on the future of the region. We present a framework for quantifying the trade-offs between economically-valuable production and ecosystem function over various temporal and spatial scales as a basis to assess the appropriate balance. We also present examples of applying ecological knowledge to identify critic al conservation locations and corridors to maintain conservation value while meeting human needs for ecosystem goods. The Cerrado presents a key opportunity to apply these scientifically-based approaches to regional land use decisions. This presentation provides a context for the other presentations in the session.

230. THE EFFECT OF INLAND HABITATS ON THE VIABILITY OF THE SOUTHEASTERN BEACH MOUSE. DELONG, ANGELIQUE T.; Quintana-Ascencio, Pedro F.; Stout, I. Jack; Roth, James D. Department of Biology, University of Central Florida, Orlando, FL, USA, 32816, angelique_delong@yahoo.com.

An important element required for the management of any species at risk is an assessment of the viability of existing populations. Demographic models are increasingly being used as quantitative tools for guiding the management and conservation of threatened or endangered species. The current study examines the viability of the Southeastern beach mouse (*Peromyscus polionotus nivieventris*), a threatened subspecies of the oldfield mouse (*P. polionotus*), at Cape Canaveral Air Force Station, Cape Canaveral, FL, USA. Beach mice are typically thought to be denizens of undisturbed, coastal areas, occupying habitat in the primary and secondary dune system. However, recent research has show n that they may occupy habitats 1 km inland of the primary dune. Data collected from 1976 to 1979 at two locations in two habitat types - coastal and inland - were used to supplement and validate data collected from a 2003 to 2005 demographic study at six locations in the same two habitat types. Survival estimates were not different between the two habitats, but were different among inland locations. When data from inland habitats were incorporated into the model, species persistence time increased, indicating that inland habitats are important in maintaining the populations at this location.

231. HOW ARGENTINA'S PAMPAS DEER HELPED ME TEACH IN TRANSLATION: AN INSTRUCTOR'S EXPERIENCES WITH NZP'S FIRST SPANISH LANGUAGE CONSERVATION GIS COURSE. DEMARIA, MANUEL R. Instituto Nacional de Tecnología Agropecuaria (INTA). CC 17, CP 5730 Villa Mercedes, San Luis, Argentina (mdemaria@sanluis.inta.gov.ar).

Pampas deer are Argentina's most endangered deer species. However, broad issues related to pampas deer survival, such as distribution, population, environmental and management indicators of habitat quality, and land use characterizations have received little attention. The extensive area occupied by the deer, in combination with the lack of maps, roads, or geographic references, make it difficult to address such issues. To overcome these constraints, new and different approaches are being applied. These include new research technologies such as satellite image analysis and GPS/direct field observation integrated with GIS analysis. These have proven extremely effective for describing deer populations and landscape patterns. In this case these are also the fastest, most economical, and most accurate ways of getting information. The experience I acquired while researching pampas deer gave m e the background to teach this course. Many of the conservation problems encompassed within the Pampas deer project are simi-

lar to the constraints experienced by conservation projects focused on other species and environments throughout Latin America, and these useful new approaches are transferable, too. The spread of these applied technologies within Latin America should prove a key tool in meeting daunting challenges to natural resources conservation in the region.

232. NEW DATA ON THE STATUS AND DISTRIBUTION OF *Speothos venaticus*: EVALUATING ITS DEGREE OF PROTECTION AND DIRECTING RESEARCH EFFORTS. DEMATTEO, KAREN E. Department of Biology University of Missouri - St. Louis 8001 Natural Bridge Road. St. Louis MO 63121 USA.

The bush dog (*Speothos venaticus*), listed as Vulnerable (IUCN 2000), is a small canid from Central and South America whose status, distribution, and ecological requirements are poorly understood. The *Speothos venaticus* Status and Distribution Survey was developed in an attempt to determined its status (e. g., stable, declining, absent), current distribution, and identify ecological needs by correlating habitat types to *Speothos* sightings. Responses from the survey generated a database with 390 locations recorded between 1834 and 2003. Distribution maps were generated which will provide researchers with a quick range reference for *Speothos*. With year and precision of the location accounted for, ecological niche modeling was conducted using GIS data on seasonal land coverage regions and bioclimatic data. These analyses generated a number of important findings, including that approximately 30% of the locations where *Speothos* was reported are associated with fragmented or altered habitat. These results allow the degree of protection currently provided to *Speothos* (e. g., intact versus fragmented area) to be re-evaluated and locations which require more intensive conservation efforts both in terms of research and protection (e. g., creation of reserves, upgrading their protection status) to be identified.

233. WOODY COVER CHANGES 1992-2004 AND IMPLICATIONS FOR WILDEBEEST IN THE SERENGETI-MARA REGION. DEMPEWOLF, JAN; DeFries, Ruth; Swinnen, Else. Department of Geography, University of Maryland, 1104 LeFrak Bldg., College Park, Maryland 20783, USA, dempewol@umd.edu.

Wildebeest play a key role in the balance between woody cover and open savanna in the Serengeti-Mara ecosystem. There is a lack of large scale spatial and temporal analysis of woody cover and the implications for wildlife. Woody cover changes were derived from a satellite time series of monthly Advanced Very High Resolution Radiometer (AVHRR) composites at 1 km spatial resolution (1992 -1999) and MODIS composites at 250 m resolution (2000-2004). For each year a large number of metrics were derived and used to classify for percent woody cover using a decision tree approach. Training areas with little or no changes in woody cover were derived from ground surveys and Landsat data from mid/1980s and 1999/2000 using a maximum likelihood classification and NDVI-differencing technique. The impact on wildebeest was analyzed using positional data, collected with GPS collars. These data allowed to determine preferences of wildebeest and how woody cover densities limit grazing areas and the impacts on migration routes. The results of this project show the spatial distribution and intensity of woody cover trends, how they relate to wildebeest movements and potentially to other relevant factors, such as elephant density and fire.

234. TARGETING ECOLOGICAL PROCESSES - A TOP DOWN APPROACH. DESMET, PHILIP. Leslie Hill Institute for Plant Conservation, University of Cape Town, Private Bag, Rondebosch, 7701, South Africa; factoryrider@absamail.co.za.

Systematic conservation planning requires that quantitative targets be set for both biodiversity pattern and processes. Whilst the challenge of setting quantitative representation targets has been well addressed in the literature, guidelines for conceptualizing and setting process targets are lacking. This paper explores the potential for metapopulation and landscape fragmentation studies to provide useful insights into developing process targets by relating the amount and structure of remaining habitat to critical thresholds in the probability of population persistence. It is argued that these thresholds provide a basis for developing generic ecological process targets in conservation planning. Observed and estimated population extinction thresholds vary depending on the landscape and organism studied, but most studies point to habitat retention values of between 20% and 75% below which populations are likely to go extinct. Process targets framed in the context of this research can be defined as the minimum amount of natural habitat that must remain to ensure the long-term survival of the majority of species, or the average extinction threshold for the group of most transformation-sensitive species inhabiting the planning domain. An important conclusion drawn from this review is that whilst the 10% target may represent the majority of species in a landscape, this target falls far short of conserving processes necessary for the persistence of these species.

235. PIAGAÇU-PURUS SUSTAINABLE DEVELOPMENT RESERVE: CONSERVATION AND MANAGEMENT OF THE BIODIVERSITY OF THE PURUS RIVER LANDSCAPE. DEUS, CLÁUDIA; Da Silveira, Ronis. Coordenação de Pesquisas em Biologia Aquática, Instituto Nacional de Pesquisas da Amazônia, Manaus, AM 69060-001, Brazil, claudias@inpa.gov.br (CPD). Instituto de Biociências, Universidade Federal do Amazonas, UFAM, Manaus, AM 69000-000, Brazil (RS).

The Piagaçu-Purus Sustainable Development Reserve was created in August 2003 by the Government of the State of Amazonas. This reserve is on the lower Purus river. It covers a total area of 1,008 km² (about 626 mi²) of which 40% of it is periodically flooded and the remainder consists of terra firme. The Purus river has a high biological value and for this reason it is very important in terms of conservation. The region has a large biodiversity due to its vast complexity of environments, providing habitats for the development of different species of mammals, birds, turtles, fish, amphibians and reptiles in general. The Reserve area was originally in a conservation unit of the Environmental Protection Area type. However, the State Government did not set up any development program for the region. This resulted in conflicts between inhabitants and external explorers, both indians and non-indians, and other social problems. The human population is estimated to be between about 5,000 inhabitants, who survive by means of agriculture as well as the exploitation of resources such as fish, Brazil nuts (*Bertholettia excelsa*), timber and non-timber products and hunting wild animals. Preliminary results will be showed.

236. DECOMPOSITION OF CARBON-14 LABELLED RICE STRAW IN SOIL TREATED WITH ORGANOPHOSPHOROUS INSECTICIDES. DEVI, SHARUNGBAM GEETA; Kapadnis, B. P.; Deopurkar, R. L.; Kale, S. P. Department of En-

vironmental Sciences, University of Pune. Pune - 411007, India, (SGD) sharung1@indiatimes.com;Department of Microbiology, University of Pune.Pune - 411007, India (BPK, RLD); Nuclear Agriculture and Biotechnology Division, Bhabha Atomic Research Centre. Mumbai. - 400085, India (SPK).

Decomposition of carbon - 14 labelled rice straw in flooded and non-flooded soil treated with three organophosphorous insectides viz: quinalphos, chlorpyrifos and monochrotophos was studied in laboratory condition for 40 days. Experiment was conducted in triplicate for each treatment. Two concentrations (1ppm and 10ppm) were used for all the three insecticides. Control flasks were kept to check the decomposition of rice straw in the soil not treated with insecticides. In the entire flasks a vial containing 3ml of 1N NaOH solution was placed. The amount of decomposition was determined by counting the $^{14}CO_2$ trapped in the NaOH solution using liquid scintillation counter. All the analysis was performed in triplicates. It was observed that the decomposition of the rice straw in the soil treated with insecticides showed significant retardation both in the moist and flooded conditions irrespective of the concentration used. Retardation in decomposition was far more significant in the case of flooded soil. Among the three insecticides used the retardation in decomposition of rice straw was more in monocrotophos. This study showed that insecticides can adversely affect the normal decomposition of the agricultural substrate in the environment, this study can help in the restoration of agricultural soil and useful soil microflora.

237. ANTIBIOTICS, ANTIBIOTIC RESISTANCE, AND CONSERVATION: WHAT'S THE CONNECTION? DEVINCENT, STEPHEN J. 26 Montgomery Street, Boston, MA, USA, sdvdvm@earthlink.net.

In a variety of interconnected ecosystems, antibiotics and antibiotic resistance can lead to alterations in biodiversity by disturbing established interdependencies. Little is known about the extent of occurrence, fate, effects, and risks associated with environmental release of antibiotics. They represent ecological problems that include toxic effects on aquatic and terrestrial ecosystems and consequently interference with trophic chains. Antibiotics are detected in wastewater, surface water, ground water, estuaries, sediments and soil, and in aquatic and terrestrial wildlife and plants. Use of antibiotics in humans, animals, agriculture and aquaculture increases selective pressure for the emergence and dissemination of antimicrobial-resistant bacteria. While studies in wildlife are limited in number, antibiotic resistance has been identified in pathogenic and commensal bacteria within free-ranging and captive wild mammals, birds, reptiles and aquatic species. Antibiotics can increase the expression of virulence factors in pathogenic bacteria. Transmission of more virulent bacteria to wildlife may lower the threshold density of the pathogen and contribute to emergence of wildlife infectious disease. The mobility of wildlife and potential ecosystem transfer of these pathogens may represent a challenge to conservation efforts. Antibiotic residue and resistance data from wildlife should be used to assess potential adverse effects on human, wildlife and ecosystem health.

238. EMPLOYING BUTTERFLIES AS CULTURAL KEYSTONE SPECIES' - A WINDOW OF OPPORTUNITY TOWARDS ENRICHING URBAN BIODIVERSITY IN BANGALORE, INDIA. DEVY, M. S. Ashoka Trust for research in Ecology and the Environment, 659, 5th A Main, Hebbal, Bangalore 560 024, India.

Ecologists have long recognized keystone species for their crucial role in the overall structure and functioning of an ecosystem. Recently Garibaldi and Turner (2004) have identified plants and animals that figure prominently in the language, ceremonies, and narratives of native peoples as cultural keystone species. Urbanization is seen as largest threat in the future as 60% of the world populations are expected to be living in cities. Building the biodiversity in cities is the biggest challenge before us. Cities comprise a social-ecological system with little or absolutely no 'past memory' of nature and the knowledge generation of in this system therefore needs an attractive package. Organisms that generally win the support of community have seen immediate conservation or restorations efforts. In the urban context, butterflies could replace tiger and elephants, and could serve as cultural keystone species. Butterflies have received enormous attention in the ecological sciences because of their ubiquity of occurrence and taxonomic clarity compared to other insects. Due to their aesthetic appeal butterflies are closely imbibed in all the elements of urban society comprising multiple cultures and has found its way in literature, fashion and a wide range of other things. In this paper we highlight our restoration efforts using butterflies as cultural keystone around Bangalore.

239. LANDSCAPE HABITAT ASSOCIATION OF THE MOST THREATENED NEOTROPICAL GRASSLAND BIRD POPULATIONS: ADVANTAGES AND PITFALLS OF CURRENT LAND USE PRACTICES. DI GIACOMO, ADRIÁN S.; Ostrosky, Christian; Vickery, Peter D. Departamento de Conservación, Aves Argentinas/AOP. 25 de mayo 749 2º p Of. 6, C1002ABO Buenos Aires, Argentina, digiacomo@avesargentinas.org.ar (ASDG, CO). Center for Ecological Research, Richmond, ME 04357 USA (PDV).

The Aguapey River in the Campos grasslands of Argentina is the last refuge for a complete assemblage of rare and threatened birds. We evaluated the influence of landscape attributes on the occurrence and density of six globally threatened and endemic passerines. We used point counts to census birds, and quantified landscape attributes 200-m and 1000-m from the count centers. Strange-tailed Tyrants (*Alectrurus risora*) selected sites with a high proportion of tall-grass habitat in lowlands. Saffron-cowled Blackbirds (*Xanthopsar flavus*) and Black-and-white Monjitas (*Heteroxolmis dominicana*) preferred a mixed landscape with marshes associated with dry upland grasslands. Occurrence of endangered seedeaters (*Sporophila palustris, S. cinnamomea* and *S. ruficolli*) was not associated with any landscape attributes analyzed. Seedeaters are probably responding to local habitat features. The Campos grassland is used primarily for livestock grazing and afforestation; up to 50% of the remaining grassland habitat has been planted with exotic trees. If this trend continues, Saffron-cowled blackbirds will become extinct in the Campos. GIS tools allow us to predict new populations of threatened birds, and to provide guidelines for establishing future reserves and wildlife management. Our study indicates that future reserves must contain a complete landscape gradient to preserve populations of all these endangered species.

240. CONSERVATION OF THE THREATENED STRANGE-TAILED TYRANT *Alectrurus risora* IN THE EASTERN CHACO: NESTING HABITAT AND REPRODUCTIVE SUCCESS. Di Giacomo, Alejandro G.; Di Giacomo, Adrián S.; REBOREDA, JUAN C. Departamento de Conservación, Aves Ar-

gentinas/Asociación Ornitológica del Plata, 25 de Mayo 749 2° 6, C1002ABO Buenos Aires, Argentina (AGDG, ASDG). Departamento de Ecología, Genética y Evolución, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Pabellón II Ciudad Universitaria, C1428EHA Buenos Aires, Argentina, reboreda@bg.fcen.uba.ar (JCR).

We studied the reproductive success of globally threatened Strange-tailed Tyrant *Alectrurus risora* in the eastern Chaco. The study was conducted at Reserva Ecológica El Bagual, Formosa, Argentina (26° 11´ S; 58° 57´ W). At the beginning of the breeding season, a small fraction of the male population established adjacent breeding territories, where they displayed for attracting females that nested clumped in male territories. Males provided no resources for females and they did not participate in any form of parental care. Nests were built in two main habitats: 1) grasslands dominated by *Imperata brasiliensis* or *Andropogon lateralis* (uplands), and 2) grasslands dominated by Paspalum intermedium (lowlands). More than 90% of the area suitable for nesting was lowland, but only 18% (29/162) of the nests were built in this habitat. Nesting success, and hatchability and chick survival in successful nests did not differ between habitats, but males had more nests per territory in upla nds than in lowlands. Our results indicate that Strange-tailed Tyrants prefer upland habitats for nesting and that this preference is associated to a higher reproductive success of males but not females. The provision of appropriate grassland habitats could be a management option for Strange-tailed Tyrant populations in eastern Chaco.

241. MICROSATELLITES MARKERS FOR *Micoureus demerarae* POPULATION BIOLOGY IN "RIO DOCE" PARK, A FRAGMENT OF ATLANTIC FOREST IN BRAZIL. DIAS, ISABELA M. G.; Assis, Joana B.; Paiva, Ana Luiza B.; Paglia, Adriano; Cunha, Heitor; Carvalho, Maria Raquel S.; Fonseca, Cleusa G. Departamento de Biologia Geral e Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, 31270-901, Brazil, imgdias@icb.ufmg.br.

As one of the richest and most endangered ecosystems of the world, the Atlantic Forest deserves research and effective action for biodiversity conservation. The Rio Doce Park (Minas Gerais, Brazil) is the larger remnant fragment (35,974 ha). The most frequent little mammal species in the park are *Micoureus demerarae* (or *M. travassosi*) and *Didelphis aurita*. Wild animal identification by means of microsatellite markers is an important tool to estimate population size and amount and distribution of genetic diversity, but microsatellite loci haven't been yet described for *Micoureus*. In this study, primers from other species were tested. Samples used are mouth cells (swab) and/or blood cells from 32 *M. demerarae*. Swab was an important method to obtain DNA, because it rapidly provides large amounts of high quality DNA and animal stress is reduced due to faster handling. Thirty microsatellites from *Mus musculus* and six from *Didelphis marsupialis* were tested until this moment. Two markers of mouse (D7Mit189 and D15Mit156) and one of opossum (Dm1) showed good results. The Dm1 marker is polimorphic when tested in eight individuals: six of them were heterozigotes and two homozigotes and four alelles were detected. More tests will be made for population studies.

242. CONSERVATION MODELS FOR ENDANGERED FOREST ECOSYSTEMS AND CULTURES IN CHILE. DIAZ, IVAN. 1 Haight Street, San Francisco, PC 9402, USA.

Chilean native forest ecosystems have been heavily impacted by human activities, including replacement of native forests by industrial plantations of non-native trees, land clearing for agriculture and illegal logging. Within Chile's native forest ecosystems are more than one-quarter of the world's remaining temperate rainforests, including some of the largest remaining areas of coastal temperate rainforests and some of the world's rarest and most endangered forest species. Moreover, at least several hundred thousand people of indigenous ancestry still live in close association with native forests in south-central Chile, but they have been forced to retreat toward marginal lands characterized by low productivity and limited accessibility. Instead of developing viable conservation strategies for these endangered cultures and forest ecosystems, the Chilean government maintains a Pinochet-era system of subsidies for the planting of non-native species and has no effective system for protecting native species from further destruction and replacement. To help counteract these environmentally and socially regressive policies, private conservation models for Chile's endangered forest ecosystems and cultures are being developed through innovative collaboration between industry and environmental nongovernmental organizations.

243. CERRADO ECORREGIONAL ASSESSMENT: USE OF SURROGATES FOR BIODIVERSITY AS A TOOL TO IDENTIFY TERRESTRIAL AND FRESHWATER PRIORITY CONSERVATION AREAS. DIEDERICHSEN, ANITA; Oren, David C.; Matsumoto, Marcelo. Central South American Savannas Conservation Program, The Nature Conservancy, SHIN CA 05, Conj. J, Bloco B, salas 301-309, Brasília, DF, 71.503-505, Brazil (adiederichsen@tnc.org.br).

The Cerrado ecoregion is very large, occupying over 20% of Brazil with a small portion extending into Bolivia and Paraguay. It is characterized as a savanna ecosystem, presenting high habitat diversity, with the highest herbaceous plant diversity among the world's savannas and an explosive rate of habitat loss due to conversion for agriculture and ranching. It is currently one of the most threatened ecoregions of South America. Lack of organized and uniform information for the entire area is also a daunting challenge. Given this scenario and the urgent need to develop strategies for the conservation of this ecoregion, systematic conservation planning in a short time frame, using surrogates for biodiversity, can be a useful tool. For the Cerrado terrestrial ecoregion we used the map of landscape units, and for the freshwater ecoregion we defined and mapped a classification of freshwater ecological systems. Through the application of these surrogates during workshops, the experts identified terrestrial priority conservation areas for Mato Grosso and the freshwater ecoregional priority conservation areas for the entire Cerrado terrestrial ecoregion area.

244. DEMOGRAHPIC AND GENETIC EFFECTS OF INTENSE PREDATION IN AN ISOLATED POPULATION OF GOLDEN LION TAMARINS. DIETZ, JAMES M.; Ballou, Jonathan; Baker, Andrew J. Department of Biology, University of Maryland, College Park, MD 20742, USA, (JMD). Conservation and Research Center, Smithsonian National Zoological Park, Washington DC 20008, USA (JB). Zoological Society of Philadelphia, 3400 W. Girard Ave., Philadelphia PA 19104, USA (AJB).

Since 1986 we continuously monitored 13 reproductive groups (187 group years) of golden lion tamarins in the 6300ha Poço das Antas Reserve, Brazil. Here we report changes in demographic and genetic parameters resulting from three "waves" of intense predation in this forest fragment. Prior to 1993, predation on

tamarins was rare and typically resulted in the death of one individual per event. Subsequently the predation rate increased during three periods of two to three years each. At maximum, predation rate quadrupled and often resulted in loss of multiple individuals including breeding adults. Rate of breeder loss increased from one/ 5.9yrs to one/1.7yrs. Tamarins have a high reproductive capacity and initially showed little change in offspring production and survival. However, subsequent predation pulses reduced offspring production by 42% and offspring survival by 61%. Population size rebounded significantly following each wave of predation but continued predation pressure of the current magnitude is predicted to result in population extinction in about 16yrs. Genetic analysis suggests that each wave of predation caused significant genetic turnover in the population as long-standing breeding groups were replaced with newly formed groups containing individuals from outside the study population. Genetic change is reflected by a reduced mean kinship in the population relative to values prior to predation events.

245. INTEGRATING THE HUMAN SOCIAL SYSTEM AND THE ECOSYSTEM TO SUCCESSFULLY ADDRESS THREATS TO PROTECTED AREAS. DIETZ, LOU ANN; Rambaldi, Denise M. Golden Lion Tamarin Association, 9604 Garwood St., Silver Spring, MD 20901, USA, louann.dietz@verizon.net (LAD). Associação Mico-Leão Dourado, C.P. 109.968, 28.860-970, Casimiro de Abreu, Rio de Janeiro, Brazil (DMR).

The future of biodiversity depends on effectiveness of global protected areas. Protected areas are cornerstones of most biodiversity conservation strategies. A 2004 assessment of management effectiveness of 200 protected areas in 37 countries, conducted by WWF using a tracking tool developed with the World Bank and World Commission on Protected Areas, found that although legal establishment, boundary demarcation, design and objective setting, and biodiversity condition assessment were satisfactorily addressed, a consistent problem was a failure to manage relations with people, both local communities and visitors. The most critical threats to parks were poaching, encroachment, logging, and collection of non-timber forest products. To effectively address such problems, managers must both understand human behavior toward the environment and design management activities that are supported and implemented by local residents and therefore have a greater chance of success. Using a model adapted from Byers 2000, and the case study of a long-term program to protect the Atlantic Forest biodiversity in Rio de Janeiro, Brazil, we demonstrate how a focus on human behavior can help managers to understand the interrelationships of the social system and the ecosystem to develop initiatives that are both successful and sustainable in addressing threats to protected areas.

246. OCELOT (*Leopardus pardalis*) DENSITY AND HOME RANGE USING REMOTE CAMERAS AND RADIO TELEMETRY IN BELIZE, CENTRAL AMERICA. DILLON, ADAM; Kelly, Marcella J. Virginia Tech University, College of Natural Resources, Cheatham Hall, Blacksburg, VA 24061 USA, (adillon@vt.edu).

From the 1960s to the 1980s, ocelots were heavily hunted for their fur and their numbers were in serious decline. Although hunting regulations have increased and hunting pressure has declined, there is still little known about ocelot populations, especially in Central America. This study used camera trapping and radio telemetry to estimate ocelot density and home range in Belize. Five camera-trapping grids, with various camera spacings, were established in the same area over three years in broadleaf jungle habitat. Increasing camera spacing resulted in decreasing density estimates. Average ocelot density across grids was 15-20 ocelots/100 km^2. Two camera-trapping grids in the adjacent pine forest habitat yielded an average ocelot density of 1-3 ocelots/100 km^2. This dramatic difference demonstrates the importance of suitable habitat for healthy ocelot populations. Radio-telemetry performed on seven ocelots in broadleaf jungle resulted in average home ranges of 23.00 km^2 and 14.26 km^2 for males and females respectively, and resulted in density estimates of roughly 12 ocelots/100km^2. This study highlights the importance of camera spacing in density estimation techniques, compares two density estimates through different yet simultaneous techniques, and provides valuable baseline information for conservation of ocelots in Central America.

247. STRUCTURE AND DYNAMICS OF THE ARBOREAL COMPONENT OF AN URBAN FOREST FRAGMENT IN SÃO PAULO, BRASIL. Dislich, Ricardo; Pivello, Vânia R.; RUSSO, FELIPE. Ministério do Planejamento, Orçamento e Gestão, Esplanada dos Minitérios bloco K-DF, Brazil, rdislich@msn.com (RD). Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo. Rua Matão, trav 14, 321 Cep 05508900, Brazil, vrpivel@ib.usp.br (VRP). Universidade Presbiteriana Mackenzie, Otávio Tarquinio de Souza 1203,04613003, São Paulo, Brazil, febarata20@uol.com.br (FBR).

Management actions and biological conservation in forest fragments must be based on the understanding of the ecological processes that happen on them, which may differ from those in larger areas. We analyzed the structure and dynamics of the arboreal component of an urban forest fragment in São Paulo, Brazil, to detect changes over 5 years. We measured and identified at species level every woody element with DBH $\geq$ 9.5 cm in a 2.1 ha plot. The exotic palm *Archontophoenix cunninghamiana* was analyzed in more detail. We compared our data, collected in 2002, with previous data, collected in 1997 and 2000. In 5 years, the forest fragment showed some changes typical of a regenerating forest, such as low stability and the decrease of some early succ essional species populations. However, the late successional species did not show considerable increment, indicating possible regeneration problems. Moreover, species richness decreased from 1997 to 2002. The guilda of native species showed a negative growth (-0,69% year $^{-1}$) whereas *A. cunninghamiana* presented a growth rate higher than those usually expected for tropical forest species (10,3% year $^{-1}$), pointing towards an undergoing biological invasion process. These results emphasize the need for active management in small isolated forest fragments.

248. THE IMPORTANCE OF ANNUAL VARIATION AND MATRIX USE TO UNDERSTAND THE EFFECTS OF ATLANTIC FOREST FRAGMENTATION ON LEAF LITTER FROGS. DIXO, MARIANNA; Metzger, Jean Paul. Laboratório de Ecologia da Paisagem e Conservação da Natureza (LEPAC). Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP. Rua do Matão, trav. 14, n. 321. CEP 05508-900. Brazil, mariannadixo@yahoo.com.br.

We tested the effects of forest fragmentation, fragment size and connectivity on leaf litter frogs. The study area is situated in the Plateau of Ibiúna, near the city of São Paulo, within the Atlantic forest region. The anurofauna was sampled on the wet seasons of 2002 and 2003 in six sites situated in a forested landscape and in

20 fragments in an adjacent fragmented landscape. Fragment sizes varied from 5-276 ha, and presented different degrees of connectivity. Additionally, we sampled also the agricultural matrix from the fragmented landscape. The richness and evenness of frogs were higher in forested sites than in large fragments (50-276 ha) when considering the wet seasons together. The inte r-annual variation of frog abundance, richness and evenness was higher in small fragments when compared with larger ones, indicating an hyperdynamism in small fragments. Data from matrix areas showed that for *Bufo ornatus* all fragments should be considered connected. *Physalaemus cuvieri* was even more abundant in the matrix than in the fragments, and was then benefited by fragmentation. These results highlight the importance of long-term studies and matrix sampling to understand the dynamics of the frog community on a fragmented landscape. FAPESP and FUNDAÇÃO BOTICÁRIO support this study.

249. MAPPING THE RISKS TO THE BIODIVERSITY IN A CONSERVATION UNITY OF ATLANTIC FOREST. DOBROVOLSKI, RICARDO; Hasenack, Heinrich; Kindel, Andreas; Oliveira, Paulo Luiz. Programa de Pós-Graduação em Ecologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, 91501-970, Brazil, ricardo@ecologia.ufrgs.br.

Conservation Units (CU) in the Atlantic Forest are endangered by many human activities. Therefore, adequate actions upon threats to biodiversity are needed and must be monitored in order to verify their effectiveness. The Itapeva State Park (Parque Estadual de Itapeva) is a CU which has been implemented within the Atlantic Forest area, located in Torres, RS, Brazil. With an extension of approximately 1000ha, the park is surrounded by intensively used lands. Our aim is to identify and to map the risks to biodiversity, generating a management and monitoring tool. The threats within the park area and its near buffer zone (500m) were identified and mapped by the analysis of a *Quickbird* image from 2004, aerial photographs and corresponding field work. The risks observed include agriculture, cattle raising, selective logging of *Euterpe edulis*, sandboard riding, and the presence of exotic plant species such as *Eucaliptus sp*., *Pinus* sp. and *Hedychium coronarium*. Roads and the increasing urbanization in the buffer zone are also of great concern. This map will assist in the development of improved conservation and monitoring strategies.

250. SCIENTIFIC CHALLENGES AND GLOBAL OPPORTUNITIES INHERENT TO THE CBD2010 GOALS. DOBSON, ANDREW P. Ecology and Evolutionary Biology Department, Princeton University, Princeton, NJ 08544-1003, USA, andy@eno.princeton.edu.

By agreeing to strive for a significant reduction in the current rate of loss of biological diversity' by the year 2010, political leaders at the 2002 World Summit on Sustainable Development presented conservation scientists with a great opportunity, but also one of their most significant challenges. Assessing how rates of biodiversity loss have changed from current levels by 2010 will require that a given attribute be measured at least three times; however, most habitats, species, populations and ecosystem services have not been assessed even once, especially in biodiversity-rich regions. I use examples to examine the desired properties of 'ideal indicators.' I then change focus and examine an initial framework that asks how we might monitor changes in the economic goods and services provided by natural ecosystems. I will use this exercise to examine how the set of indicators given by the Convention on Biological Diversity might be modified in ways that they provide a more critical assay of the economic value of biological diversity. I will emphasize that we need not only to monitor these benefits, but also to significantly increase public awareness of human dependence upon the role that non-voting species play in driving the world's financial economy.

251. CONSERVATION INVOLVING THE COMMUNITY: FISHERIES CO-MANAGEMENT IN MALAWI. DOBSON, TRACY; Chimatiro, Sloans; Russell, Aaron. Department of Fisheries and Wildlife, Michigan State University, 13 Natural Resources Bldg., East Lansing, MI 48824-1222, USA (TD, AR) Director, Department of Fisheries, Ministry of Natural Resources & Environmental Affairs, P.O. Box 593, Lilongwe, Malawi (SC).

In response to the crash of key nearshore fish stocks in Lakes Malawi and Malombe, in 1993 Malawi's Department of Fisheries, aided by donors GTZ and UNDP, launched a pilot project at Lake Malombe to test the viability of using co-management as a strategy to move towards sustainable fisheries. Up to that time the Department had employed a top down, command-and-control approach. Early results were promising, but failure of the Department to follow through on certain commitments and to relinquish some measure of control, as well as no improvement in the stocks led to disillusionment among fishers. An evaluation of the program to date, detailing a variety of weaknesses, measured against the best practices for collaboratively designing and implementing location-appropriate co-management, as described by Ostrom et al (2002), provides valuable guidance for the Department's new leadership as it seeks to reshape its troubled program.

252. THE *Polylepis* PROBLEM" REVISITED: THE BIOGEOGRAPHIC HISTORY OF THE KEÑUA (*Polylepis* spp.) AND ITS IMPORTANCE FOR ITS CONSERVATION. DOMIC, ALEJANDRA. Carrera de Biologia, Universidad de San Andres, La Paz, Bolivia, alejandradomic@biociencias.org.

The keñua (*Polylepis* spp.) has an unusual distribution pattern. They are restricted to small forest patches dispersedly distributed along the Andean mountain range. Kessler has, recently called the origin of this particular distribution pattern, the "*Polylepis* problem". He affirms that the explanations for the origin of this pattern are attributable to one of two hypotheses, anthropic and natural. The anthropic hypothesis to which this author subscribes, establishes that before humans occupied the Andean region, *Polylepis* forests were widely distributed, and that long-term fire hunting, fuel-consumption, and other negative practices, produced the current discontinuous pattern. On the other hand, the natural hypothesis establishes that the restricted distribution is due to specific microclimatic requirements. In the present paper, I compare both hypotheses in light of recent evidence. Although, human impact is an important factor in the distribution and ecological dynamics of the *Polylepis* patches, ecological studies show that its present distribution has to be understood, taking into account micro-environmental factors. I conclude that if the goal is to understand the distribution of the genus and to develop useful conservation policies and management practices, both environmental and human factors have to be appropriately addressed and studied trough a holistic perspective.

253. COMMUNITY PARTICIPATION IN CONSERVATION IN BOLIVIA'S PROTECTED AREAS. DOMROESE, MEG; Davis, Susan; Herrera, Patricia; Rojas, Judith. Center for Biodi-

versity and Conservation, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024 USA, domroese@amnh.org (MD). Museo de Historia Natural Noel Kempff Mercado, Av. Irala 565, Santa Cruz, Bolivia (SD, PH). Museo Nacional de Historia Natural, Calle 26, Cotacota, La Paz, Bolivia (JR).

Since 1998, three museums have collaborated in a program that aims to bring together scientific and local expertise for biodiversity conservation in Bolivia's protected areas. The program partners are the American Museum of Natural History - New York, the Museo Nacional de Historia Natural - La Paz, and the Museo de Historia Natural Noel Kempff Mercado - Santa Cruz. Recognizing the urgent need for protected area residents to actively participate in and benefit from conservation of the resources upon which they depend, the program partners offered small grants to enable communities to develop their own conservation projects, including interpretive centers, ecotourism facilities, and informational materials. With projects located in ten communities, it has been possible to identify a variety of environmental, economic, social, and political factors that may facilitate or hinder their success. The program has also had a significant impact on its institutional partners as they ha ve expanded their involvement at the community level and shifted priorities to further incorporate educational activities with research aims.

254. ISLAND CONSERVATION: WHERE WE ARE, WHERE WE ARE GOING, AND WHAT WE NEED TO GET THERE. DONLAN, C. JOSH; Wilcox, Chris; Lavoie, Christian; Campbell, Karl; Cruz, Felipe; Tershy, Bernie. Department of Ecology and Evolutionary Biology, Corson Hall, Cornell University, Ithaca, NY 14853-2701 USA cjd34@cornell.edu (CJD). Island Conservation, Center for Ocean Health, 100 Shaffer Road, Santa Cruz, CA 95060 USA (CJD, BT). The Ecology Centre, University of Queensland, Brisbane, QLD, 4072, Australia (CW). Galápagos National Park Service, Puerto Ayora, Isla Santa Cruz, Galápagos, Ecuador (CJD, CL, KC, FC). Charles Darwin Foundation, Casilla 17-01-3891, Quito, Ecuador (CL, KC, FC). United Nations Development Program, Av. Amazonas 2889, Quito, Ecuador (CL). Natural and Rural Systems Management, Gatton College, University of Queensland, Gatton Qld 4345 Australia (KC).

Nowhere but on islands is extinction so rife. Non-native mammals have triggered a massive wave of insular extinctions across the globe. They remain a premier threat today, and thus the removal of non-native mammals from islands is one of our most powerful conservation tools. Over the past decade, significant conservation gains have been made on islands worldwide and eradication techniques have been vastly improved. These techniques include leveraging and integrating 1) aerial hunting and poison broadcasting by helicopter, 2) the use of specially trained hunting dogs and ground-hunting techniques, 3) the integration of global positioning system and geographic information system technology, and 4) improved Judas goat techniques. As island conservation practitioners tackle larger and more biological complex islands for eradication, they will face new challenges. These challenges will not only require technology and knowledge transfer, but will necessitate new tools and approache s. These will include 1) quantitative, statistical, and economic tools needed to help prioritize and guide decision making in eradication campaigns, 2) novel technical approaches (e. g., disease) that effectively and efficiently remove large populations of non-native species 3) new toxins that reduce or eliminate non-target poisoning and secondary effects, and 4) sociological frameworks that are incorporated into eradication campaigns in an effort to obtain buy-in from island inhabitants and users. These four disciplines will encompass the challenges to island conservation in the coming decades.

255. TESTING EXPERT GROUPS FOR A HABITAT SUITABILITY MODEL FOR THE LYNX (*Lynx lynx*) IN THE SWISS ALPS. DOSWALD, NATHALIE; Zimmermann, Fridolin; Breitenmoser, Urs. Department of Biology, University of York, York YO10 5YW, England (ND) natdoswald@icqmail.com. KORA, Thunstrasse 31, 3074 Muri, Switzerland (FZ, UB).

Modelling species distribution is an important aspect of conservation ecology. Empirical models are most commonly used. However, collecting data for these models is time-consuming and expensive. Expert models may be a good alternative method, though previous studies have found mixed results. In this study two expert habitat suitability models (using scientific experts and local experts) were evaluated with independent lynx home ranges from the Swiss Alps. The models were constructed using the techniques of Multi-Criteria Decision-Making and evaluated using Ivlev's Electivity Index and Linear Regression. The results of the regression showed that both models fitted the data well. However, the local expert model was better (R^2 = 78.3%, p = 0.001) than the scientific expert model (R^2 = 57.1%, p = 0.018). This study showed that expert knowledge, and especially local knowledge, can be employed to create a good habitat suitability model. This has important implications for conservation and science because it shows not only that expert knowledge may be used when no other data exists but also that local 'ground workers' should be more often employed in the development of habitat suitability models or conservation plans.

256. THE INFLUENCE OF LANDSCAPE ATTRIBUTES ON MEDIUM AND LARGE SIZE MAMMAL COMMUNITIES OF AGROECOSYSTEMS IN SOUTHEASTERN BRAZIL. DOTTA, GRAZIELA; Verdade, Luciano M. Laboratório de Ecologia Animal, Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, SP, 13418-900, Brazil, grazidotta@rocketmail.com (GD, LMV).

Passa-Cinco river basin can be considered a convenient model for the study of biodiversity conservation. It contains a mosaic of agroecosystems habitats, and is used as one of the major water supply for the metropolitan area of Campinas (approximately 3,000,000 people). In this study we censused medium/large size mammals along 280 km transects in semideciduous forest, eucalyptus plantations, sugar-cane plantations and exotic pastures. We found 23 species in native forest fragments, 20 in sugar-cane, 17 in eucalyptus, and 12 in pastures (total of 25 native, 2 exotic and 6 domestic species). Diversity and evenness indexes suggest that environments are similar. The distribution species curve (Log-series model) showed few abundant and a majority of rare species. Crab-eating fox and European hare were the only species with differences among habitats in frequency of occurrence, and European hare was the only one with difference among habitats in relative abundance. The results show that these mammals community is suitable to the environmental alteration that this region has been suffering, and the current community is basically formed by generalist species. In such conditions, current environmental laws should be enforced in order to improve forest conservation and mitigate the impacts of agriculture, paper industry, and livestock production.

257. MODELING BIO-CULTURAL FACTORS UNDERLYING UTILIZATION AND MANAGEMENT OF INDIGENOUS TREE SPECIES. DOVIE, DELALI B. K.; Witkowski, E. T. F.; Shackleton, C. M. Restoration & Conservation Biology Research Group, School of Animal, Plant & Environmental Sciences University of the Witwatersrand, Wits 2050, Johannesburg, South Africa, delali@biology.wits.ac.za (DBKD, ETW). Environmental Science Department, Rhodes University, Grahamstown, 6140, South Africa (CMS).

The utilization of indigenous tree species in South Africa's biodiversity rich savannas is common and widespread in poor rural communities. Uses include medicine, wild edible fruits and several others that are examined with underlying bio-cultural factors important for the sustainable utilization of the species. The diversity of indigenous tree species in communal lands is high, probably as a result of favourable human use-disturbance. Environmental factors are becoming less important in assessing the species diversity in such areas. Of the ninety-seven tree species that were listed as being useful, sixty four were medicinal, forty three as edible fruits, thirty two for fuel wood purposes and seventeen for wood carving. Twenty four other species are u seful as indigenous housing poles, fifteen for fencing and two for the manufacture of indigenous furniture. Analysis of species data, using ANOVA showed that there were no significant differences in the number and uses of species listed, between various generations of the local people and their genders. Knowledge about the uses challenges our thoughts on using local selection and extraction decision -making processes by local people as important tools for studying the conservation biology of indigenous tree species.

258. HOW MANY SPECIES FORM METAPOPULATIONS IN FRAGMENTED LANDSCAPES? BEETLES FROM NATURAL EUCALYPT FRAGMENTS IN A SEDGELAND MATRIX, TASMANIA. DRISCOLL, DON; McQuillan, Peter. School of Biological Sciences, Flinders University, GPO Box 2100, Adelaide, South Australia, 5001 Australia. dondriscoll@flinders.edu.au; School of Geography and Environmental Studies, University of Tasmania, GPO Box 252-78, Hobart, Tasmania, Australia. P.B.McQuillan@utas.edu.au.

Species may survive habitat fragmentation by forming a metapopulation. Metapopulation theory predicts that some habitat fragments will be occupied, but not all, and many species in recently fragmented landscapes conform to this pattern. However, a process of gradual extinction could account for the same pattern, so it remains debatable how common metapopulations are in fragmented landscapes. To determine what proportion of species is likely to have a metapopulation, we used a naturally fragmented landscape in Tasmania, where habitat patches are older than human-modified landscapes. We used pit-fall traps to examine the distribution of beetle species among *Eucalyptus* patches, in adjacent continuous forest and in the sedgeland matrix. Twenty of 33 species occurred throughout the fragments, but most of these did not occur in the matrix, implying frequent dispersal or resistance to local extinction. Of the six species with a significant distance effect, three were only found in the continuous forest or nearest patches, implying limited dispersal or that patches are unsuitable for some other reason. Only two species had a distribution that was consistent with a metapopulation, implying that metapopulations occur infrequently. Hopes that many species will form viable metapopulations in human-modified landscapes may therefore be misplaced.

259. THE APPLICATION OF FORAGING THEORY TO COMMUNITY LEVEL HABITAT UTILISATION. DRUCE, DAVE; Brown, Joel; Kerley, Graham; Kotler, Burt; Slotow, Rob. School of Biological and Conservation Sciences, University of KwaZulu-Natal, Durban, 4041, South Africa (DD, RS), davedruce@webmail.co.za. University of Illinois at Chicago, Biological Sciences, Chicago, Illinois, 60607-7060, USA (JB). Terrestrial Ecology Research Unit, Department of Zoology, University of Port Elizabeth, 6013, South Africa (GK). Mitrani Centre for Desert Ecology, Ben-Gurion University of the Negev, Sede Boqer Campus, 84990, Israel (BK).

Many conservation areas in South Africa are small (< 1000 km^2) and enclosed by fences that prohibit the emigration or immigration of mammals. As such, these reserves need to be extensively managed. Good management requires a thorough knowledge of habitat requirements and how individual species utilize their habitat. We applied optimal foraging theory and giving-up densities (the amount of food a forager leaves behind in an artificial food patch after a given time period) to study factors responsible for habitat partitioning and species coexistence between two abundant, small mammal species (rock hyrax and klipspringer) in Augrabies Falls National Park, South Africa. Both mammals are herbivorous and inhabit rocky outcrops and both are exposed to predation risk although they have different strategies of vigilance for predators. Results indicate that both species do respond to specific environmental variables and utilise their habitats differently with hyrax relying on cover to a greater extent than klipspringer. The technique of using giving-up densities to determine habitat requirements, response to various environmental variables and species coexistence could prove a useful tool to managers of small, enclosed reserves in determining community interactions and therefore, in managing conservation areas.

260. MESOSCALE DIFFERENTIATION OF HERB SPECIES COMPOSITION BETWEEN CATCHMENTS. DRUCKER, DEBORA P.; Costa, Flávia R. C. Coordenação de Pesquisas em Ecologia, Instituto Nacional de Pesquisas da Amazônia, Av. Efigênio Sales, 2239, Manaus, AM, 69.011-970, Brazil (debora@inpa.gov.br).

In spite of the general agreement on the influence of environmental heterogeneity on species distribution, the environment is often treated as classes roughly delimited. However, important differentiation on species composition may occur within seemingly "homogeneous" environments. Here we investigate the structure of the ground herb community occurring on lowlands of a "terra firme" primary forest at central Amazonia. Thirty 200m^2 plots were distributed at the valleys of Adolfo Ducke Forest Reserve (100Km^2). The Reserve has two main drainage basins: the one to the east drains to the Amazon River and to the one to the west to the Negro River. A dissimilarity matrix based on relative species abundance was constructed using Bray-Curtis index and the species composition variation was resumed in two axes with Hybrid Multidimensional Scaling (HMDS). Results show that the species composition is strongly spatially auto correlated and differ between the two main drainage basins, as well as between the sub-basins within them, indicating that they should be considered independent management units. Therefore, the variation on species composition between sub-basins shows that representation of some biological groups in conservation units may need to incorporate more patches inside one area and not only large areas.

261. THE INITIAL SPATIAL EFFECT OF THE TRANSLOCATION IN A RESIDENT POPULATION OF MARSH DEER (*Blastocerus dichotomus*). DUARTE, JOSÉ M. B.; Torres, Hermógenes A.; Andriolo, Artur; Piovezan, Ubiratan; Costa, Mateus J.R.P. Dept. Zootecnia, FCAV/UNESP, Jaboticabal, SP, 14884-900, Brazil (JMBD, HAT, MJRPC). Dept.Zoologia, Instituto de Ciências Biológicas/UFJF, Juiz de Fora, MG, 36036-900, Brazil (AA). CPAP/EMBRAPA Pantanal, Corumbá, MS, Brazil (UP).

The rescue and immediate translocation of the local fauna has been the main option to mitigate the environmental impact in Hidroelectrics. Generally, it is evaluated only the translocated specimens. We evaluated the effect of a marsh deer translocation in a resident population. We captured, marked and tracking 21 (9 males, 12 females) resident animals, which represented approximately 70% of the local population from the Cisalpina Farm, west margin of Paraná river, Brazil. Six animals (3 females, 3 males) were captured in the same margin (46km) of the river, and translocated for Cisalpina. We monitored the resident animals for 45 days before and after the translocation and translocated ones for 6 months, and analyzed the use areas and the distance between them. We observed an expressive reduction of the use area by resident males after translocation, and a stabilization of this parameter in females. The resident males removed themselves of the translocated males (1684m) and females (1575m). The spatial movements of the resident females were not affected by translocation. Translocated males tended to go away from the release point, but females remain in the release area. These results suggest an important effect of the translocation in the male resident community.

262. DISTRIBUTION AND ABUNDANCE OF THE SMALL RED BROCKET DEER (*Mazama bororo* DUARTE, 1996): IS IT AN ENDANGERED SPECIES? Duarte, José M. B.; VOGLIOTTI, ALEXANDRE; Garcia, J. E.; Talarico, Â. C.; Rodrigues, Fernando P.; Oliveira, E. J. F.; González, Susana; Maldonado, Jesús E. Projeto Cervídeos Brasileiros, Departamento de Zootecnia, FCAV-UNESP, Jaboticabal, SP, 14.884-900, Brazil, avogliot@esalq.usp.br (JMBD, AV, FPR, ÂCT, EJFO). Departamento de Bioquímica e Biotecnologia, CCE, Universidade Estadual de Londrina, Londrina, PR, 86.051-990, Brazil (JEG). Departamento de Citogenética, Instituto de Investigaciones Biológicas Clemente Estable, Montevidéo, 11.600, Uruguay (SG). Genetics Program, NMNH, Smithsonian Institution, Washington, DC, 20008-2537, USA (JEM).

The small red brocket deer, recently described in the Atlantic Forest of southeastern Brazil, is considered one of the most endangered deer species. To obtain distribution and abundance information, we developed genetic markers that allowed us to conduct a non-invasive fecal DNA analysis. Species-specific mitochondrial DNA markers based on PCR/RFLP techniques were developed to establish their distribution, while 3 microsatellite markers were developed to identify the feces to the individual level to aid us in estimates of abundance. With the aid of a trained dog, we collected 218 fecal samples at the most important protected areas in southern and southeastern Brazil. Positive identification of this species was established at four localities from the sta tes of São Paulo and Paraná, suggesting a distribution restricted to the Tropical Ombrophilous Forest, between parallels $23^o50'$-26^o South and meridians 47^o-49^o West. The individually identified fecal samples from Intervales State Park were used in a capture/recapture model using the Schumacher estimator, giving density estimates of 1.44 animal/km^2. Considering that the extent of their preferred habitat within the protected areas is 263,745 ha, we estimate that the population size is approximately 5,500 animals, which suggest that this species may not be facing eminent extinction risks. (This study was supported by PROBIO/MMA/BIRD; FAPESP; CNPq and CAPES, PROGRAMA DE PÓS-GRADUAÇÃO INTERUNIDADES EM ECOLOGIA DE AGROECOSSISTEMAS-USP)

263. UNDERSTANDING THE "MAP" REGION AS A SOCIAL-ECOLOGICAL SYSTEM: A FRAMEWORK FOR BUILDING RESILIENCE AND PROMOTING SUSTAINABLE RESOURCE MANAGEMENT. DUCHELLE, AMY E.; Chavez, Andrea; Paniagua, Franklin; Rojas, Rafael; Villegas, Zulma. School of Forest Resources and Conservation, University of Florida, PO Box 110410, Gainesville, FL 32611, USA, duchelle@ufl.edu (AED). Department of Geography, University of Florida, P.O. Box 117315, Gainesville, FL 32611, USA (AC, ZV). School of Natural Resources and the Environment, University of Florida, PO Box 116455, Gainesville, FL 32611, USA (FP, RR).

Understanding complex linkages between social and ecological systems, and their resilience to external shocks, is essential for promoting sustainable management of natural resources. The trinational frontier region of Peru, Brazil and Bolivia, provides an exceptional opportunity to explore the resilience of social-ecological systems to rapid infrastructural change. This region, known as "MAP," is comprised of the states of Madre de Dios-Peru, Acre-Brazil, and Pando-Bolivia. Although MAP is characterized by lowland wet tropical forest habitat, its historical settlement, patterns of deforestation, public policies and socioeconomic development vary considerably from one country to the next. Recent plans to extend the newly paved Brazilian BR-317 highway into Bolivia and Peru, and provide regional access to Pacific ports, will undoubtedly change the nature of this formerly remote region. In this study, we use a broad-scale systems approach to integrate socioeconomic, political and biophysical variables in the MAP region, create a series of conceptual models to understand social-ecological linkages over time, and present three possible resource management scenarios related to future development of the Transoceanic highway. Results highlight the importance of robust local and national institutions to build resilience to external disturbances and promote sustainable natural resource management, through regulatory mechanisms.

264. DEFORESTATION, FOREST RESOURCES, CIVIL CONFLICT, AND COMMUNITY FOREST MANAGEMENT INSTITUTIONS: A COMPARISON OF TWO WATERSHEDS IN GUERRERO, MEXICO. DURÁN, ELVIRA; Velázquez, Alejandro; Bray, David Barton. Instituto de Geografia, Universidad Autonoma de Mexico, Aquiles Serdan 382, Morelia, Michoacan, 58000, Mexico, eduran3@hotmail.com (ED, AV). Department of Environmental Studies, Florida International University, Miami, FL 33199, USA.

We compare deforestation, forest resources, civil conflict, and community institutions in two adjacent watersheds in the Mexican state of Guerrero. We used remote sensing and social methodologies to study relationships among the variables. Dependent variables of deforestation and civil violence (both higher in the Petatlán watershed, lower in the Técpan watershed) are hypothesized to be influenced by commercial richness of forest resource and effectiveness of community organizations. The biodiverse wa-

tersheds are distributed along an elevation gradient from 0-2,800 m, with pine and oak forests and deciduous tropical forests as predominant vegetation. In the land use/cover change analysis compatible digital maps on vegetation and land uses of two dates (t_1 =1979 and t_2 = 2000) were crossed with using GIS, and a map of change processes and change rates were obtained. Over 21-years in both watersheds, about 92% of temperate forests covers remained (annual loss -0.08%), whereas about 50% of tropical forests were deforested (annual loss -5.94%), the latter much higher rates than reported elsewhere in Mexico, but with differences between the two watersheds. Results show that effective local organizat ions can both reduce deforestation and civil violence.

265. RELATING LONG-TERM STUDIES TO CONSERVATION PRACTICE: THE CASE OF THE SERENGETI CHEETAH PROJECT. DURANT, SARAH; Bashir, Sultana; Maddox, Thomas; Laurenson, Karen; Caro, Tim. Institute of Zoology, Zoological Society of London, London, NW1 4RY, UK, s.durant@ucl.ac.uk.

Although detailed long-term scientific studies provide potentially crucial information for conservation, they are rare. Moreover there is a continuing disjunction between scientists and managers that can affect whether scientific information is used to inform conservation problems. Long-term studies, by virtue of their very longevity and continuity help improve mutual trust, respect and understanding between scientists and managers, and hence are ideally placed to strengthen relationships. This paper examines the direct and indirect impacts of one such long term study, the Serengeti Cheetah Project (SCP) on cheetah conservation. We first give a brief history of the SCP followed by a summary of the key scientific findings of this 30-year old research project. We then summarise the conservation impact of the scientific findings and go on to document the evolution of the SCP from a project that exclusively addressed pure behavioral and ecological science questions to a broade r conservation programme, which seeks to use scientific research to directly address conservation needs. We finally assess the impacts of the SCP on conservation policy and practice and go on to make some general conclusions about the integration of science and management in conservation.

266. IMPORTANT BIRD AREAS IN THE PACIFIC - ADAPTING A GLOBAL TOOL TO LOCAL CONDITIONS. DUTSON, GUY; Masibalavu, Vilikesa. BirdLife Pacific Partnership Secretariat, GPO Box 18332, 11 Ma'afu Street, Suva, Fiji (guy@birdlifepacific.org.fj).

The Important Bird Area programme of BirdLife International identifies sites of international importance for the conservation of birds and other biodiversity. The approach, first developed in Europe, is now being adapted for application in three territories in the Pacific: Palau, New Caledonia and Fiji. All have small human populations and few (non-marine) conservationists, so capacity-building is being integrated into all stages of the IBA process. This paucity of conservationists enables a Project Steering Committee to disseminate project ideas direct into each relevant institution and spread ownership, as well as offer project guidance. Most land is owned by tribal groups, so all biodiversity fieldwork is combined with socio-political fieldwork and community awareness. Distribution patterns of forest birds in the Pacific has made applying standard IBA selection criteria difficult. IBA selection has therefore been informed by a site's supportive socio-political status, thereby improving the prospects of positive conservation action, and by the presence of subspecies of non-threatened birds which occur at no other site. Project flexibility and adaptive management enables exploitation of unexpected conservation opportunities. Despite many shared factors, Pacific islands have heterogeneous cultures and different approaches are needed for different countries.

267. USING INDIGENOUS KNOWLEDGE FOR CONSERVATION: BAREFOOT CONSERVATION EDUCATORS OF INDIA. DUTT, BAHAR; Kaleta, Rachel; Hoshing, Vikram. Wildlife Trust of India, A 220 New Friends Colony, New Delhi-65. India, bahardutt@yahoo.com.

Wildlife conservation laws in India have been in direct conflict with the livelihood needs of many communities. The 'Jogi-Nath' snake charmers are one such community. In this paper we present the results of a multi-disciplinary survey conducted with the community along with recommendations that will help resolve this tension between biodiversity conservation and livelihoods. The research results show that nearly three quarters of the community is still dependent on snakes to earn a living. We then examined the condition of the snakes held by them in captivity and found as many as eight different species of snakes were used of which two species of conservation concern were the Royal snake and the Indian Python but these were observed only in a small percentage of the households. The main results of this paper thus show that traditional use of wildlife still continues, despite the introduction of regulatory conservation laws. It is urged that the indigenous knowledge of the community be used through training and employment as 'barefoot conservation educators', to educate people about venomous and non-venomous species of snakes. This would not only provide a livelihood but also assist in the protection of snakes killed by ignorant people.

268. MANAGEMENT OF IMPORTANT BIRD AREAS: WELL-DESIGNED THEORY OR EFFECTIVE MECHANISM? DZHAMIRZOEV, GADZHIBEK S.; Banik, Mikhail V. Institute of Applied Ecology, Dakhadaeva 21, Makhachkala, Daghestan Republic, 368000, Russia, dzhamir@operamail.com (DGS). Ukrainian Research Institute of Forestry and Forest Melioration, Pushkinska 86, Kharkiv, 61024, Ukraine, mbanik@operamail.com (BMV).

Important Bird Area is a widely accepted concept for the territory that supports populations of vulnerable species or high species diversity. Since 1996 IBA programme has been implemented in Daghestan Republic, Russia, in unique region in eastern part of Caucasus with rich bird fauna. 26 IBAs have been selected in Daghestan within 9 years' period. One of the IBAs, Adzhi lake, can be taken as an example of evolution from initial small-scale and single-aimed conservation project to effective implementation of multi-aimed management plan for the territory. One widely acclaimed conservationists' opinion is that well-designed management plan can be implemented by any initiative group in any conditions within short-time period. We condemn such view stressing more realistic approach, as the most important thing in conservation is to justify lasting effect. The success of the actions depends on your own "evolution" in understanding those people who are empowered in decision making at local level. Our experience evidenced that effective mechanism of implementing management plans can be driven only on those territories where small-scale projects were already realised and by those people who have viable contacts with local communities (projects supported by BP Conservation Programme, MacArthur Foundation and Russian Bird

Conservation Union).

269. SELECTING LANDSCAPES FOR CONSERVATION: IMPACTS OF SPECIES PRIORITISATION. EARLY, REGAN; Moilanen, Atte; Thomas, Chris. Department of Biology, University of York, York, YO10 5YW, UK (re7@york.ac.uk) (RE, CT); Metapopulation Research Group, Department of Biological and Environmental Sciences, University of Helsinki, P.O. Box 65, FI-00014, FINLAND (AM).

A new reserve design algorithm 'ZONATION' is used to identify complementary landscapes, the conservation of which would maximise the likelihood that all species within an assemblage would persist. The sensitivity of priority areas to the weighting of species is explored for British butterflies. Priority weightings are given to individual species according to (a) regional rarity and value, (b) national decline, and (c) European decline. Differences between regional and continental-scale priorities strongly affect the design of the reserve network. When species are weighted according to their regional or national priorities, locally rare species are heavily represented in the reserve network even if the species are common and widespread elsewhere in Europe, whereas European priority species are under-represented. However, weighting species to reflect their European priority causes the representation of local high priority species to drop disproportionately more than that of local medium and low priority species. Ultimately, we produce a compromise solution for Britain, reflecting both continental and local biodiversity value. We argue that global and continental priorities must be incorporated into local and regional priority-setting, to ensure that internationally threatened species receive protection within their distributional "heartlands", the are as where long-term conservation is likely to be most successful.

270. INCORPORATING INBREEDING DEPRESSION IN RISK ASSESSMENT MODELS: A LITERATURE REVIEW OF INBREEDING EFFECTS ON VITAL RATES. EARNHARDT, JOANNE; Bier, Louise; Thompson, Steve D. Alexander Center for Applied Population Biology, Lincoln Park Zoo, Chicago, IL, 60614, USA. (Joanne@lpzoo.org).

Inbreeding has been shown to decrease genetic variation and fecundity/fertility and increase mortality rates. Increases in infant, juvenile, and adult mortality rates can decrease population growth and/or limit population size and thus potentially increase a population's probability of extinction. While many conservation biologists consider inbreeding depression a serious threat to small populations, inbreeding depression is often omitted from population viability analyses (PVAs). This omission is often attributed to uncertainty about the functional form (i. e., what demographic parameters should be impacted) and/or appropriate values for parameterization of inbreeding depression. We reviewed 54 papers reporting the effects of inbreeding on mammal and bird populations and collected data on direction and magnitude of the effect of inbreeding on traits that are considered essential to projection of population viability. We found 1) no significant effect in 61% of all traits (N= 583), 2) no difference in the magnitude of effect between reproduction and mortality traits and 3) adult mortality was twice as likely to be negatively impacted as infant mortality. When genetic data do not exist for the specific modeled population, we provide general guidelines for methods to model inbreeding depression in PVAs.

271. BUILDING ALLIANCES TO SUPPORT THE CONSERVATION COMMONS. ECOCHARD, JEAN-LOUIS; Hammond, Thomas E. The Nature Conservancy, 4245 N Fairfax Drive, Suite #100, Arlington, VA 22203 USA, jecochard@tnc.org; IUCN The World Conservation Union, Canada Office, 555 Rene Levesque Blvd. W., Suite 500, Montréal Québec, H2Z 1B1, Canada, tom.hammond@iucn.org.

Policy makers and conservation practioners alike require access to the most current and comprehensive, and the most rigorously and professionally evaluated expert knowledge available - derived from the best available data and information assets we have. Successful conservation work requires nothing less . Effective knowledge management in our work depends to a large degree on the logical synthesis and technical integration of data, information and expertise. In turn, success in this endeavour depends largely on open access to existing sources of data and information - and leveraging these existing assets to address knowledge gaps. The Conservation Commons is an international partnership of like-minded conservation, scientific, and research organizations and other institutions sharing common principles of open access to data and information essential to further our understanding of biodiversity, and ensure effective conservation practice on the ground. In addition to incorporating and promoting the principle of open access, these groups are also working together to improve the technical "inter-operability" of existing data and information.

272. RELIABILITY OF HISTORICAL DATA WHEN ASSESSING CONTEMPORARY PATTERNS OF DISTRIBUTION OF ENDANGERED MARINE SPECIES IN THE GALAPAGOS MARINE RESERVE. EDGAR, GRAHAM. Conservation International and Tasmanian Aquaculture and Fisheries Institute, University of Tasmania. Nubeena Cres, Taroona 7053, Australia.

While strategies to maximize conservation outcomes using spatial approaches are developing rapidly for terrestrial environments, marine conservation planning lags, in large part due to a paucity of biological data coupled with the 'out of sight' nature of subtidal habitats. The sparse available historical data indicate substantive changes in shallow Galapagos marine habitats since the 1982/83 El Niño, including the apparent disappearance of formerly common fish, invertebrates and macro-algae. A preliminary assessment revealed 47 globally- threatened marine species in Galapagos, including 5 mammal, 6 seabird, 5 reptile, 3 fish, 3 echinoderm, 2 crab, 2 mollusk, 4 coral, 9 brown algal and 8 red algal species. A total of 18 marine species are presently included on the IUCN Red List, wi th the remainder considered to fulfill IUCN threatened species criteria but not yet formally assessed by a specialist group. Distributional records were used to identify sites ('key biodiversity areas') containing anomalously-high concentrations of threatened plants and animals, with an ultimate management aim to protect such sites from adverse anthropogenic threats within a marine protected area network. Strong biases associated with historical sampling effort were revealed during contemporary field trips directed at sites with highest recorded concentrations of threatened marine species.

273. SPATIAL PATTERN OF NATURAL RESOURCE USE BY LOCAL COMMUNITIES IN CAPRIVI, NAMIBIA. EGOH, BENIS NCHINE. Department of Botany an Zoology, Private Bag X1, Matieland, 7602, Stellenbosch, South Africa, benis@sun.ac.za.

Though collection of natural resources could lead to degradation, there is lack of data and villagers are probably using far more greater area for collection of resources than other land use practices. We used field survey data, forcus group discussions and mapping, existing vegetation maps to model the pattern of resource use by rural communities. Our results show that distance to collection site contributed significantly to resource use by villagers. There was a positive significant relationship between distance traveled to collect palms and grasses against village size. Percentage of fences constructed with grass and reeds was negatively significant against distance traveled to collection sites. This pattern was also observed with percentage of *Mopane* against distance to poles. Areas ± 2km from villages were used more. Villagers showed a strong preference to certain resources. However resource substituion was common when resources become scares. Areas where villagers collect two or more resources are areas very close to the village. The immediate surrounding area of the villages is therefore very important to villagers. Although villagers seem to be using the whole area, different habitats are important for different resources. GIS and local knowledge can be used to model resource pattern.

274. SEX RATIO MANIPULATION IN NESTS OF *Podocnemis sextuberculata* (CORNALIA, 1849) IN THE PIRAPUCÚ BEACH, RDS/MAMIRAUÁ, AM. EISEMBERG, CARLA C.; Drummond, Glaucia M.; Vogt, Richard C. Coleção de Anfíbios e Répteis, Instituto Nacional de Pesquisas da Amazônia. Av. André Araújo, 2936, Campus II, CXP 478, CEP 69083-000, Manaus, AM, Brazil, carlacea@yahoo.com.br (CCE, RCV). Fundação Biodiversitas, R. Ludgero Dolabela, 1021, 7o andar, Gutierrez, Caixa Postal 1462, CEP 30430-130, Belo Horizonte, Minas Gerais, Brazil (GMD).

The temperature increase might be used for the sex manipulation of the hatchlings and addition of females to the population in conservations and management programs for the endangered quelonian populations. This work has tested de efficiency of black plastic placed over *Podocnemis sextuberculata* nests to produce more females, in Pirapucú beach, Japurá sector, in the RDS/Mamirauá, Amazonas, Brazil. Thirty nests were monitored, witch 15 were covered with a 2 m^2 black plastic and 15 used as the control group. The influence of other variables like the nest distance from de beach and time of incubation were tested. Data loggers were used in 16 nests on an artificial beach in order to check the temperature means differences between the nests with and without plastic. The oviposition was from 17/09 to 22/09/2003. The presence of black plastic significantly affected the sexual rate and nests with plastic produce 38% more females. In nests with plastic mortality was 12% greater than in nests without. In the artificial beach, nests without plastic were 0,96ºC colder. Other variables weren't related with the sexual rate. Besides the higher mortality, the methodology represents a cheap alternative for the quelonian sex manipulation where the sexual rates are male biased.

275. CONSERVATION GENETICS OF NEOTROPICAL CARNIVORES (MAMMALIA, CARNIVORA): RECENT ADVANCES AND PROSPECTS FOR THE FUTURE. EIZIRIK, EDUARDO; Trigo, Tatiane C.; Tchaicka, Ligia; Trinca, Cristine S.; Rodrigues, Manoel. Faculdade de Biociências, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, RS 90619-900, Brazil, eduardo.eizirik@pucrs.br (EE, MR). Departamento de Genética, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS 91501-970, Brazil (TCC, LT, CST).

The 47 species of carnivores inhabiting the Neotropical region have experienced in the last few centuries an increasing amount of pressure from anthropogenic threats including loss and fragmentation of habitats, hunting and direct persecution. In spite of the growing recognition of the need to devise adequate conservation strategies for these species, incorporating input from multiple disciplines, still very little is known regarding basic aspects of their biology, ecology and evolutionary history. The use of molecular and/or genetic approaches to address conservation-related issues has expanded dramatically in the last two decades, allowing the characterization of evolutionary, ecological and behavioral aspects of many taxa. Although many such studies have focused on carnivores, few have addressed Neotropical species. Our group has been working for several years on genetic studies of Neotropical carnivores, attempting to integrate our findings within broader conservation strategies for this group. In this presentation we will summarize recent advances in projects addressing (i) molecular evidence for hybridization between two Neotropical cats (*Leopardus tigrinus* and *Oncifelis geoffroyi*); (ii) phylogeography of the fox *Cerdocyon thous*; and (iii) development and optimization of molecular markers for species identification of Neotropical carnivores, as well as for conservation genetic studies of Neotropical canids and otters.

276. SETTING KEY BIODIVERSITY AREA THRESHOLDS - LESSONS FROM TURKEY. EKEN, GÜVEN; Gem, Engin; Karatas, Ahmet; Kiliç, Dicle Tuba. Doga Dernegi, PK 640, 06445, Yenisehir, Ankara, Turkey - guven.eken@dogadernegi.org; Doga Dernegi, PK 640, 06445, Yenisehir, Ankara, Turkey; Nigde University, Nigde, Turkey; Doga Dernegi, PK 640, 06445, Yenisehir, Ankara, Turkey.

Turkey is amongst the few countries that has nearly completed the selection of the Key Biodiversity Areas are (KBAs) at a national scale. Taxon groups covered by the Turkish KBA programme include birds, mammals, herpetofauna, freshwater fish, dragonflies, butterflies and dragonflies. The process of employing thresholds for each KBA criterion gave several results that may also be applied elsewhere in the world. These include: (i) Higher thresholds may be sought for species classified as EN and VU, which meet the RedList sub-criterion A1 only; (ii) The 50,000 km² threshold for defining restricted-range species does not generate major commission errors, despite the fact that this cut-off initially gives the impression of being very high for species with fine-grained distributions, such as plants. The same threshold can also effectively be applied for freshwater fish; (iii) One percent of the global population seems to be an applicable threshold for most congregatory taxon groups; (iv) Biome-restricted assemblages criterion has proven to be the most difficult for applying thresholds. For many taxon groups, it was not possible to employ an assemblage-based threshold (such as 25% of all biome-restricted species of a given taxon group). Using simple population thresholds may be more appropriate for this criterion.

277. USING BIODIVERSITY OFFSETS AS A MITIGATION TOOL IN THE PRIVATE SECTOR. EKSTROM, JON M. M. BirdLife International, Wellbrook Court, Girton, Cambridge, CB3 0NA, UK.

Biodiversity offsets are conservation activities intended to compensate for the residual harm caused to biodiversity by development projects. They form part of a three stage process in the environmental mitigation hierarchy: first avoid impacts on biodiversity, then minimise these impacts, finally offset impacts with com-

pensatory measures Offset implementation is furthest developed in the US where "mitigation banking" has become commonplace. Currently, offsets are emerging in the international private sector in the guise of voluntary corporate responsibility (CR) programmes of several multinationals who wish to demonstrate "no net loss" to biodiversity through their operations. I present results of a multivariate analysis of the biodiversity programmes of several transnational companies to demonstrate the strengths and weaknesses of this approach, using examples from high biodiversity countries such as Madagascar. I find that the mechanism has already resulted in positive impacts on biodiversity in several cases, but the application of offsets is hindered by a) low rates of voluntary take-up amongst all but the largest companies; b) lack of international and national regulation; and c) and poor concurrence on what constitutes an offset. I conclude that at least on the latter point, the conservation biology community could provide much guidance to facilitate this process.

278. PRELIMINARY RESULTS OF NGO TRAINING NEEDS IN THREE CONTINENTS. Elbin, Susan; TABER, ANDREW. Wildlife Trust,61 Route 9W, Palisades, New York, 10964-8000, USA, elbin@wildlifetrust.org.

Many conservation scientists from developing countries pursue graduate training in the North America or Europe, where they hone their skills in biology and associated fields during a discrete period of time. Once back in their home countries, further need for on-the-ground training in specific disciplines arises, with access to this specialized training difficult to attain. The Wildlife Trust Alliance provides a virtual venue for our international project leaders to meet their training needs by sharing their skills, experiences, and insights. We surveyed 14 Wildlife Trust conservation scientists about their professional training needs in building their conservation capacity. The principle needs identified were: 1) keeping current in conservation technologies, ranging from learning GIS or ecological modeling to evaluating environmental impact statements and overall conservation impact; 2) educating future conservationists in country; and 3) building conservation organizations, ranging from developing a business plan to meeting facilitation and consensus building. Next steps include prioritizing needs and identifying training opportunities that each alliance member can provide to the group; compiling an intra-alliance training guide; facilitating learning teams; and conducting joint training courses for alliance members.

279. MANAGEMENT STRATEGIES TO PROMOTE THE CONSERVATION OF TREEFERN SPECIES OF THE GENUS *Cyathea*. ELEUTÉRIO, A. A.; Perez-Salicrup, D.R. Centro de Investigaciones en Ecosistemas, Universidad Nacional Autonoma de Mexico, Antigua carretera a Pátzcuaro 8701 Col. Ex-Hac. Sn. Jose de la Huerta C.P. 58190, Morelia, Michoacán, México, aeleuterio@oikos.unam.mx.

Strategies for conservation of endangered species often include translocation of individuals from areas where they are subjected to high mortality to protected areas. Individuals of treefern species of *Cyathea* are harvested from cloud forest remnants by artisans in Cuetzalan, Puebla, México. Current extraction, besides being forbidden by Mexican law, strongly reduces the abundance of adults in natural populations. We evaluated the viability of transplanting individuals of two species of *Cyathea* from disturbed areas (roadsides) to protected environments, under two conditions of light availability. While only 30% of the individuals naturally established in roadsides survived after one year, individuals transplanted to open canopy and in 50% shade experienced > 80% survival. Transplanted individuals of *C. divergens* elongated faster than *C. mexicana* individuals (0.74cm and 0.5cm respectively) and produced more fronds. Individuals transplanted to 50% shade also produced more fronds than the transplanted to open canopy areas. The observed growth rates were superior than commonly reported to other treefern species in the literature. The adequate transplantation of *Cyathea* spp. individuals from roadsides increases survival and growth. The commerce of transplanted individuals for gardening could substitute current management practices.

280. BUSHMEAT CONSUMPTION IN CAMEROON; BASELINE DATA FOR LONG TERM COMMUNITY CENTERED CONSERVATION PROJECT. ELLIS, CHRISTINA; Kamou, Edouard. The Jane Goodall Institute, B.P. 11317, Yaoundé, Cameroon (CEenbrousse@aol.com).

The commercial bushmeat trade, as one of the foremost threats to biodiversity conservation in Central Africa, contributes to food security and the local economy in thirty-one villages bordering the Sanctuaire à Gorilles de Mengamé, Cameroon. As a key component of baseline data collection, a long term bushmeat consumption study is being conducted in three villages bordering the 115000 ha protected area. Complementing inventories of mammals, botany and human socio economics, a village assistant collects data on hunting/ selling zones, hunter demographics, species, state, and price. Results of the first 24 months of data indicate that bushmeat (representing more than 45 species) plays a key role in local economics for select individuals; bushmeat consumption is well below the consumption of fish. However, during the heavy hunting months from August to October, a village of 200 inhabitants may consume 1034 kg of bushmeat and sell an additional 1268 kg. Interestingly bushmeat hunting is a secondary activity to preferred livelihoods based on fishing and agriculture (cocoa, plantains, palm oil, maize, groundnuts). Baseline data collected during the project pilot phase provides structure for the definition of impact indicators, and completed the first step of the piloted Community Centered Conservation approach.

281. MODELING POPULATION DYNAMICS WITH LIMITED DATA: PELICAN POPULATION TRAJECTORIES, MODEL SENSITIVITY, AND THE LIKELY IMPACT OF WIND FARMS. ELPHICK, CHRIS S.; Ellis, Martha. Department of Ecology and Evolutionary Biology, University of Connecticut, 75 North Eagleville Road, Storrs CT 06268-3043, USA, elphick@uconn.edu.

We evaluated the potential impact of a proposed wind energy facility on an endangered population of Caribbean brown pelicans. We created a population model using the limited demographic information available, conducted an extensive sensitivity analysis, and predicted the consequences of additional mortality caused by turbines. Under the estimated current conditions, the model predicted a rapid population decrease and near extinction within a few decades. What limited census data exist closely match the model's qualitative predictions, although the model slightly overestimated the rate of population decline. Although certain parameter estimates were based on very little information, we found that our qualitative results were robust and that only large errors would result in different conclusions. Based on the model, increasing the population size is extremely unlikely without increases in pelican survival rates. Improved nesting productivity might also be necessary, but is unlikely to be sufficient. Adding the mortality predicted to be caused by turbines had little effect on population

trajectories. These results suggest that the population is heading towards extinction, even without a wind facility. More generally, our analysis shows that even simple models based on little data can help one to assess the impact of some threats to endangered species.

282. INTRODUCED BROWN TROUT AFFECT FOOD WEBS OF SMALL STREAMS IN TASMANIA. Elvey, William F.; BARMUTA, LEON A.; Davies, Peter E. School of Zoology and Tasmanian Aquaculture and Fisheries Institute, University of Tasmania, Private Bag 5, Hobart, Tasmania 7001, Australia. Leon.Barmuta@utas.edu.au (WFE, LB, PED). Freshwater Systems Pty Ltd, Sandy Bay, Tasmania 7003, Australia (PED).

A combination of field surveys and an outdoor artificial stream experiment were used to identify the potential impacts of introduced brown trout on the benthos of small streams in Tasmania. Trout had the strongest impacts on mayflies (especially baetids), but little effect on non-epibenthic prey. Localised, patch-specific phenomena affected the interaction between trout and the benthos. From the surveys, there was some evidence that trout streams support a higher biomass of algae, but this effect depends on the degree of shading. Similarly, in depositional habitats, the abundant detritus and low densities of vulnerable epibenthic species showed only weak effects of trout on benthic community structure. We conclude that introduced brown trout have patch-specific eff ects on epibenthic invertebrate prey, but caution that this seemingly modest effect may not prevail everywhere in Tasmania, especially in streams where brown trout have displaced endemic galaxiids or been introduced into previously fish-free waters.

283. PRELIMINARY REPORT OF SEMEN COLLECTION IN SPECTACLED BEAR (*Tremarctos ornatus*) IN CAPTIVITY. ENCISO, MARCO A.; Bermúdez, Lizette; Evangelista, Shirley; Rojas, Gianmarco. Laboratoy of Animal Reproduction, Faculty of Veterinary Medicine, San Marcos University. Av. Circunvalación cda 29 s/n, San Borja, Apartado 41-0068. Lima, Perú, marco.enciso@gmail.com (MAE, SE). Huachipa Zoological Park. Av. Las Torres s/n, Ate, Lima, Perú (LB, GR). PUMAS Group. Mariscal Las Heras 325-5, Lince, Lima, Perú (MAE, LB, SE, GR).

In this work, the electroejaculation method for the extraction of semen was evaluated in one adult Spectacled Bear (*Tremarctos ornatus*), with an electroejaculator design for small ruminants, applying four series of consecutive discharges of 6 volts, for a period of fifteen seconds each one, accompanied by a manual stimulation. In the last series of discharges, an effective erection was obtained, having a little sample of ejaculated, enough for carry out the morphologic and motility sperm evaluation, appreciating inclusive a 50% of progressive motility. In conclusion, the electroejaculation technique results useful for semen collection, and it is necessary the adaptation of that technique for this specie, in length of rectal and voltage transducer to obtain a bigger semen volume.

284. LONG-TERM EVALUATION OF THE GOLDEN LION TAMARIN EDUCATION PROJECT. ENGELS, CHRISTINE A.; Jacobson, Susan K. Center for Biodiversity Conservation, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024, USA, cengels@amnh.org. Department of Wildlife Ecology and Conservation, Program for Studies in Tropical Conservation, P. O. Box 110430, University of Florida, Gainesville, FL 32611-0430, USA.

In their mission to sustain a genetically viable population of golden lion tamarins (*Leontopithecus rosalia*) in the coastal forest of Rio de Janeiro, the Golden Lion Tamarin Association has been using environmental education as a strategy to increase public support for the protection of this endangered primate and its habitat. This study compared results of an evaluative survey conducted in 2001 with baseline data from 1986 to: (1) assess changes in public support and knowledge over time, (2) identify strong and weak project features, and (3) suggest modifications. Focus groups also were conducted to provide an in-depth, descriptive context for the study results. Comparative analysis of the sample of 666 surveys revealed an increase in positive support regarding the tamarin and the environment, as well as an increase in the general knowledge about the environment. However, gaps in knowledge about the biology and the conservation status of the tamarin also emerged. Logistical regressions were used to identify socio-demographic groups less knowledgeable about the tamarins to suggest new target audiences, such as women, to involve in the project. The Association is using the results of this study to improve the impact of environmental education activities in the region.

285. MAJOR HIGHWAYS BLOCK GENE FLOW AND DECREASE GENETIC DIVERSITY OF DESERT BIGHORN SHEEP. EPPS, CLINTON W.; Palsboll, Per J.; Wehausen, John D.; Roderick, George K.; Ramey II, Rob R.; McCullough, Dale R. Department of Environmental Science, Policy and Management, University of California Berkeley, 137 Mulford Hall #3114, Berkeley California 94720, USA, buzzard@nature.berkeley.edu (CWE, PJP, GKR, DRM). White Mountain Research Station, University of California, 3000 E. Line Street, Bishop, California 93514, USA (JDW). Department of Zoology, Denver Museum of Nature and Science, 2001 Colorado Blvd., Denver, Colorado 80205, USA (RRR).

An explosion of road networks has increased connectivity of humans, while reducing connectivity among natural populations of flora and fauna. Isolation of natural populations generally is assumed to cause increased rates of population extinction, in part through reduction of genetic diversity. However, there are few cases in which anthropogenic barriers have been linked directly to the loss of genetic variability. Here we use 14 microsatellite loci and 515 base-pair mitochondrial DNA control region sequences to assess genetic diversity and gene flow across human-made barriers among 27 populations of desert bighorn sheep (*Ovis canadensis nelsoni*). We document a recent and rapid reduction in genetic diversity due to only 40 years of anthropogenic isolation. Interstate highways, freeways, canals, and developed areas, where present, have apparently eliminated gene flow. Highways and other human-made barriers constitute a serious threat to the long-term persistence of this and other species with fragmented distributions.

286. ECOPHYSIOLOGY MEETS PREDICTIVE DISTRIBUTION MODELLING: CHANGES IN EVAPORATIVE COOLING REQUIREMENTS OF BIRDS UNDER CLIMATE CHANGE CONDITIONS. ERASMUS, BAREND F.N.; McKechnie, Andrew E. School of Animal, Plant and Environmental Science, University of the Witwatersrand, Private bag 3, WITS 2050, Johannesburg, South Africa (BFNE, AEM).

Predictive distribution modelling relies heavily on the association between observed distributions and environmental variables. Although there are cases where distributions coincide with climate regions or shift in synchrony with climate, these phenomena do not

necessarily imply a causal relationship. Patterns of species' distributions are the cumulative result of individual animals responding to fine-scale states and fluxes of resources, and therefore a causal relationship can only be established if the mechanism by which individuals respond to these states and fluxes, is known. Evaporative water loss is employed by birds in hot and arid environm ents to maintain body temperature, and to cool down eggs. Failure to do so results in either death of the individual or reduced reproduction. If either of these events occurs frequently, it may act as a mechanism by which the distribution of the species is limited. Based on empirical evidence, we predict the rate of evaporative water loss in birds as a function of temperature. This relationship is applied to historical and predicted climate data. Birds that are not adapted to arid conditions and occur in habitats that are expected to experience reduced water availability in future are the most likely to exhibit drastic range changes.

287. THE MONITORING OF MARINE MAMMALS ONBOARD SEISMIC VESSELS AS TOOL FOR THE KNOWLEDGE OF THE DISTRIBUTION OF THE GENUS STENELLA IN THE BRAZILIAN COAST. ERBER, CLAUDIA; Moreira, Sergio; Fernandes, Tatiana; Carneiro, Andréa; Alencastro, Paulo; Poletto, Fabiana; Figueiredo, Luciana; Fortes, Roberto; Bertoncini, Áthila; Grando, Alexandre; Rinaldi, Giovanna; Figna, Vicente; Silva, Erico; Moraes, Eloísa; Ramos, Renata. Everest Tecnologia em Serviços Ltda. erberbio@hotmail.com, Av N Sra Navegantes, 671/1201, Vitória, ES, 29056-900, Brazil.

Between 2001 and 2004, during seismic survey onboard PGS company vessels, 115 sightings (~7.161 specimens), being 28 *S. longirostris* (~3.265), 35 *Stenella sp.* (~1.743), 31 *S. frontalis* (~658), 18 *S. attenuata* (~1.219) and 3 *S. clymene* (~150) were regisstered. *Stenellas* was present in seven Sedimentary Basins: Pará/Maranhão (~01°00'N-00°30'S), Ceará (~01°44'S-03°13'S), Sergipe/Alagoas (~10°00-11°30'S), Camamu/Almada (~13°00'S-13°44'S), Espírito Santo (~19°00-20°50'S), Campos (~22°18'S-23°40'S) and Santos (~23°45'S-27°54'S). *S. longirostris* was found in the Basins: Pará/Maranhão (6), Sergipe/Alagoas (6), Camamu (1), Campos (9) and Santos (6). *Stenella* sp. was found in the Pará/Maranhão (7), Ceará (5), Camamu (3), Campos (7) and Santos (13). *S. frontalis* was found in the Sergipe/Alagoas (2), Espírito Santo (1) and Santos (28). *S. attenuata* was found in the Pará/Maranhão (3), Ceará (4), Espírito Santo (2), Campos (1) and Santos (8). *S. clymene* was the less frequent species found, sighted only in Sergipe/Alagoas (1), Campos (1) and Santos (1). The largest concentration of the genus *Stenella* occurred between the latitudes of 22°S-28°S (64,4%) and 01°N-03°S (21,7%). The observed species show occurrence patterns that seem to be associated to batimetry, with largest occurrence (80,9%) in areas with up to 1.000m of depth. Sponsorship: PGS Investigação Petrolífera Ltda.

288. THE ROLE OF EXOTIC PINE PLANTATIONS IN THE CONSERVATION OF FOREST VERTEBRATE DIVERSITY IN CENTRAL CHILE. ESCOBAR, MARTÍN A. H.; Tomasevic, Jorge A.; Vukasovic, M. Angélica; Venegas, Ana M.; Estades, Cristian F. Laboratorio de Ecología de Vida Silvestre, Departamento de Manejo de Recursos Forestales, Facultad de Ciencias Forestales, Universidad de Chile, casilla 9206, Santiago, Chile, marescob@uchile.cl, 56-02-6785871 / 77.

Most of the forests in the coastal range of the Maule region in Central Chile (world biodiversity hotspot) were replaced by exotic pine plantations which caused a major habitat loss for many vertebrate species and likely produced many local extinctions. However, there is increasing evidence of wildlife use of plantations. Using our data and published literature we analyzed the use of pine plantations by forest vertebrates in Central Chile. Seventy-one (85%) of forest vertebrates have been recorded in pine plantations (98% birds, 60% mammals, 83% amphibians and 100% reptiles), including 12 endemics (71%). Sixty pecent of bird species have been recorded breeding in pine plantations. Considering that the coastal native forests in the Maule cover only 8.2% of the landscape compared to a 60% represented by pine plantations, these artificial forests may be home to a significant proport ion of the population of many vertebrate species in the region. Although demographic information is poor, there is evidence that pine plantations may support many viable populations and may help to sustain highly fragmented populations by enhancing landscape connectivity. This evidence stresses the potential conservation role of pine plantations in Central Chile and calls for a better coordination between government and timber companies.

289. HISTORICAL POPULATION STRUCTURE AND GENETIC DIVERSITY IN THE ENDANGERED GOULDIAN FINCH *Erythrura gouldiae*. ESPARZA-SALAS, RODRIGO; Crozier, Ross H.; Johnson, Christopher N. Department of Zoology and Tropical Ecology, James Cook University, Townsville, Queensland 4811, Australia, rodrigo.esparzasalas@jcu.edu.au.

Gouldian Finches are granivorous birds, endemic to northern Australia. As a result of altered habitat quality, Their populations have declined drastically in numbers during the past three decades. The decline in Gouldian Finch populations has resulted in extinctions from locations of their original distribution range. We reconstructed the genetic structure and obtained levels of genetic diversity of past and present populations of Gouldian Finches using mitochondrial DNA. Our results show a general lack of population structure for this species. Mitochondrial DNA sequences are relatively similar between each other, and are not restricted to particular geographic areas. Sequences obtained from ancient samples were not different from those obtained from contemporary samples. Nucleotide diversity values found are relatively low, compared to those reported for non-endangered bird species. The lack of population structure and the low genetic diversity found in Gouldian Finches can be explained as a historical population bottleneck event. Management practices for the recovery of Gouldian Finches shall be implemented to avoid a further loss of genetic diversity. Given the genetic similarities across different geographic areas, wild individuals can be used to improve the genetic pool of founder populations in ongoing captive breeding programs.

290. EVALUATION OF AN ENVIRONMENTAL EDUCATION PROGRAM FOR THE ANDEAN BEAR IN THE CAYAMBE COCA ECOLOGICAL RESERVE, ECUADOR. ESPINOSA, SANTIAGO; Jacobson, Susan K. Department of Wildlife Ecology and Conservation, University of Florida, PO Box 110430, Gainesville, FL 32611-0430, USA, santiea@ufl.edu Department of Wildlife Ecology and Conservation, University of Florida, PO Box 110430, Gainesville, FL 32611-0430, USA.

This study evaluates the impact of an environmental education program (EEP) to protect the Andean bear (*Tremarctos ornatus*) in Ecuador's Cayambe-Coca Ecological Reserve. To help conserve this species, the Andean Bear Conservation Project's EEP was implemented in 1997 in one reserve community. The EEP's objective was to stimulate local support toward conservation of

the Andean bear and its habitat. We analyzed program success based on changes in levels of environmental knowledge, attitudes and behavioral intentions toward bear protection, before and after its implementation, using survey and focus group methods. Evaluation results reveal that positive attitudes toward bear protection, and behavioral intentions based on conflictive situations with bears were positively associated with participants' knowledge and education levels. Positive attitudes toward bear presence in the community were negatively associated with respondents' past experiences with livestock predation. To increase program success recommendations include creating more continuity in project activities; reaching more sectors of the population; improving communication strategies for informing the public about project activities and results; and planning future evaluations and monitoring of the EEP. Our study also suggests the importance of coordinating educational activities with development projects that shift dependence on cattle to other livelihoods and thereby reduce conflicts with bears.

291. LIVESTOCK GRAZING AFFECTS THE EGG SIZE OF AN INSECTIVOROUS PASSERINE. EVANS, DARREN M.; Redpath, Stephen M.; Evans, Sharon A.; Elston, David A.; Dennis, Peter. NERC Centre for Ecology & Hydrology, Hill of Brathens, Banchory, Aberdeenshire, AB31 4BW, United Kingdom, dme@ceh.ac.uk (DME, SMR, SAE) Biomathemtaics & Statistics Scotland, The Macaulay Institute, Craigiebuckler, Aberdeen AB15 8QH, United Kingdom, d.elston@bioss.ac.uk (DAE) The Macaulay Institute, Craigiebuckler, Aberdeen AB15 8QH, United Kingdom, p.dennis@macaulay.ac.uk (PD).

Livestock grazing is a major driver of ecosystem change, and has been associated with significant declines in various bird species worldwide. In Great Britain, there is particular concern that severe grazing pressure is deleteriously affecting vegetation and birds in upland regions. However, the mechanism by which grazing affects birds is unclear. Here, we report for the first time that sheep grazing pressure affects the egg size of a common upland passerine: the meadow pipit *Anthus pratensis*. We manipulated sheep stocking densities in a replicated field experiment, and found that plots with the highest stocking density contained nests with the smallest eggs, and that plots with low stocking density contained nests with the largest eggs. However, eggs laid in ungrazed plots were also small, suggesting that both too many or the complete removal of sheep in upland areas might have a detrimental effect on pipit egg size. We found no significant effect on fledging success but the reduced post-fledging survival of young from smaller eggs, as seen in other studies, could partly explain declines in upland birds.

292. CAROTENOIDS, COLOUR AND CONSERVATION IN AN ENDANGERED PASSERINE, THE HIHI OR STITCHBIRD *Notiomystis cincta.* EWEN, JOHN G.; Surai, Peter; Stradi, Riccardo; Møller, Anders; Armstrong, Doug P. Institute of Zoology, Zoological Society of London, Regents Park, London, NW1 4RY, United Kingdom, john.ewen@ioz.ac.uk (JGE). Lipid and Antioxidant Group - Department of Biochemistry and Nutrition, Avian Science Research Centre, Scottish Agricultural College, Auchincruive, Ayr, KA6 5HW, United Kingdom (PS). Dipartimento di Chimica Organica, Università degli Studi di Milano, via Venezian 3, I-20133 Milano, Italy (RS). Laboratoire de Parasitologie Evolutive, CNRS UMR 7103, Université Pierre et Marie Curie, 7quai St Bernard, Case 237, F-75252 Paris Cedex 05, France (AM). Wildlife Ecology Group, Institute of Natural Resources, Massey University, Private Bag 11-222, Palmerston North, New Zealand (DA).

Carotenoids are essential dietary components utilised not only in pigmentation but also as immuno-stimulants and antioxidants by animals. Reduced availability can have consequences on individual health and survival and this is likely exacerbated in sexually selected species that trade carotenoid use for health with signal quality. We used carotenoid profiles and plumage colour as indicators of habitat quality in an endangered passerine species in New Zealand characterised by proneness to pathogens, poor survival and failed reintroduction attempts. This species is subject to strong sexual selection and males express a prominent carotenoid-based plumage badge. There were differences in the availability of carotenoids between the three populations of this species. Individuals of one reintroduced population had substantially higher concentrations of carotenoids circulating in the plasma and brighter reflectance in their yellow plumage. This population is also the only successful reintroduction of this species. Given the benefits carotenoids have, we suggest our approach is a valid method of assessing habitat quality. The significant variation between populations suggests either a lack of carotenoids and/or variable pathogen load impacting on absorption and use of carotenoid resources. Constraints on the availability of essential dietary components needs assessing as they potentially alter the viability of small populations.

293. SUSTAINABLE OPENED SYSTEMS. FABRÉ, NIDIA NOEMI. Departamento de Biologia, Instituto de Ciências Biológicas, Universidade Federal do Amazonas (UFAM), Manaus, AM, 69077-000, Brazil, tchoni1@uol.com.br.

Sustainable Opened Systems (SOS) is a methodological proposal for local, integrated development, adaptive and participative in partner-territorial units of free access, by means of local empowerment. It promotes the creation of alternative sources of income compatible with the responsible use of natural resources, for the improvement of quality of life and for the conservation of the floodplains. In this process, collaborative co-management serves as an inspirational source of new locally adapted technologies which better local livelihood. Local traditional knowledge is one of the best sources of knowledge for sustainability of local development. To succeed, this methodology necessitates a minimum set of actions: Participative diagnosis and planning; Definition of units of co-management; Creation of new agreements between communities with governmental and non-governmental organizations (the Local Council of Administration); continuous and integrated training of local administration and community development (Agents of Sustainable Development); Invigoration of the civil society (Associations of Local Sustainable Development); Institutionalization of new legal instruments for integrated co-management of natural resources (Agreements of Integrated Use of the Natural Resources); Definition of economic alternatives for the increase of the local income, increasing the socio-cultural and

natural capital of the units of co-management.

294. MAYFLIES FROM PARANÃ RIVER VALLEY, BRAZIL (EPHEMEROPTERA). FALCÃO, JESINE N.; Martins-Silva, Maria Júlia; Rocha-Miranda, Fabio; Araujo, Juliana S.; Engle, Diana W. Departamento de Zoologia, Instituto de Biologia, Universidade de Brasilia, Brasilia, DF, 70.919-900, Brazil, mjsilva@unb.br.

The Paranã River Valley has been classified as an area of very little knowledge in the "Priority Actions for the Conservation of the Biodiversity in the Cerrado and Pantanal" (Ações prioritárias para a conservação da biodiversidade do Cerrado e Pantanal) workshop. This area has an enormous richness of rivers and streams which are affluent of one of Brazil's most important rivers. Water quality and water course conservation may be determined by benthonic communities study. In this study the mayflies' assembly composition was investigated to determine prior areas for conservation. These benthonic insects have a high morphological and ecological differentiation, being considered good biological indicators. We sampled 10 streams from the Paranã Valley using a D net, 0.125mm mesh, and a Drift net. We found 27 genera in 6 families of mayflies. The most common genera were *Americabaetis*, *Farrodes*, *Thraulodes* and *Traverhyphes*. Higher richness was found in Água Fria, Correntes and Macacos streams. We suggest that these three streams present better state of conservation and deserve special attention in Paranã River area. (Financial support PROBIO/GEF/BIRD/CNPq)

295. WOLF (*Canis lupus*) EXPANSION IN THE ALPINE RANGE: POTENTIAL CONFLICTS AND PROTECTED AREAS. Falcucci, Alessandra; Maiorano, Luigi; BOITANI, LUIGI. Department of Animal and Human Biology, University of Rome "La Sapienza", viale dell'Università 32, 00185 Rome, Italy, a.falcucci@pan.bio.uniroma1.it (AF, LM, LB). College of Natural Resources, University of Idaho, Moscow, Idaho, USA (AF, LM).

Historically, the wolf was distributed throughout the Alps. In the early XX^{th} century the species was exterminated and the only nearby populations were in the Apennines. From 1970s, the species gradually begun to extend its range: in 1985 some animals reached Liguria, in 1994 6 wolves have been seen in France, in 1995 there was the first sighting in Switzerland, in 2002 wolf scats have been collected in the central Alps. Wolves' presence always caused conflicts with human activities, and the re-colonization of the Alps is considered a political issue. At the same time many protected areas can potentially provide conservation and management opportunities. We built a habitat suitability model for the wolf covering the whole Alpine range and representing the actual (inside the range) and the potential (outside) presence of the species. We compared the outcome of the model with the distribution of protected areas and with the presence of hunters and livestock to predict the potential areas of expansion, the potential areas of conflicts, and the possible management and conservation options. The results of our modeling exercise outline that there is room for coexistence of economic activities and wolf presence.

296. EFFECTIVENESS OF CORRIDORS RELATIVE TO HABITAT PATCH ENLARGEMENT. Falcy, Matthew R.; ESTADES, CRISTIAN F. Departamento de Manejo de Recursos Forestales, Universidad de Chile, Casilla 9206, Santiago, Chile.

The establishment of biological corridors between two otherwise isolated habitat patches has become a common conservation strategy, although their effectiveness in mitigating pernicious effects of landscape fragmentation on populations remains unclear. However, even if corridors help to maintain populations in fragmented landscapes, the cost-effectiveness of this measure is not warranted. We used a spatially-explicit individual-based simulation model to study the effectiveness of corridors relative to another conservation strategy: enlargement of existing habitat patches. We used a multifactorial experimental design in which patch size, isolation, corridor width, and the probability that individuals cross the border from habitat to matrix were varied. Response variables were total population size in the patch, the number of extinctions, and the fraction of the simulation time that individuals were absent in a habitat patch. For the same amount of new area added, the enlarg ement of patches tended to be more beneficial than the establishment of corridors when the latter were relatively long and the patches were relatively large. This study is the first to compare the effectiveness of corridors with patch enlargement as competing conservation strategies and suggests that the latter deserves more attention than it has received in the literature.

297. SELECTING PRIORITIES FOR BIOLOGICAL CONSERVATION IN COLOMBIA. FANDIÑO-LOZANO, MARTHA; van Wyngaarden, Willem. Research Group ARCO Faculty of Science Pontificia Universidad Javeriana Cra 7 # 45-83 Bogotá Colombia martha.fandino@javeriana.edu.co.

The present system of national parks covers almost 10% of the country but includes only half of the ecosystems. Thus there is an urgent need to complete the system. For a successful selection, three elements are needed: (1) valid criteria, (2) good ecological and biological information comparable for the whole territory considered and (3) proper techniques to apply them correctly, systematically and efficiently. The prioritization of conservation areas for Colombia was carried-out based on these three elements: a set of selection criteria, including quantitative targets, was implemented in the program FOCALISE, that was run using as input the present and original-potential distribution of the terrestrial ecosystems. The presented scenario meets the targets for all ecosystems.

298. BAT AND BIRD ASSEMBLAGES FROM FORESTS AND SHADE CACAO PLANTATIONS IN TWO CONTRASTING LANDSCAPES IN THE ATLANTIC FOREST OF SOUTHERN BAHIA, BRAZIL. FARIA, DEBORAH; Laps, Rudi R.; Baumgarten, Julio. Departamento de Ciências Biológicas, Universidade Estadual de Santa Cruz, Rodovia Ilhéus Itabuna, Km 16, CEP 45650-000, Ilhéus-BA, Brazil, deborah@uesc.br (DF, JB). Departamento de Ciências Naturais, Universidade Regional de Blumenau - FURB, Cx. Postal 1507, CEP 89010-971, Blumenau-SC, Brazil (RRL).

In the southern Bahia state, Brazil, the bulk of the forest cover comprises shade cacao plantations, most under the so-called "cabrucas", a system in which the cacao is grown under the shade of a thinned forest. We investigated the potential of these cabrucas to harbor birds and bats species in two close municipalities - Una and Uruçuca - with contrasting landscapes. At Una, shade plantations are small and surrounded by large tracts of forest, whereas in Uruçuca these cabrucas are the dominant element of the landscape. A comparison of small fragments and cabrucas from both areas showed that the conversion of forest to cabrucas impacted the dominance pattern of species and guilds differently regarding birds and bats, but species assemblages in cabrucas generally reflect those observed in nearby forests. Species richness and composition were different in these landscapes, and both habitats

from Uruçuca showed losses of forest-dwelling species compared with those habitats from Una. Our study has shown that, although cabrucas can be permeable matrices for many species from the local biota, they are not forest surrogates. A landscape dominated by cabrucas with a minor portion of native forests is unlikely to assure an adequate conservation of many forest species.

299. POPULATION GENETICS OF COMMERCIALLY IMPORTANT CHARACIDS OF THE VÁRZEA: IMPLICATION FOR CONSERVATION. FARIAS, IZENI P.; Vasconcelos, William; Nunes, Mário; Leão, Adam; Mota, Edvaldo; Teixeira, Ailton; Ruffino, Mauro Luis; Santos, Maria. Laboratório de Evolução e Genética Animal - LEGAL, Departamento de Biologia, I.C.B., Universidade Federal do Amazonas, Estrada do Contorno 3000, Manaus, AM, 60077-000, Brazil, izeni_farias@ufam.edu.br (IPF, MN, AL, EM, AT, SM). Provárzea - IBAMA, Manaus, AM, 60077-000, Brazil (MR).

Many characid fishes are commercially important food resource for several Amazonian countries, however, little is known about their population genetics within the huge Amazonas River system. In this category *Prochilodus nigricans* (curimatã) and *Colossoma macropomum* (tambaqui) are the two most important characid species of the Amazônia várzea. The tambaqui is also a very important aquiculture species. They are classified as seasonal migratory species which use both lacustrine and riverine environments for reproduction, feeding and dispersal, following the year flood regime of the Amazon River. In the present study we report a population genetic analysis of two mitochondrial DNA gene regions analyzed in approximately 100 individuals per species collected from multiple localities within the Solimões/Amazônas várzea system. Both species show a high level of genetic exchange among localities with no population differentiation through the entire Amazon channel. These findings suggest that each species comprise one evolutionary unit and acts as a panmitic population. Despite other studies suggesting over-exploitation, *C. macropomum* shows high genetic variability; the same result is observed in *P. nigricans*. The genetic studies are encouraging for the long-term sustainable management and preservation of healthy stocks of these species, and for acting as a genetic reservoir for aquiculture populations.

300. THE AMAZONIAN SCHOOL PROJECT: USING ENVIRONMENTAL EDUCATION TO RAISE AWARENESS AND CHANGE THE CURRENT STATE OF DEGRADATION IN THE BRAZILIAN AMAZON DOORWAY. FARIAS, RENATO. renato@fundacaocristalino.org.br.

The Brazilian Amazon Doorway, located in the north of Mato Gross State, suffered a hard blow in the mid 1970's: the arrival of native immigrants from southern Brazil and their inappropriate land use practices. Due to a lack of information, these practices did not consider the characteristics of the Amazonian ecosystems. As a result, during the last three decades the native forest has been destroyed through the use of activities that do not promote the regional sustainability and on the contrary, create a higher social inequality in the region. In this scenario, environmental education becomes one of the main strategies to tackle this situation of degradation. Through information, awareness and team work, it is necessary to encourage the creation of a new scenario that aims to bring socially responsible, economically feasible and environmentally appropriate sustainable development. To meet this need, the Escola da Amazônia uses field based workshops to involve students from public schools in the Municipalities of Alta Floresta and Novo Mundo. The workshops promote discussions about regional environment issues and encourages students to on their own, develop and propose possible solutions that take into consideration social, economic and environmental aspects. The main objective is to allow integration of development and environmental conservation.

301. THREATS TO THE VÁRZEA FROM ACTIVITIES OUTSIDE ITS BOUNDARIES. FEARNSIDE, PHILIP M. National Institute for Research in the Amazon (INPA), C.P. 478 Manaus, Amazonas, 69.011-970, Brazil (pmfearn@inpa.gov.br).

Várzeas (Amazonian floodplain) can be severely affected by alterations in terra firme (upland) areas in the watersheds that feed them. Várzeas and other wetland ecosystems depend heavily on the annual pulse of water and sediments, and any alteration of this cycle has severe consequences. One alteration that is rapidly proceeding is deforestation, with attendant increases in peak runoff and decreases in flow between rainfall events, as well as increases in sedimentation. Hydroelectric dams are another major change, decreasing the amplitude and changing the timing of streamflow downstream of the dams. Long-range plans for dam construction total 79 dams in Brazil's "Legal Amazon" region, blocking all Amazon tributaries except those in flat terrain in the extreme western part of the region. Dams retain sediments that would otherwise be deposited in floodplains. The water released from the turbines has little or no oxygen, making downstream river stretches inhospitable for many fish species. Hydroelectric reservoirs create artificial floodplain ecosystems. The scale of planned hydroelectric development in Amazonia makes this significant as a factor in global change, as well as having great local effects. All projected dams in Brazilian Amazonia flood a total of 10 million hectares, an area larger than Portugal.

302. ENVIRONMENTAL IMPACTS OF HYDROELECTRIC DAMS IN THE AMAZON. FEARNSIDE, PHILIP M. National Institute for Research in the Amazon (INPA), C.P. 478 Manaus, Amazonas, 69.011-970, Brazil (pmfearn@inpa.gov.br).

Hydroelectric reservoirs destroy the terrestrial ecosystems they replace and radically aquatic ecosystems. Dams block migration of fish and turtles and retain sediments that would otherwise be deposited in floodplains. The water released from the turbines has little or no oxygen, making downstream river stretches inhospitable for many fish species. The change in flooding regime affects downstream floodplains. Many Amazonian dams have very large vertical drawdowns, thereby exposing vast areas of land at low water. Soft vegetation grows rapidly in the drawdown zone, only to decompose under anaerobic conditions on the bottom of the reservoir when the water level subsequently rises. This p rovides a permanent source of methane, with a significant impact on global warming. A smaller source of renewable carbon comes from macrophytes growing in the reservoir. In the first years after reservoir filling, substantial carbon inputs come from non-renewable sources such as labile soil C stocks. The non-renewable stocks also generate CO_2, especially through above-water decay of forest biomass. Total impact is substantial: the Belo Monte/Altamira (Babaquara) complex would have an annual average net release of CO_2-equivalent carbon over the first ten years that is larger than the current emission of the city of São Paulo.

303. THE CONSERVATION MOSAIC IN THE TERRA DO MEIO (LAND IN THE MIDDLE). Feitosa da Silva, Tarcísio; SCHWARTZMAN, STEPHAN; Santos, Ana Paula Souza; Vilas Boas, André. Comissão Pastoral da Terra - Xingu, Av. João Pessoa 1212, Barrio da Catedral, 68371-000, Altamira, Pará, Brasil (TFS); Environmental Defense, 1875 Connecticut Av. NW Suite 600, Washington DC 20009, USA. steves@ed.org (SS); Fundação Viver, Produzir e Proteger, Rua Anchieta 2092, Bairro Perpétuo Socorro, 68371-190, Altamira, Pará, Brasil (APSS); Instituto Socioambiental, Av. Higienópolis 901, 01238-001, São Paulo, SP, Brasil (AVB).

The *Terra do Meio*, the 7.9 million hectare region between the Xingu and Iriri/Curuá rivers in Pará state in the Brazilian Amazon, is the largest intact forest area in the southeastern Amazon. The authors have since 2002 conducted biological and social research in the region and collaborated with the Ministry of Environment to design an integrated protection proposal for the region. Both federal and state governments have committed to a "mosaic" of protected areas - different kinds of conservation units, inhabited and uninhabited - covering the entire area. Protecting the area will create a continuous 25 million hectare forest corridor including the indigenous lands to the north and south, spanning the ecosystems from the savanna - forest transition in the south to closed moist forest in the north. The mosaic was originally formulated and proposed to the federal government by a coalition of small farmers' organizations located along the Transamazon highway. The farmers' movement supports protection of the Terra do Meio to halt uncontrolled illegal land occupation ("grilagem") in the region, thus establishing the effective governance on which their strategy of sustainable regional development based in family farming depends.

304. CHANGES IN COMMUNITY STRUCTURE OF WOOD VEGETATION OF THE CERRADO SENSU STRICTO IN FAZENDA ÁGUA LIMPA (FAL) - DF, OVER 18 YEARS (1985-2003). FELFILI, JEANINE M.; Libano, Andrea M. Departamento de Engenharia Florestal, Universidade de Brasília, Brasília, DF 70.000 Brazil. felfili@unb.br (JMF). Departamento de Botânica, Instituto de Biologia, Universidade de Brasília, Brasília, DF, 70919-900 Brazil (AML).

Changes in community structure of cerrado "*sensu stricto* " at the Fazenda Água Limpa-DF were studied with three-year intervals in 19 permanent plots. Three burns occurred in the area (1984; 1989; 1994). The inventories were compared to detect changes in diameter structure over time and to verify the effects of fire disturbances. Density and basal area reduced after occasional burnings and started to increase in intervals without burning. The diameter distribution for dead standing stems showed reversed "j" form indicating increase in mortality of small stems after burnings. The living stems also show this form for all occasions and nine years after burning showed an increase in stems at the first class. The distribution and the species number in the initial classes suggest that the community has a self-regeneration capacity. The Kolmovorov-Smirnov test did not show significant differences for eight of the fourteen most important species. To the community the test not differed between surveys measured in the nine first years. Significant differences occurred between inventories measured before and after the great burn (1994). All surveys also differ of the measured survey after the major time without burn. Fluctuations in species populations are expected with changes of dominant species over time.

305. PROTECTION OF GOLDEN LION TAMARIN (*Leontopithecus rosalia*) HABITAT IN PRIVATE LANDS. FERNANDES, ROSAN V.; Schmidt, Marcio A. R.; Rambaldi, Denise M.;. Associação Mico-Leão-Dourado, Caixa Postal 109968, Casimiro de Abreu, RJ 28860-970, Brazil, rosan@micoleao.org.br.

The Atlantic Forest hotspot is restricted to 7% of its original range, but is one of the richest Brazilian biome. The golden lion tamarin (*Leontopithecus rosalia*) is endemic from the lowland Atlantic Forest of the Rio de Janeiro State and endangered due to loss and habitat fragmentation. Using the PHVA - Population and Habitat Viability Assessment, we understood that the public protected areas have no enough area to ensure a long term viable population. To save them, 2,000 wild tamarins are needed as well, 25,000 ha of protected forests. Public protected areas comprise 8,800 ha. To increase the amount of protect habitat, a program to support the creation of Private Reserve of Natural Heritage (RPPN) was established. IBAMA - Brazilian Environmental Agency is encharged of recognizing the RPPN and give the tax exemption status to the area, that can only be created if it is the desire of the landowner. So far, 17 RPPNs were recognized in the golden lion tamarin occurence area, adding 2,500 ha of habitat. Beside that, other 30 areas are to be created and will add about 4,700 ha. Nowadays, Silva Jardim is the county that has the largest number of RPPNs: 11.

306. CAPACITY BUILDING FOR THE CONSERVATION OF THE BIOLOGICAL AND CULTURAL DIVERSITY OF THE GRAN CHACO IN FORMOSA, ARGENTINA. FERNANDEZ-DUQUE, EDUARDO; Valeggia, Claudia; Dixson, Alan; Rudran, Rasanayagam. Fundación Ecosistemas del Chaco Oriental, J.M. Uriburu 374, Formosa, 3600, Argentina, efduque@arnet.com.ar (EFD, CV). Zoological Society of San Diego, Escondido, California, 92027, USA (EFD, AD). Department of Conservation Biology, National Zoological Park, Smithsonian Institution, Washington DC, 20008, USA (RR).

We present the progress made to establish a center for the conservation of the biological and cultural diversity of the South American Gran Chaco in Formosa, Argentina. During the last few years, Fundación ECO, the Zoological Society of San Diego and the Smithsonian Institution have targeted the following components to be developed: 1-faculty and research, 2-curriculum, 3-local and overseas collaboration, 4-financial support, 5-administrative infrastructure, 6-construction of facilities and equipment purchases. Fourteen Argentinean biologists and anthropologists are currently working on the ecology of owl monkeys and edentates, and on the reproductive ecology and health of indigenous communities, having offered training opportunities to over 150 students. We have organized 3 courses on primate conservation biology and wildlife management for 35 Latin American students. We are training school teachers, organizing student outings to the forests, and offering community workshops. Fundación ECO has received the financial support and/or formalized cooperation agreements with an important number of international and national agencies. Although we have made significant progress, it is necessary now to focus on raising support for administrative infrastructure and the construction of adequate facilities to establish a fully-equipped center led by full-time professionals.

307. TEN YEARS AT THE HOWLER MONKEYS' ISLANDS: A LONG-TERM STUDY ON EFFECTS OF HABITAT FRAGMENTATION ON SMALL MAMMALS AT THE BRAZILIAN ATLANTIC FOREST. FERNANDEZ, FERNANDO A. S. Departamento de Ecologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, 21941-590, Brazil, rodentia@biologia.ufrj.br.

Habitat fragmentation may result in small populations of forest-dwelling species inhabiting habitat remnants and highly vulnerable to local extinctions. The "Ilhas dos Barbados" ("Howler Monkeys'Islands"), a group of eight small (mostly <10 ha) forest fragments within Poço das Antas Reserve, separated by grassland, have been chosen as having size and degree of isolation suitable for a long-term demographic study on marsupials and rodents in an Atlantic Forest landscape. A ten-year capture-mark-recapture program (1995-2005) yielded 5,584 captures of mammals from 21 species. Estimated population sizes for most species in each fragment were very small (usually <20 individuals). Two local extinctions of the arboreal rat *Oecomys concolor* were recorded during the study. Species followed a continuum going gradually from those forming isolated populations in each fragment (e. g. *Caluromys philander*) to those which moved often across the matrix (e. g. *Didelphs aurita*). *Micoureus demerarae* formed an atypical metapopulation where only males moved among fragments; local extinctions cannot therefore be replaced, as males themselves cannot found populations. Tolerance to the matrix was the best predictor of vulnerabilities to local extintion (estimated by proportion of fragments where each species was absent); fecundities, body weights, longevities, population densities and arboreality were all weak predictors of extinction vulnerabilities.

308. TYPICAL HERBACEOUS PLANT COMMUNITY OF *Polylepis besseri* FOREST IS THREATENED BY ALTERATION COMMUNITIES. FERNÁNDEZ, MILTON; Pasquier, Verónica; Castellón, Kayshara. Centro de Biodiversidad y Genética, Universidad Mayor de San Simón, mfernand@fcyt.umss.edu.bo, Calle Sucre frente Parque La Torre, casilla 538, Cochabamba, Bolivia.

The increase of shrub generalist, herbaceous communities and others that establish themselves due to alteration by anthropogenic and fire effects is a serious threat for the survival of typical *Polylepis besseri* plant communities in Andean forests. Evaluating this threat, our study was conducted for two years in a set of forest fragments in Sacha Loma (3700 - 3800 m. a. s. l.). Surveying plants and their communities in 204 plots, we found 5 well defined communities, the typical *Polylepis* community, and four communities present by alteration effects. Statistical analysis also showed significant differences in their presence (versus absence) through out these fragments. The generalist community was present in 88.24% of plots, the fire community in 54.68% of plots, the matrix invasive community was present in 31.86% of plots and 19.61% presence of the nitrophilus community. The typical *Polylepis* herbaceous community was present in only 9.31% of plot s, which means that they are in serious threat for their survival due to alteration effects. There were no significant differences for presence of communities regarding interior and forest edges, which also indicates that alteration of these forests has penetrated into the interior and has generated very heterogeneous herbaceous plant composition.

309. A NOVEL EXPERIENCE OF A CONSERVATION RESEARCH GROUP IN SRI LANKA. FERNANDO, PRITHIVIRAJ. Centre for Conservation and Research, 35 Gunasekara Gardens, Nawala Road, Rajagiriya, Sri Lanka. Wildlife Trust Alliance, Palisades NY 10964, USA, pf133@columbia.edu.

Due to limitations in governmental and non-governmental sectors, and academia, conservation biology has played a restricted role in Sri Lankan wildlife conservation. Graduates recruited to state conservation agencies are mainly from non-biological fields, leading to limited institutional capacity to relate to conservation biology. While there are many environmental NGOs in Sri Lanka, they have traditionally concentrated on advocacy rather than conservation biology. Although conservation biology has been a long-standing component of university curricula, the emphasis has been on classical theoretical work rather than applied research. Consequently, the conservation establishment has been deficient in the ability to conduct research and apply conservation biology principals to wildlife conservation. We also found that conducting research, scientific publication, and submission of reports to state agencies, failed to integrate research findings in management and conservation. The Centre for Conservation and Research was set up to address these issues. Our approach has been to collaborate with both the state sector and academia in our research. Currently we are conducting a number of research projects in this manner. Through this strategy we hope to build capacity in the conservation establishment to conduct research and understand conservation biology, and to integrate research findings into conservation and management plans.

310. EXPANSION OF THE SOYA FRONTIER IN THE BRAZILIAN AMAZON: TRENDS AND IMPLICATIONS FOR THE CONSERVATION OF BIODIVERSITY. Ferraz, Silvio F.B.; Perez, Carlos A.; AMARAL, WEBER A. N.; Smeraldi, Roberto. Departamento de Ciências Florestais, ESALQ, USP, Av. Pádua Dias, 11, 13418-900, Piracicaba, SP, Brazil, wamaral@esalq.usp.br (SFBF, CAP, WANA). Amigos da Terra, R. Bento de Andrade, 85, 04503-010, São Paulo, SP, Brazil (WANA, RS), International Plant Genetic Resources Institute, Roma, Italy (WANA).

This paper focuses on the cyclical fluctuation of soya expansion in the Amazon region, exploring the main driving forces and directions and their linkages and how they affect the conservation of biodiversity. Modelling simulations were performed to address the above issues using a series of data sets and tools such as: forest cover and land use datasets (PRODES / INPE), maps of the distribution of conservation units, data and maps of spatial distribution of infrastructure and logistical transportation and soya-processing hubs, edaphic-climatic zoning and suitability index for soya plantations. They were displayed in geographic information systems. The main assumption of these models was the forecast of an increased area of 20,000,000 ha for soya plantations in the entire country, assuming that two thirds of this area would be located in the central western and northern regions of Brazil. The results indicated the likely geographic locations of these plantations in that area by State and the socio-economic impacts and consequences on biodiversity conservation in each identified location. Proper land use planning policies, taking into account the demonstrated patterns of distribution of biodiversity and assessment of current levels of the degree of habitat fragmentation will be critical for minimizing the impacts of this expansion.

311. PATTERNS OF AQUATIC BIODIVERSITY IN THE AMAZON BASIN. FERREIRA, LEANDRO. Coordenação de Ciências da Terra e Ecologia (CCTE), Museu Paraense Emílio Goeldi (MPEG), Avenida Perimetral 1901, Bairro Terra Firme,66077-530, Belém, Pará, Brazil, lvferreira@museu-goeldi.br.

The Amazon basin is comprised of the Amazon River and its tributaries, defined as those areas periodically or permanently flooded by freshwater. This includes permanently flooded areas such as lakes or swamps as well as periodically flooded areas along the edges of rivers and lakes. These flooded areas encompass a variety of soil conditions (sand, mud and clay) and various physical and chemical-based aquatic classifications (saltwater influence, white freshwater, clear freshwater, black freshwater). The continuous and branching Amazon basin extends along the narrow borders of the rivers to cover an area of approximately 660,500 km^2, including a wide variety of ecological and biological features to maintain by the cyclical fluctuation of water levels. We have identified four major objectives for the conservation of the Amazon basin: (1) Guarantee representation of all existing habitat types; (2) Maintain terrestrial and aquatic connectivity, both lateral and longitudinal; (3) Preserve hydrological and sedimentation cycles and (4) Maintain viable populations of species of special concern, including endemic species, typical species, and economically important species. The objective of this presentation will be described how these processes can be affect the Patterns of Aquatic biodiversity in the Amazon basin.

312. HUMAN TRAMPLING ON A TROPICAL ROCKY SHORE FAUNA. FERREIRA, MARIANA; Rosso, Sergio. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, 05.508-900, Brazil, marinf@ib.usp.br (MF, SR).

Increased tourist activity in coastal regions demands management strategies to reduce impacts on rocky shores. The highly populated coastal areas in southeastern Brazil are an example of degradation caused by development of industry and tourism. Among different shore impacts, trampling has been intensively studied, especially in temperate zones. Several works observed a reduction in richness and abundance of the intertidal fauna. In this project we used randomized blocks to experimentally study the effects of two different trampling intensities on richness, abundance and biomass of the r ocky shore fauna of Moisés beach, Guarujá, southeastern Brazil. Blocks were distributed in two portions of the intertidal zone, dominated respectively by *Chthamalus bisinuatus* (Cirripedia) and *Isognomon bicolor* (Bivalvia). Blocks were trampled over three months, simulating the vacation period in Brazil, and were monitored for the following nine months. Results indicate that some species, such as *Isognomon bicolor, Chthamalus bisinuatus*, *Clianella castroi* (Isopoda) and nereidids (Polychaeta) are more vulnerable to trampling. Both dominant species were affected by trampling, probably leading to significant changes in community structure. In general, results agree to previous trampling studies, suggesting that Brazilian managers of protected areas may use intertidal rocky shore species as indicators of recreational capacity of coastal environments.

313. GEOPROCESSING TECHNIQUES IN LANDSCAPE EPIDEMIOLOGY OF BRAZILIAN SPOTTED FEVER. FERREIRA, PATRÍCIA M.; Pinter, Adriano; Horta, Maurício C.; Ferraz, Kátia M. P. B.; Gunnewiek, Mônica Fagundes; Dias, Ricardo Agusto; Verdade, Luciano M.; Labruna, Marcelo Bahia; Amaku, Marcos; Neto, José Soares Ferreira; Ferreira, Fernando. Departamento de Medicina Veterinária Preventiva e Saúde Animal, FMVZ/USP, São Paulo, Brazil, patlira@uol.com.br (PMF, AP, MCH, RAD, MBL, MA, JSFN, FF); Laboratório de Ecologia Animal - ESALQ/USP São Paulo, Brazil (KMPBF, LMV); Coordenadoria de Defesa Agropecuária do Estado de São Paulo (CDA), São Paulo, Brazil (MFG).

Global changes have caused impacts on environment, consequently, on the interactions among humans, vectors and reservoir hosts at the interface that determine the epidemiology of vector-borne diseases. The habitat fragmentation followed by new patterns of land use favored changes on distribution and abundance of animal populations. The capybara is one of the species that has been influenced by these processes, since large groups can be observed in anthropogenic habitats, possibly due to the great availability of food and the local extinction of large predators. Landscape epidemiology involves the identification of geographical areas where disease is transmitted. The epidemiological surveillance of these infections can be favored by the use of advanced technologies such as remote sensing and geographical information systems (GIS). These tools have been used to predict the distribution of *Amblyomma* ticks supported by environmental data analysis. The tick *Amblyomma cajennense* is the main vector of Brazilian spotted fever. Although the occurrence of suitable hosts is essential for determining the presence of ticks, its distribution is limited by environmental factors. The goal is to map risk areas for human infestation as a function of independent variables: density of suitable hosts (equids and capybaras) and environmental data (temperature, moisture and vegetal biomass) obtained from satellite image. (Finacial support: FAPESP; Processo nº 01/01798-9, 02/03899-0 e 03/08980-2)

314. CONSERVING BIODIVERSITY IN HUMAN-DOMINATED LANDSCAPES. FESWICK, APRIL; Kerr, Jeremy T. Department of Biology, University of Ottawa, 150 Louis Pasteur, P.O.Box 450 Station A, Ottawa, ONT K1N 6N5, Canada, afeswick@yahoo.ca, jkerr@uottawa.ca.

The expansion of agricultural activities represents the leading cause of extinction in many regions of the world. Although minimizing further agricultural expansion would improve the conservation outlook, preventing extinctions within agricultural landscapes is a high priority that requires identification of mechanisms of species decline. We test three hypotheses to help identify specific mechanisms of species decline. First, we test whether increasing agricultural intensity leads to lower species diversity, second that species are lost from increasingly agricultural areas because of habitat loss per se, and finally that species are lost because increasing agricultural intensity leads to reduced habitat heterogeneity. We identified a series of old field habitats surrounded by natural areas, light or moderate intensity agriculture (e. g. pastures), and high intensity agriculture (e. g. corn) within 100km of Ottawa, Ontario. We measured butterfly and plant species richness in these areas from May to August, 2004. Butterfly richness is unrelated to plant richness nor to the area of each study site. Increasing agricultural intensity leads to large declines in butterfly richness but not in plant richness. Overall, intense agriculture seems to reduce butterfly species richness by eliminating habitat

remnants more effectively than in less intense agricultural areas.

315. CHARACTERISTICS OF EFFECTIVE MANAGEMENT OF NATIONAL PARKS IN BRAZIL: A DELPHI STUDY OF BRAZILIAN EXPERTS' OPINIONS. FIGUEIREDO, CLAUDIA; Loadman, William. School of Educational Policy and Leadership, College of Education, The Ohio State University, 29 West Woodruff Ave, 315 Ramseyer Hall, Columbus, OH 43210, USA.

Conservation areas (CA) have been threatened by low implementation, as shown by recent management effectiveness evaluations. In this study, Brazilian experts were asked their opinions about the most important characteristics of effectively managed Brazilian national parks. They participated in a three-round Delphi study. The first questionnaire generated 42 items (n=33 experts). These items were evaluated in the second questionnaire from 1=not at all important to 7= extremely important (n=31 experts). Items that did not reach consensus were clarified and re-rated in the third round (n=24 experts). Consensus was obtained when at least 75% of the participants rated the item within two points of the scale. All items were considered important for an effective management; 17 items reached consensus. Items with greater consensus and means included: presence of motivated and trained manager/ team; land tenure situation resolved; presence of stable/ adequate budget; protection of park resources; accomplishment of objectives of the PA category; management plan implementation; reduction in ecosystems and species vulnerability; support from local communities; use of social/ biological sciences in management decisions; basic infrastructure; uses compatible with CA category; and establishment of strategic partnerships. Observing these characteristics may be helpful in guiding evaluation, monitoring and strategic development of CAs.

316. TROPICAL RAIN FOREST RESPONSE TO STAND-REPLACING DISTURBANCE: PLANT FUNCTIONAL GROUPS, RARITY AND LONG-TERM FOREST DYNAMICS IN NORTHERN COSTA RICA. FINEGAN, BRYAN; Nasi, Robert; Zamora, Nelson. Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Turrialba 7170, Costa Rica, bfinegan@catie.ac.cr; Centre for International Forestry Research (CIFOR), c/o CIRAD, Campus International de Baillarguet, TA 10/D, 34398 Montpellier, France, r.nasi@cgiar.org; Instituto Nacional de Biodiversidad, Santo Dominago de Heredia, Costa Rica, n.zamora@inbio.ac.cr.

Which of the hundreds of tree species in degrading tropical landscapes are most threatened? We sought insights using long-term permanent sample plot (PSP) studies and multidimensional ecological groupings. Fifteen years of data > 10 cm dbh were from secondary forest (three 1.0 ha PSPs at our "core" site, light use, age range 15 - 41 years) compared with mature forest (seven PSPs, core site plus two others). We assigned 260 core site species to the functional groups (FG) *diameter growth rate* (DGR) *adult height* (AH), *dispersal syndrome* (DS) and to $\log_2$ abundance classes ($\log_2 N$) in mature forest at *local* (core site) and *landscape* (34 PSPs at 16 sites) scales. Individuals of canopy species were overrepresented in secondary stands, mid-canopy and understorey species underrepresented, due to slow DGR rather than DS. The most speciose mature forest DGR/$\log_2 N$ classes, slow-growing species with N <16, contributed disproportionately to reduced species-richness in secondary stands. Species-richness of underrepresented groups increased unambiguously over time though N did not; those of overrepresented groups varied little. These results increase understanding of floristic response to disturbance and its possible functional consequences but only emphasize the need for habitat protection to conserve tropical tree species. These analytical tools are now being applied to the study of logging and edge effect impacts.

317. WILDLIFE USE AND CONSERVATION IN THE BOA ESPERANÇA COMMUNITY, AMANÃ SUSTAINABLE DEVELOPMENT RESERVE, BRAZILIAN AMAZON. FLECK, LEONARDO COLOMBO; Bodmer, Richard. Rua República 300, Bairro 25 de Julho, 93900-000, Ivoti, RS, Brazil, leonardofleck@yahoo.com.br (LCF). Durrell Institute of Conservation and Ecology, Department of Anthropology, University of Kent, Canterbury, Kent, CT2 7NS, United Kingdom.

The current patterns and the sustainability of subsistence hunting undertook by a traditional community from the Amanã Sustainable Development Reserve, Brazilian Amazon, was assessed between 2002-2004. *Tayassu pecari*, *Dasyprocta fuliginosa*, *Agouti paca* were the most important species in biomass and number of individuals hunted. Hunting activity was related to the Amanã lake water level, decreasing as water level receded. Hunters preferred larger species, but preference did not explain why some species were hunted more frequently than others. In terra-firme forests, the killing frequency was strongly predicted by hunters' preference and game species densities. Bushmeat p resented an annual net economic value of US$148.33-209.80 per household, representing 38% of the minimum recommended protein intake. However, there was evidence that the local populations of *Tayassu pecari*, *Mazama gouazoubira*, *Allouata seniculus*, *Cebus albifrons* and *Callicebus torquatus* had been depleted to risky levels. Likewise, continued harvesting of *Tayassu pecari* and *Tapirus terrestris* might drive local populations to decline. As a management recommendation, no *Tapirus terrestris* should be hunted and the offtake of *Tayassu pecari* should be reduced to 53.5% in the heavily hunted zone, which would represent a socio-economic cost of 26.12% in local bushmeat benefits, with its substitution by domestic meat costing US$1,168.69-1,652.97

318. GALL INSECT COMMUNITY IN AN ENVIRONMENTAL MOSAIC. FLECK, TOMÁS; Vergara, Micheline; Mondin, Cláudio Augusto; Fonseca, Carlos Roberto. Laboratório de Interação Animal - Planta, Centro 2, UNISINOS, São Leopoldo, RS, 93022-000, Brazil, cfonseca@bios.unisinos.br.

We studied a landscape where *Araucaria* forest has being partly replaced by man-made tree monocultures of *Araucaria angustifolia*, *Pinus* and *Eucalyptus* to evaluate how the abundance, diversity and composition of gall insects respond to this impact, and to test how light availability, soil fertility, and the abundance, diversity and composition of plants affect the gall insect community structure. The density and composition of gall insects and their host plants, along with light and soil nutrient data, were recorded in 12 one-hectare areas in the Floresta Nacional de São Francisco de Paula (Brazil). In total 13363 galls of 81 species were recorded. Gall abundance did not vary among the four habitats, however, gall richness was three times higher in *Araucaria* forests than in *Eucalyptus* monocultures. Gall abundance and richness were affected by light, soil nutrient availability, and plant richness. Gall insect composition varied among habitats and was strongly influenced by plant composition. Adequate management measures, allowing the development of a complex and diverse plant understory, can minimize the negative impact caused by the replacement of native forest by tree monocultures.

319. SURROGATE-BASED APPROACHES FOR PREDICTING SPECIES RICHNESS OF MULTIPLE TAXONOMIC GROUPS. FLEISHMAN, ERICA; Thomson, James R.; Mac Nally, Ralph. Center for Conservation Biology, Department of Biological Sciences, Stanford University, Stanford, CA 94305, USA (efleish@stanford.edu) (EF), Australian Centre for Biodiversity: Analysis, Policy and Management, School of Biological Sciences, Monash University 3800, Australia (JRT, RM).

Indicator species models have been suggested as a cost-effective approach to estimating species richness across large areas. Identifying reliable sets of indicators, however, remains a challenge, especially across taxonomic groups. We used genetic algorithms and a Bayesian approach to explain and predict individual and combined species richness of butterflies and birds as a function of occurrence patterns of indicator species drawn from both groups or one group. We also compared the influence of presence / absence data and reporting rate data (the proportion of survey years in which a species was present) on models of species richness based on indicator species. We identified suites of species whose occurrence patterns explained as much as 70% of deviance in species richness of different taxonomic groups. Validation tests revealed strong correlations between observed and predicted species richness, with 83% to 100% of the observed values falling within the 95% credible intervals of the predictions. Whether reporting rate data improved the explanatory and predictive ability of cross-taxonomic models depended on the taxonomic group of the indicator species. Our methods are applicable to any assemblage or ecosystem, and provide managers with the means to maximize the information obtained from multiple years of survey data.

320. ECOSYSTEM-BASED VALUATION OF COLORADO RIVER WATER, USA AND MEXICO. FLESSA, KARL W.; Robinson, James; Nagler, Pamela. Department of Geosciences, University of Arizona, Tucson, Arizona, 85721, USA, kflessa@geo.arizona.edu (KWF). Environmental Research Laboratory, Department of Soil, Water and Environmental Sciences, University of Arizona 2601 E. Airport Dr., Tucson, Arizona, 85706, USA (JR, PN).

The diversion of Colorado River water for human use has changed the value of ecosystem goods and services provided by the 14,000 sq. km. delta and estuary. Irrigation projects have transformed wetland and desert biomes into cropland, while upstream diversions of all types have converted estuarine habitats into biomes similar to coastal shelf biomes. We used conservative estimates based on Costanza et al. (1997) to estimate the monetary value of ecosystem services in the original and the converted biomes of the delta and estuary. Although the conversion of desert to cropland doubled the value per hectare, the conversion of wetland biomes to cropland decreased the value by two orders of magnitude. In the marine environment, the transformation from an estuarine to a marine shelf biome decreased the value by an order of magnitude. Prior to conversion, the total value of ecosystems services was ~$11 billion per year; since conversion, the annual value has decreased to ~$2.5 billion. Assuming that the Colorado River supplies 16 billion cubic meters of water per year, the ecosystem value of water is $0.70/cubic meter. This figure is an ecosystem-based estimate of the mitigation cost of diverted water in the Colorado River delta.

321. PATTERNS OF EXTINCTION IN MAURITIAN LAND SNAILS AND CONSERVATION IMPLICATIONS. FLORENS, F. B. VINCENT; Thébaud, Christophe. Department of Biosciences, Faculty of Science, University of Mauritius, Réduit, Mauritius, V.Florens@uom.ac.mu (FBVF). Université Paul Sabatier, Département Evolution et Diversité Biologique, Bâtiment IVR3 pièce 208, 118 route de Narbonne, 31 062 Toulouse cedex 4, France (CT).

The terrestrial malacofauna of Mauritius, a 7.6 MY old volcanic oceanic island in the SW Indian Ocean, has 124 strictly terrestrial species of which 63% are endemic and 34% are extinct. So far, malacological studies on the island focussed overwhelmingly on taxonomy with a near complete neglect of the ecology and causes of decline of the group. We conducted over 300 field surveys and collected and analysed distribution, ecological and morphometric data from all known species to unravel trends in extinction that could inform on conservation measures that could stem this extinction crisis effectively. We found that many of the extant species are declining and some are on the brink of extinction. Certain families of snails tend to be more prone to suffer extinctions than others. Significant differences also existed between mean sizes of species within families that have suffered extinctions and those that have not, with the larger sizes more prone to extinction. Finally, a positi ve correlation was found between the proportion of endemic and that of extinct species per family. These patterns in extinction are strongly linked with deleterious impacts of alien animals and provides a framework to predict most likely future extinctions and identify corresponding conservation measures.

322. ANDEAN BEAR-CATTLE CONFLICT: APPLICATION OF THE MODEL FOR CONSERVATION PLANNING BASED ON LANDSCAPE SPECIES REQUIREMENTS TO THE OYACACHI CASE, ECUADOR. FLORES, SASKIA; Bustamante, Macarena; Remache, Gioconda; Goldstein, Isaac; Camacho, Jaime. EcoCiencia, Fco. Salazar E14-34 y Coruña, Quito, Pichincha, Ecuador, pep@ecociencia.org (SF, MB, GR, JC). Wildlife Conservation Society, Avenida 4 entre calles 18 y 19 Edificio General Masini Piso 3 Oficina B32, Merida, Merida, Venezuela, igoldstein@wcs.org (IG).

In Oyacachi, a community in the Cayambe-Coca Ecological Reserve, cattlemen since 2001 have increasingly lost their cattle due to Andean bear attacks, affecting the people's economy and attitudes, which could lead to an indiscriminate killing of the species. The purpose of the present work is to understand the conflict using the conceptual model for conservation planning considering the Andean bear as a landscape species. We focused on: the ecology of the conflict developing GIS assisted models of the Andean bear, cattle and predation probabilities of occurrence; the economic impacts of predation, studying its direct and indirect costs; and the social impacts, testing if changes in people's attitudes towards Andean bear have occurred due to predation. The results showed that the attacks took place in areas close to the forest-paramo ecotone, were cattle vigilance is poor, and where the probability of presence of both bears and cattle is moderate to high. The economic losses from 2001 to 2004 have been about 45.000 US dollars, and a strong change in the people's perceptions and attitudes towards the Andean bear have occurred. Based on the results we will design and implement a conservation plan to reduce Andean bear-cattle conflict in Oyacachi.

323. MANAGING MOSAIC LANDSCAPES: CONFLICTS OVER DIVERSITY PARTITIONING ACROSS MULTIPLE TAXA. FONSECA, CARLOS ROBERTO; Ganade, Gislene; Baldissera, Ronei; Becker, Carlos Guilherme; Brescovit, Antonio; Campos, Lucas Miranda; Fleck, Tomás; Fonseca, Vanda Simone; Hartz, Sandra; Kräffer, Marcia; Leal-Zanchet, Ana Maria; Marcelli, Marcelo; Mondin, Cláudio Augusto; Petry, Virginia; Santanna, Milene Portal; Vergara, Micheline; Mesquita, Alex Sandro; Vieira, Emerson M. Laboratório de Interação Animal - Planta, Centro 2, Universidade do Vale do Rio dos Sinos, São Leopoldo, RS, 93022-000, Brazil, cfonseca@bios.unisinos.br.

We investigated the congruence of the patterns of diversity partitioning among taxa in a mosaic landscape. The study was conducted in 12 one-hectare areas in the Floresta Nacional de São Francisco de Paula (Brazil) representing four habitats: native Araucaria Forest and monocultures of *Araucaria angustifolia*, *Pinus* and *Eucalyptus*. From 2002 to 2004, mammals, birds, frogs, insect galls, spiders, flatworms, trees and lichens were sampled in each area following standardized protocols. Gama diversity included 14 mammals, 59 birds, 7 frogs, 81 galls, 132 spiders, 32 flatworms, 108 plants and 79 lichens. Different taxa exhibited distinct among habitat alfa-diversity patterns. For instance, the local richness of birds, galls, flatworms and plants was higher in Araucaria forests and lower in *Eucalyptus* monocultures. In contrast, spiders and lichens reached their peack in monocultures of *Pinus* and *Araucaria*, respectively. Furthermore, Monte Carlo simulations indicated that beta-diversity partitioning within and among habitats also varied substantially among taxa. Decision makers should not assume that the conservation value of native and manmade habitats are the same for different taxa, and must be prepared to support taxon-oriented management tools to properly maintain the biodiversity at the regional level.

324. THE INFLUENCE OF LIANA COVERAGE ON THE FRUIT PRODUCTION OF A TIMBER TREE SPECIES IN EASTERN AMAZON. FONSECA, MARISA G.; Santos, Flavio A. M. Programa de Pós-graduação em Biologia Vegetal, Departamento de Botânica, Instituto de Biologia, CP 6109, Universidade Estadual de Campinas, 13083-970, Campinas, SP, Brazil, marisa_fonseca@yahoo.com.br. Departamento de Botânica, Instituto de Biologia, CP 6109, Universidade Estadual de Campinas, 13083-970, Campinas, SP, Brazil.

Liana cutting is a common feature of reduced impact logging operations, but its impact on tree fecundity and food availability for the fauna is unknown. We assessed the effect of liana infestation on fruit production of *Chrysophyllum lucentifollium* subsp. *pachycarpum* (Sapotaceae), a timber tree species, in Pará state, Brazil. We measured the dbh and visu ally classified liana coverage of 76 trees into three categories. Fruit production was assessed each 15 days from October 2003 until March 2004 and was considered a binary variable. The data was analyzed using logistic regression. *C. lucentifollium* trees not infested were 21 times more likely to produce fruits than trees with 5 to 50% of the crown infested, and were 57 times more likely to produce fruits than trees with over 50% of the crown infested. Although liana cutting might reduce resources liana species provide for the fauna, it may increases fruit production of some tree species and favor tree regeneration. (FAPESP; CNPq; IMAZON)

325. PREDICTING THE POTENTIAL THE INVASION OF EXOTIC MARMOSETS (*Callithrix* spp.) IN SOUTHEASTERN ATLANTIC FOREST: GENETIC CONTAMINATION OF ENDEMIC MARMOSET. FONSECA, RAFAEL L.; Bueno, Rafael; Guimarães, Paulo R.; Galetti, Mauro. Centro de Referência em Informação Ambiental (CRIA), Av. Romeu Tórtima 388, 13084-520, Campinas, SP, Brazil and Programa de Pós-Graduação em Ecologia de Agroecossistemas, ESALQ/USP, 13418-900, Piracicaba, SP, Brazil (RLF); Laboratório de Biologia da Conservação, Departamento de Ecologia, Universidade Estadual Paulista (UNESP), CP 199, 13506-900 Rio Claro, SP, Brasil (RB, MG); Programa de Pós-Graduação em Ecologia, Instituto de Biologia, Universidade Estadual de Campinas (UNICAMP), Caixa Postal 6109, 13083-970, Campinas, SP, Brasil (PRG) Instituto de Biologia da Conservação (IBC), Av. P-13, 293, Vila Paulista, Rio Claro, SP, Brasil rafael@cria.org.br (MG).

Exotic species is one of the main threat to biodiversity loss. However, very little attention has been made on the effects of genetic contamination of the introduction of primates in forest fragments. Two species of marmosets (*Callithrix jacchus*, and *C. penicillata*) has been intentionally introduced all over Brazil, increasing considerably their range. Apparently, these species hybridizes in the wild and captivity will endemic species of southeastern Brazil. Understanding which regions marmosets potentially can invade and, thus, being able to predict spatial distribution over the atlantic forest are essential methods to help in conservation policies and biocontrol programs. Here we used the Genetic Algorithm for Rule-set Prediction software (Desktop GARP) to predict th e potential distribution of exotic marmosets in the Atlantic forest of Brazil. Our results indicate that the potential distribuiton of exotic marmosets encloses great part of the distribution of endemic, native marmosets, such as *C. aurita* and *C. flaviceps*. Thus, our results remarks to the importance of effective management plans aimed to eliminate the two introduced species.

326. EFFECTS OF TREEFALL GAP DISTURBANCE ON BRACHYCERAN FLY FAMILIES IN A PRESERVED SEMIDECIDUAL FOREST. Fontenelle, Julio C. R.; CEZAR, LUCAS A.; Pimenta, Mariana A.; Rocha, Michelle D.; Martins, Rogério P. Lab. de Ecologia e Comportamento de Insetos, Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, CxP 486, CEP 31270-901, Brazil (JCRF, LAC, MAP, MDR, RPM).

Intermediate-disturbance hypothesis predict that medium-level impact could promote high diversity, improving chances of species coexistence by creating spatio-temporal heterogeneity. Little is known about effects of natural disturbances and treefall gap usage by insects is often neglected. Here, the effect of a treefall disturbance was evaluated on Brachyceran fly families. Samples from Malaise traps were taken from a disturbed place, before and after disturbance and from surrounding undisturbed places. Abundance increased in most families after the disturbance. One month after the tree fall, families of decomposers like Phoridae, Sarcophagidae, Syrphidae and the Acalyptratae group increased four to twenty folds in abundance. They were attracted by resources found primarily in the gap, like broken wood and stems. Most predators and parasitoid s families, like Asilidae, Bombyliidae, Conopidae, Pipunculidae, Tachinidae and Xylomyidae, only rose in abundance four months afterwards, since they depend on other insects, especially larvae that develop in the gap. Muscidae didn't show a clear pattern of association with disturbance. A high species turnover was found for Stratiomyidae, for example sub-

family Pachygastrinae increases and Sarginae decreases. These results indicate that treefall gaps are important for providing resources to many kinds of flies, most of them rare in undisturbed plots.

327. GENETICALLY MODIFIED CROPS IN THE CERRADO - EFFECTS ON LAND USE AND AGROBIODIVERSITY CONSERVATION. FONTES, ELIANA; Sujii, Edison; Pires, Carmen; Schmidt, F.; Lauman, R.; Faria, M.; Vieira, P.; Portilho, T.; Pereira, F.; Ortiz, G.; Ciampi, Ana Y.; Barroso, Paulo. Núcleo de Controle Biológico, Embrapa Recursos Genéticos e Biotecnologia, Caixa Postal 02372, Brasília, DF, 70.049-970, Brazil, eliana@cenargen.embrapa.br.

Agricultural crops grown in the Cerrado result from the selection of hundreds of landraces, and the development of new varieties of introduced plants. This high genetic diversity and variability of genotypes have been colonized by arthropods, weeds and microorganisms present in the surrounding natural vegetation. Other species present include annelids, amphibians, reptiles, birds, and mammals. It is expected that GM crops may be soon commercialized in Brazil, bringing benefits to farmers and the environment, as they may facilitate farm management and reduce pesticide usage. Before GM crops are introduced for commercial use the potential negative impact on the conservation of biodiversity must be assessed. The large number of arthropods, weeds and microbes found in agricultural fields raises the question of adverse effects on non-target organisms. Some crop species have wild, feral, and dooryard relatives and landraces in Brazil. Some of these are sexually compatible with the cultivated type and gene flow from new conventional or transgenic varieties may pose a threat to the long-term conservation of the crop species' genetic diversity. We will present information on species diversity on cotton cultivated in the Cerrado and discuss the potencial effects on the dynamics and conservation of species diversity in agroecosystems.

328. ENDANGERED FORESTS: MOBILIZING SCIENCE TO PROTECT ENDANGERED FORESTS WORLDWIDE. FORD, JIM. ForestEthics, One Haight Street, San Francisco, California, 94102, USA, jim.ford@forestethics.org.

As forests loss and biodiversity loss accelerate under pressure from logging and other industrial demands around the world, new commitments to protect biodiversity and natural systems by the very same companies responsible for much of this demand are a source of hope. Breakthroughs in conservation areas design in Chile and the Great Bear Rainforest of British Columbia that are a result of markets campaigns and the implementation of corporate commitments are exemplary. Sound, independent science is needed to guide the implementation of corporate commitments to protect biodiversity through their purchases of wood and paper products. "Ecological Components of Endangered Forests" outlines the major regional and global needs for conservation of forest ecosystems by scientists, GIS mapping projects and forest biodiversity experts. Three- and four-way partnerships between industry, scientists, non-governmental organizations and governments will be necessary as more regions worldwide are the subjects of far-reaching forest conservation initiatives where markets demand them.

329. SUSTAINING LINKS AND BUILDING BRIDGES WITH INDIGENOUS COMMUNITIES: TOWARDS THE MUTUAL GOAL OF CONSERVING BIODIVERSITY AND ETHNODEVELOPMENT IN THE AMAZON. FORLINE, LOUIS. Department of Anthropology/096, University of Nevada - Reno, 1664 N. Virginia Street, Reno, Nevada 89557, USA, forline@unr.edu.

Amerindian peoples, researchers, NGOs, and government institutions have forged functional partnerships in some cases. In other cases, partnerships become difficult when other players such as loggers and miners intervene. Expectations and goals can differ among the different partners yet objectives are not necessarily mutually exclusive. As indigenous peoples strive to maintain their livelihoods, many find that this objective can be met without undermining conservationist goals. Two examples are used to illustrate the resolution of differing sets of goals. The first example is the Guajá Indians of Maranhão State who currently share two reserves with members of other ethnic groups but prefer their own reserve. The establishment of a separate reserve would preserve headwater areas and biodiversity, in addition to extending security and resources to the Guajá. The second example riverine indigenous communities of the lower Xingu river near Altamira, Pará State. The establishment of new reserves for the Xipaia and Curuaia groups and the urban Indians of Altamira would halt ecosystem degradation in addition to providing these people with security and improved means to sustain their livelihoods. Conflicting claims by third parties will also be analyzed to better comprehend the potential for establishing indigenous reserves.

330. THE CAUSES AND CONSEQUENCES OF AQUATIC MERCURY CONTAMINATION IN THE BRAZILIAN AMAZON. FORSBERG, BRUCE; Belger, Lauren; Peleja, Reinaldo; Zeidemann, Vivian. Coordenacao de Pesquisas em Ecologia, Instituto Nacional de Pesquisas da Amazonia, CP 478, Manaus, AM 69011-970, Brazil, forsberg@vivax.com.br.

High concentrations of mercury have been encountered in fish, soils and human hair collected in various parts of the Amazon basin. These elevated concentrations are often attributed to anthropogenic pollution from gold mining operations. However some of the highest levels of mercury contamination have been found is isolated black water tributaries far from any industrial activity. Recent findings suggest that most of the mercury present in the Amazon ecosystem is, in fact, derived from natural processes and that its distribution in the basin is determined more by river chemistry and wetland densities than by anthropogenic influences. I summarize these findings here and present an updated overview of the biogeochemistry of mercury in the Amazon basin. Current information on the distribution and dynamics of mercury in the region, including anthropogenic influences, are evaluated in the context of the regional and global mercury cycles. Mercury concentrations in fish and human hair are shown to be highly correlated with river pH and wetland densities. Mercury concentrations are should to be naturally high in most central Amazonian soils.

331. BAT HABITAT USE IN BOMBAY HOOK NATIONAL WILDLIFE REFUGE, USA. FOX, MARCIA; Vulinec, Kevina. Department of Agriculture and Natural Resources, Delaware State University, Dover Delaware 19901, USA, (Marcia.Fox@state.de.us).

The USFWS requirement for states to develop conservation strategies for species of conservation concern has highlighted the need for preservation of natural habitats in Delaware due to increased

urban sprawl and encroachment on natural habitats. Delaware's BioLegacy committee has agreed that bats need further research, inventorying and protection. To address this issue, we examined bat activity and behavior, species occurrence, habitat acoustic complexity and habitat use in Bombay Hook National Wildlife Refuge, Delaware, USA. We used ultrasonic detectors and mistnets for s pecies identification and to assess relative activity and habitat use. Vegetation structure defined acoustic complexity: cluttered habitats (primarily deciduous forests), partially cluttered habitats (forest edges and water impoundments), and uncluttered habitats (marsh and open fields). Our data shows that bats forage primarily in uncluttered and partially cluttered habitats and commute through all habitats; however, commuting occurs more in cluttered areas at dusk (suggesting a commute from roosting to foraging grounds). Our research will assist resource managers by identifying good foraging habitats and roosting grounds for preservation and improvement within the refuge.

332. MARINE CONSERVATION IN THE ABROLHOS BANK, BRAZIL: FROM REEF FISH SPAWNING AGGREGATIONS TO EFFECTIVE MARINE PROTECTED AREAS. FRANCINI-FILHO, RONALDO B.; Moura, Rodrigo L.; Sala, Enric; Fonseca, Juliana; Dutra, Guilherme F.; Menezes, Naércio A. Museu de Zoologia da Universidade de São Paulo, São Paulo, SP, 42694, Brazil, rofilho@yahoo.com (RBFF, JF, NAM). Conservação Internacional, Caravelas, Bahia (RLM, GFD). Scripps Istitution of Oceanography, California, USA (ES).

Many reef fishes aggregate to reproduce at specific times and places, generally in large numbers. Aggregations are prime targets for fishers, who often take unsustainable catches, thus seriously compromising long-term preservation of the species and the fisheries they support. The Abrolhos Bank, Brazil, harbors a unique mosaic of marine and coastal ecosystems that encompasses the greatest marine biodiversity within the South Atlantic. Reef fisheries is one of the most important subsistence and commercial activities in Abrolhos, and it targets mainly species that are likely to form spawning aggregations (groupers and snappers). We evaluated the conservation status of groupers and snappers in Abrolhos (including three red-listed species) by interviewing local fishermen, monitoring fish landings, conducting diving surveys, and by mapping and studying potentially important, but still unprotect reefs. Density and biomass of groupers and snappers was higher inside fully-protected areas and on deep (30-80m) and unprotected reefs, these latter areas being the main targets of larger and more powerful boats. Despite some positive effects of the fully-protected areas in a local scale, the conservation and effective management of reef fishes in Abrolhos is still dependent on a larger network of protected areas, including critical habitats such as deep reefs and mangroves.

333. THE INFLUENCE OF HABITAT AVAILABILITY ON MIGRATORY RAPTOR DISTRIBUTION AT A COASTAL STOPOVER IN NEW JERSEY, USA. FRANK, CRISTINA; Burger, Joanna; Niles, Larry. Department of Ecology, Evolution and Natural Resources, Rutgers, The State University of New Jersey, 80 Nichol Avenue, New Brunswick, NJ, USA 08901 (CF), cristfr@eden.rutgers.edu. Department of Biological Sciences, Rutgers, The State University of New Jersey, 604 Allison Road, Piscataway, NJ, USA 08855 (JB). Endangered and Nongame Species Program, NJ Division of Fish and Wildlife, Trenton, NJ, USA (LN).

The survival of migrating raptors often depends on resources provided by stopover areas. The quality and availability of habitats adjacent to ecological barriers (i. e., large water bodies) are critical for migrants to rest and rebuild energy reserves prior to crossing the barrier and completing migration. Anthropogenic changes in the landscape can degrade the quantity and quality of available stopover habitat. We investigated the response of migratory raptors to landscape changes at Cape May Peninsula, NJ, USA, a valuable coastal stopover. While waiting for weather conditions suitable to cross the Delaware Bay, raptors rest and prey upon passerine migrants to improve their body condition. Using land cover classifications developed from satellite imagery, we characterized habitat loss on Cape May Peninsula over an eighteen-year period and compared our findings with several years of point count data to assess changes in raptor distribution. Our data indicate that migrants traveled further from their crossing point in search of suitable habitat than in previous years. We suggest that habitat availability may influence the distribution of raptors during their stopover. This study offers insight into the impacts of a growing human population on migrants and the need to prioritize habitat conservation at migratory stopovers.

334. SUSTAINABILITY OF SUBSISTENCE AND MARKET HUNTING AMONG THE HUAORANI IN YASUNI NATIONAL PARK, ECUADOR. FRANZEN, MARGARET. Anthropology Department, University of California, Davis, CA 95616 USA, mafranzen@ucdavis.edu.

Two techniques are used for evaluating the sustainability of subsistence and market hunting in Yasuni National Park, Ecuador. First, Robinson and Redford's (1991) model is used to evaluate the sustainability of hunting rates, measured as the number of individuals taken/km^2/year. Second, the recent establishment of one community in a previously un-hunted area allows for a natural experiment comparing harvest compositions across three communities at one point in time. Two communities were established ten years prior to the study and the third was established one year prior. Harvest compositions are compared to evaluate the present status of preferred game species surrounding the three communities. The results show that, according to estimated harvest rates, the woolly monkey (*Lagothrix lagothricha*), spider monkey (*Ateles belzebuth*), howler monkey (*Alouatta seniculus*), capuchin monkey (*Cebus albifrons*), and white-lipped peccary (*Tayassu pecari*) are at risk of being over-hunted in at least one community. Evidence from harvest composition comparisons suggests that two primate species, the woolly monkey (*Lagothrix lagothricha*) and spider monkey (*Ateles belzebuth*), are already facing local depletion in the areas surrounding the two oldest communities. Market sale of hunted meat does not appear to be a significant force driving hunting rates.

335. HABITAT INDICATORS OF PARASITOID WASP DIVERSITY. FRASER, SALLY E. M.; Mayhew, Peter J.; Dytham, Calvin. Department of Biology, University of York, York, YO10 5YW, N. Yorks, UK, semf102@york.ac.uk.

Parasitoid Hymenoptera are one of the most species rich and abundant components of terrestrial ecosystems yet they are biologically and taxonomically poorly known. Species-level conservation of parasitoids is impractical because of their immense diversity, so habitat-conservation must substitute, but habitat indicators of parasitoid diversity have been very little studied. Parasitoid wasps were sampled in fifteen woodlands in the Vale of York, England, using Malaise traps, and the catch related to the vegetation char-

acteristics. Different taxa responded differently to measured habitat varaibles. The ichenumonid sub family Pimplinae were more abundant and species rich in woods with a high broadleaf content and tree species richness. Such habitat variables may therefore prove useful indicators of pimpline diversity. The abundance and diversity of the ichn eumonid subfamily Diplazontinae showed no association with the measured habitat variables suggesting that patterns in abundance and species richness may operate on a different spatial scale in this group. These results suggest that conservation management of parasitoid species will need to be taxon specific and may need to be considered on several spatial scales.

336. EFFECTS OF THE FRAGMENTATION OF ATLANTIC FOREST IN THE STATE OF ALAGOAS (NORTHEASTERN BRAZIL) ON THE DIVERSITY OF SPECIES OF LIZARDS AND SNAKES. FREIRE, ELIZA M. X.; Caramaschi, Ulisses; Rodrigues, Miguel T.; Silva, Selma T. Departamento de Botânica, Ecologia e Zoologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte, Natal, RN, 59072-790, Brazil, elizajuju@ufrnet.br. Departamento de Vertebrados do Museu Nacional da UFRJ, Quinta da Boa Vista, São Cristóvão, Rio de Janeiro, RJ, Brazil. Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, Brazil. Museu de História Natural da Universidade Federal de Alagoas, Maceió, AL, Brazil.

The Atlantic Forest of the Brazil has become fragmented and reduced to about 7% of its original size. In the Northeastern Region the most significant remnants are in the States of Bahia (6%) and Alagoas (2%). An inventory was carried out between 1993 and 1996 in different-sized forest fragments in the state of Alagoas, occupying a total of 2,950 man-hours of fieldwork. The diversity of species was ascertained and areas were compared applying Shannon 's diversity index and Hutcheson's t-test. A large diversity of species was observed and, furthermore, 19% of the species were endemic to the northern part of the Atlantic Forest, indeed two of them are new to science and the smallest area exhibited the highest diversity index. To re-evaluate these results, further studies were carried out in two of the previous areas and two new areas, during 1,100 man-hours of work. The results confirmed greater diversity in the smaller area. Despite this fact being important for the conservation of forest fragments, it should be noted that the maintenance of this diversity is not guaranteed, because the populations of these fragments may not be viable in the long term.

337. INFLUENCE OF FOREST FRAGMENTATION ON DIASPORE RAIN IN THE BRAZILIAN ATLANTIC FOREST. FREITAS, CÍNTIA GOMES; Leal, Inara R. Departamento de Botânica, Centro de Ciências Biológicas, Universidade Federal de Pernambuco, Recife, PE, 50.670-901, Brazil, cintuca@hotmail.com.

In this study we relate landscape variables such as the area, shape, and isolation of forest fragments with species richness, diversity as well as biomass and abundance of diaspores. We worked on nine forest fragments in Usina Serra Grande, Alagoas, Brazil, from 2003, September to 2004, October. We collected 21.985 diaspores from 190 morphspecies. The richest family was Papilionaceae, Euphorbiaceae and Sapindaceae with 7, 5 and 5 species respectively. The majority of identified seeds are classified at "small" or "medium" sized class, with a pioneer regeneration strategy, and a zoocoric dispersal mode. There is a continuous production of fruits that peaks at the beginning of dry season and wet season. The regression analysis between the landscape variables cited and the diaspores collected were not significant, except for biomass and the distance to the diaspore source area ($F= 7.2845$; $p= 0.0298$), which can be related with the capacity of animals to cross the matrix carrying large seeds. The lack of significance in the analysis could be due to (1) the supra-annual fructification of some shade-tolerant species, (2) the diaspore source area heterogeneity, and (3) the high diversity reached in fragments immediately after a disturb.

338. EXOTIC INVASIVE GRASSES IN THE BRAZILIAN CERRADO AND THEIR IMPACT ON FIRE REGIMES. FREITAS, GLAUCO K. Central South American Savannas Conservation Program, South America Conservation Region, The Nature Conservancy Brazil, SHIN CA 05, Conj. J, Bloco B, salas 301-309, 71.503-505, Brasília, DF, Brazil,(gfreitas@tnc.org.br).

In Brazil, African grasses introduced as forage, successfully established in the Cerrado due to its environmental similarity with African savannas and are now competing and displacing native grass species. African grasses have evolved under intense ungulate grazing resulting in morphological features that confer competitive advantages over the native species, such as perennial organs near or below the ground and a rapid response to defoliation. Vegetative growth is responsible for large biomass production that, in turn, increases fire occurrences in the Cerrado. Constant fires diminish herbaceous physiognomies and allow the dominance of few invasive and opportunistic species. Moreover, it changes the velocity and temperature of fires, resulting in hotter and slower fires that destroy the soil microorganisms and seeds. Conservation actions aiming to control alien species as well as preventive actions of human induced introductions are essential in order to pre vent the Cerrado species to disappear. Such actions are not simple, and there is a lack of long term experiments that integrate different field practices: ex. prescribed burns, herbicides, allelopathy, shading and native species re-seedling. It is also necessary to develop preventive efforts at different scales, ranging from education programs for farmers, to policy actions engaging decision-making institutions.

339. RELATIONSHIPS BETWEEN FOREST STRUCTURE AND LANDSCAPE METRICS IN ATLANTIC RAINFOREST FRAGMENTS OF SOUTHEASTERN BRAZIL. FREITAS, SIMONE R. Laboratório de Ecologia e Biogeografia, Departamento de Geografia, Instituto de Geociências, Universidade Federal Fluminense, Niterói, RJ, 24210-310, Brazil, sfreitas@biologia.ufrj.br.

To increase predict-ability, future research in landscape pattern analysis must go beyond the mere quantification of landscape pattern and emphasize its relationships to ecological processes. This paper aims to evaluate relationships between forest structure and landscape metrics in Atlantic Rainforest fragments, in Rio de Janeiro State. I studied 11 forest fragments where took measurements of forest structure (e. g. tree diameter, canopy height). I used a classified Landsat 7 ETM+ image to generate a 1km buffer surrounding each one of these forest fragments. Landscape metrics were taken from each fragment and its surroundings (e. g. fragment area and shape, mean distance of forest nearest-neighbor). Measurements of forest structure were associated to landscape metrics through a Pearson Correlation and Linear Regression. Lianas freq uency was negatively correlated to fragment area, whereas *Cecropia* frequency was positively correlated to more irregular shaped fragments. Lianas and *Cecropia* are indicators of edge effect in forest fragments, showing that fragment

area and shape index could also be used. Other relationships indicated that fragment size and shape, its distance from the others and edge types were related to forest structure, suggesting the importance of landscape metrics to evaluate the fragmentation effects on vegetation structure.

340. EFFECT OF FRAGMENTATION ON THE DIVERSITY AND BODY SIZE OF CLOUD FOREST FROGS (AMPHIBIA: ANURA) FROM THE CENTRAL ANDES OF COLOMBIA. GALEANO, SANDRA; Urbina, Jenny. Grupo Herpetológico de Antioquia, Universidad de Antioquia, Medellín, Colombia, spgaleano@yahoo.com (SG, JU).

Fragmentation is one of the most severe threats affecting biodiversity worldwide; however, much of the research on this has been biased taxonomically and geographically. The highly fragmented Andean cloud forests harbor an extremely rich and unique anurofauna, yet it is unknown how landscape changes in this ecosystem impact these amphibians. We assessed the effect of fragmentation on the habitat, diversity, and body size of forest anurans from the Central Andes of Colombia. To do so, we selected six forest patches of varying size where we measured environmental and habitat features, and sampled frogs during the wet and dry seasons of 2002. We used ordination analyses techniques (PCA, CCA) to evaluate how habitat differences among patches influence the variation in species diversity and body size. Species richness was not related to patch area despite cumulative numbers of captured individuals being larger in large fragments. Relative abundances showed differential responses to fragmentation according with particular habitat characteristics. Only an endemic beaked toad (*Rhamphophryne macrorhina*) exhibited larger body sizes at small patches. Our results indicate that taking patch area alone is an unreliable way to elucidate the fragmentation effects on anurans since multiple environmental and habitat variables do influence diversity and abundance.

341. VIZCAINO BIOSPHERE RESERVE: ITS LIZARD COMMUNITY AND CONSERVATION. GALINA-TESSARO, PATRICIA; Alvarez-Cárdenas, Sergio; Ortega Rubio, Alfredo; Castellanos-Vera, Aradit. Centro de Investigaciones Biológicas del Noroeste, S. C. Mar Bermejo 195 Col. Playa Palo de Santa Rita, La Paz 23090 Baja California Sur, México. (PGT, SAC, AOR, ACV).

Vizcaíno Biosphere Reserve is the biggest Biosphere Reserve in Mexico. Located in the middle of Baja California Peninsula has a lizard community composed by 20 species. Four of them are Baja endemics, and had restricted distribution in the Reserve. Seven species are restricted to the rocky soils, six of them in the Eastern sierras. Two species are included in the CITES list and 11 in the Mexican Official Norm (NOM -059-SEMART-2001), in some conservation category. We studied eight different habitats recording thirteen species and the most abundant species was *Uta stansburiana* accounting 59% of all observation. Lizard community composition were similar except by two areas. The habitat with the highest diversity was located in San Francisco sierra with rocky soils. Livestock (cattle and goats) is an extended and poorly regulated activity in the reserve particularly in the Eastern sierras where most of the endemic species are distributed. Because according to this work Sierra de San Francisco and Scammon dunes are the habitat showing more endemics and protected lizard species, management plans of conservation should be reassessed to incorporate specifc territorial and operational guidelines to protect these species and their habitat.

342. CLASSIFICATION OF NEOTROPICAL BATS ACCORDING TO THEIR RESPONSE TO LANDSCAPE FRAGMENTATION. GALINDO-GONZALEZ, JORGE. Laboratorio de Biotecnologia y Ecologia Aplicada, Universidad Veracruzana. Apdo. Postal 250, Xalapa, CP. 91001, Ver., Mexico, p jgalindo@uv.mx.

Human activities transformed rainforest to fragmented landscape. Genetic flow among subpopulations, as well as abundance and diversity of organisms' decrease, while genetic drift, and local extinctions probabilities increase. Bat species respond differently to habitat transformation, some species fly throughout grasslands and croplands, other don't. I propose three types of bats species according to their responses to fragmentation, by considering habitat types where bats have been collected, their abundances, and habitat vegetation structure: Type I (Habitat dependent), those species that live in forest, very sensitive to habitat perturbations, they don't fly into open areas; so, they are isolated in remnants. Type II (Vulnerable), these bats live in forest and fragments, but they al so use riparian vegetation that connects fragments through grasslands, but don't fly into open areas. Type III (Adaptable), very tolerant to habitat transformations, some also get benefits from it; they use forest, remnants, secondary and riparian vegetation, isolated trees and croplands, they fly across grasslands to reach other fragments. Effects of habitat fragmentation on bat abundance, diversity, and genetic structure will be primarily patent on Type I bats, and the major efforts for bat conservations most focussed to this group, in order to avoid extinction probabilities.

343. IS THE SELECTION OF DIURNAL BED SITES IMPORTANT TO DEFINE CONSERVATION STRATEGIES FOR WHITE-TAILED DEER IN SEMIARID AREAS? GALLINA, SONIA; Bello-Gutierrez, Joaquin; Contreras-Verteramo, Carlos. Instituto de Ecología, A.C., km 2.5 Antigua Carretera a Coatepec, No 351. Congregación El Haya A.P. 63, Xalapa 91000, Veracruz, México (SG, CCV) (sonia@ecologia.edu.mx). División Académica de Ciencias Biológicas, Universidad Juárez Autónoma de Tabasco. Km 0.5 carretera Villahermosa-Cárdenas, Entronque a Bosques de Saloya, Villahermosa, Tabasco. México, (JBG).

The characteristics of diurnal bed sites used by deer (*Odocoileus virginianus*) on semiarid zones with xerophyllous brushland, that have high temperatures (more than 40ºC) and low annual precipitation (less than 400 mm) should be considered for conservation and habitat management strategies. This research was carried out from December 1997 to October 1998, at San Francisco Ranch, northeastern Mexico, within an area of 1000 ha. There were done several mo nthly transects of 7 km on horseback, during morning, midday and afternoon to locate resting deer. Several habitat variables of the bed sites were measured: shrub species, height, volume, thermal and protection cover, forbs and grass cover, temperature and humidity. Random sites were characterized to compare the habitat variables and detect preferences. A two way ANOVA was applied. Forty nine diurnal bed sites with 49 random sites were sampled. Shrub cover, height and volume had higher values in the bed sites ($P<0.001$). Seasonal differences were found on site selection ($P<0.05$). Males select bed sites under shrubs with higher values on thermal cover, volume and height. Does, during the fawn season look for higher protect cover. Conservation strategies have to take into account that deer select the bed sites with specific characteristics.

344. SYSTEMATICS AND CONSERVATION: DELIMITING SPECIES AND REASSESSING DECLINES IN CRICKET FROGS (ANURA: HYLIDAE). GAMBLE, TONY; Berendzen, Peter B.; Simons, Andrew M. Conservation Biology Graduate Program, University of Minnesota, 100 Ecology, 1987 Upper Buford Circle, St. Paul, MN 55108, USA, gambl007@umn.edu (TG). Fisheries Graduate Program, University of Minnesota, 100 Ecology, 1987 Upper Buford Circle, St. Paul, MN 55108, USA (PBB); Department of Fisheries, Wildlife, and Conservation Biology & Bell Museum of Natural History, University of Minnesota, 100 Ecology, 1987 Upper Buford Circle, St. Paul, MN 55108, USA (AMS).

The seemingly close connection between systematic and conservation biology is often not fully realized. Many conservation biologists take for granted that the biodiversity of a particular region is fully described or that current nomenclature reflects biological realty. Neither scenario is often true. The identification of species and species boundaries is fundamental to conservation biology as it is critical to know precisely what is to be conserved. The northern cricket frog (*Acris crepitans*) has declined dramatically in the northern portion of its range since the early 1970's. Understanding the biological diversity within northern cricket frogs is essential to understanding patterns and causes of declines. We investigated the phylogenetic relationships and species boundaries in the genus *Acris*. We sequenced one mitochondrial (cytochrome b) and two nuclear genes (beta-crystallin intron and exon 1 of tyrosinase). Data were analyzed both separately and combined using parsimony, maximum likelihood, and partitioned Bayesian analyses. Analyses of the combined data produced a well-supported phylogeny that was consistent with each of the individual datasets. Results showed greater species diversity within *Acris* than reflected in current nomenclature, with *A. crepitans* consisting of at least two species. We discuss the conservation implications regarding *A. crepitans* declines in light of these findings.

345. LIMITS TO THE USEFULNESS OF SINGLE TAXA DIVERSITY DATA FOR PREDICTING HABITAT INTEGRITY. GANADE, GISLENE; Fonseca, Carlos Roberto; Baldissera, Ronei; Becker, Carlos Guilherme; Brescovit, Antonio; Campos, Lucas Miranda; Fleck, Tomás; Fonseca, Vanda Simone; Hartz, Sandra; Joner, Fernando; Kräffer, Marcia; Leal-Zanchet, Ana Maria; Marcelli, Marcelo; Mondin, Cláudio Augusto; Petry, Virginia; Santanna, Milene Portal; Vergara, Micheline; Mesquita, Alex Sandro; Stranz, Anamaria; Vieira, Emerson M. Laboratório de Ecologia da Restauração, Biologia, UNISINOS, cxp 275, São Leopoldo, RS, CEP 93022970, Brazil, gganade@bios.unisinos.br.

Single taxon diversity is often used as indicator of habitat integrity. However, there is a lack of information on how different taxa would correlate in the manner they respond to habitat degradation. We performed a multi taxa survey of mammals, birds, frogs, insect galls, spiders, flatworms, trees and lichens in 12 one-hectare areas in the National Forest of São Francisco de Paula, southern Brazil. Areas were represented by native Araucaria Forest and man-made monocultures of *Araucaria angustifolia*, *Pinus* and *Eucalyptus*. Habitat integrity levels were ranked according to land use, age, degree of isolation and management regime. A PCA followed by simple regression analysis revealed that the richness of birds, trees, insect galls and flatworms were positively correlated with each other and to habitat integrity, meaning less species in more degraded areas. However mammals, frogs, and spiders were significantly correlated with each other but did not have their richness correlated to habitat degradation, while lichen richness showed an idiosyncratic behaviour not correlated to habitat integrity. We conclude that some taxa respond in the same manner to habitat degradation while others do not. Screaning for conservation priority areas should consider the use of multitaxa surveys.

346. THE INFLUENCE OF DAMS ON THE MIGRATORY FISH *Prochilodus lineatus*, IN RIO GRANDE (BRAZIL). GARCEZ, RIVIANE; Almeida-Toledo, Lurdes F. Laboratório de Ictiogenética do Instituto de Biociências da Universidade de São Paulo, SP, 05508-900, Brasil, rivigarcez@yahoo.com.br.

P. lineatus has a great importance for Rio Grande's fishing. The construction of dams in this area affected populations of migratory fishes, like *P. lineatus*, that can not swim through them. For programs of fishing management, analyses about the influence of dams are necessary. Genetic markers are useful for these. Individuals of four different places were analyzed: Cardoso (n=26), Colombia (n=25), Igarapava (n=16) (Rio Grande), and Jaborandi (n=16) (Rio Pardo), with PCR-RFLP from DLoop region of mtDNA. The nucleotide and haplotype diversity within populations and the nucleotide divergence and diversity between populations were calculated. For Rio Grande, a little decrescent tendency in the values of diversity upstream was observed. Biggest values were found in Rio Pardo. Interpopulation analysis showed the smallest index between the localities of Rio Grande, while the biggest were found between those and Rio Pardo. These data indicate: there are genetic differences between the rivers, and the localities of Rio Grande must be considered as a single genetic stock. Programs of re-stocking and the continuous lost of habitats upstream must influence the values of diversity in Rio Grande when compared to Rio Pardo. More researches on migratory fishes in areas of dams must be realized. FAPESP.

347. ANALYZING THE DISTRIBUTION OF PROTECTED AREAS AND INTACT HABITAT IN RELATION TO HOTSPOTS OF HERPETOFAUNA DIVERSITY IN THE LOWLANDS OF WESTERN MÉXICO. GARCÍA, ANDRÉS. Estación de Biología Chamela, Instituto de Biología, Universidad Nacional Autónoma de México, Jalisco, 48980, México, chanoc@ibiologia.unam.mx.

The identification of diversity hotspots throughout ecological modeling has been a regional conservation strategy under time and financial support limitations. Hotspots have a valuable application in conservation, however a realistic assessment needs to evaluate the distribution of existing protected areas and intact ecosystems relative to their distribution. This study presents the results of modeling 364 species spatial distributional patterns through GARP analysis, to identify hotspots of species richness, endangerment and endemism in western Mexico. It also compares the distribution of these hotspots with the distribution of 1) federal protected areas (FPA); 2) priority regions for conservation (PRC) and; 3) intact seasonally dry tropical forests (STDF), the main vegetation type in the region. Western Mexico accounted for a third of the Mexican herpetofauna, with high levels of endemism and endangerment (both 49%). There was a high spatial correspondence of hotspots of species richness, endemism and endargement. FPAs and PRC accounted only 2.1% and 19.1% of the study area respectively. A low correspondence was recorded for the distribution of hotspots of species richness, endemism, and geographically restricted species, in relation to the distribution of FPAs and TPRs, whereas it was high in relation to the distribution of intact STDF.

348. ENVIRONMENTAL EDUCATION IS NOT ENOUGH: SOCIAL PARTICIPATION IN THE INTERMUNICIPAL PROGRAM FOR THE INTEGRATED MANAGEMENT OF THE AYUQUILA RIVER, JALISCO, MEXICO. GARCÍA R., SALVADOR; Carrillo, Gabriela Pérez; Graf M., Sergio; Peláez, Enrique Jardel; Santana C., Eduardo; Rivera, Luis M. Martínez; Rodríguez, Alejandra. Instituto Manantlán de Ecología y Conservación de la Biodiversidad-DERN, Universidad de Guadalajara-CUCSUR, Ave. Independencia Nacional 151, Autlán de Navarro, Jalisco C.P. 48900 Mexico (SGM, ESC, LMMR, SGR); Fundación Manantlán para la Biodiversidad de Occidente A.C., Carrillo Puerto 37-B, Autlán de Navarro, Jalisco, México (SGM); Dirección de la Reserva de la Biosfera Sierra de Manantlán, Comisión Nacional de Areas Naturales Protegidas, Secretaría del Medio Ambiente y Recursos Naturales (AR).(arodriguez@conanp.gob.mx).

The Sierra de Manantlàn Biosphere Reserve Environmental Education Program began as a joint initiative of the University of Guadalajara and the federal Sierra de Manantlán Biosphere Reserve Directorship. It has been implemented with a "socio-environmental context" approach that includes a participatory diagnosis of the locally perceived priority environmental problems and the creation of institutio nal "collaboration frameworks." Since 1987 this approach has been a powerful mechanism to achieve: 1.- the creation the first municipal solid waste recycling program in western Mexico, which during its first year and half reduced solid wastes by 60%, attained 50% voluntary household participation, and survived four political municipal administrative changes; and 2.- increased local awareness and participation in forest fire control. In 2002 we incorporated RARE's "PRIDE" methodology which increased our effectiveness. This methodology uses a charismatic species to generate local support. We used the Mexican Trogon and the Belted Kingfisher in the forest fire prevention and the Ayuquila River restoration campaigns, respectively. Our program has expanded from covering only the reserve, to a much broader region of influence with 10 participating municipalities. We have learned that constructing "institutional response capabilities" is a necessary condition for the success of a participatory environmental education program.

349. FEEDING STATIONS FOR GRIFFON VULTURES: TESTING A POTENTIAL THREAT FOR HUMAN HEALTH AND BIRDS' NATURAL BEHAVIOR. GAULT, AGNES; Sarrazin, François. Species Conservation, Restoration and Population Survey (CERSP), National Museum of Natural History, 61 rue Buffon, 75005, Paris, France, gault@mnhn.fr.

Provisioning is commonly used to insure the survival and reproduction of newly reintroduced individuals. However, the use of such spatially predictable food resources can lead to the loss of natural behavior. Griffon Vultures were reintroduced in the Grands Causses (France) in the 1980s. Since then, the population has been supplied on feeding stations with carcasses coming from livestock's natural mortality. Facing the risks due to Bovine Spongiform Encephalopathy, the European Union is planning stricter sanitary legislation for carcass management, which may affect the use of feeding stations in necrophagous species reintroduction programs. To test the appropriateness of such sites, we experimentally manipulated the spatial availability of food sources using sheep decoys. Field work was conducted on the reintroduced population of the Grands Causses as well as on a natural population in the Pyrenees, where there are no feeding stations. We show that (1) Griffon Vultures from the reintroduced population detect food more quickly on feeding stations than in random sites (15 versus 45 min) and that (2) the long-lasting use of feeding stations did not affect the species' original ability to detect randomly dispersed carcasses.

350. THE DEVELOPMENT OF STRATEGIC FRAMEWORKS TO GUIDE REGIONAL CONSERVATION PROGRAMMES. GELDERBLOM, CAROLINE. CSIR, PO Box 320, Stellenbosch, 7599, South Africa, cgelder@csir.co.za.

For regional conservation programmes which require collaboration from a wide variety of stakeholders, reaching agreement on a common vision and the development of an implementable strategy to achieve is difficult. This paper reviews the process used to support the development of a biodiversity action plan for the Wild Coast of South Africa. This is an area of globally significant biodiversity. As a consequence of South Africa 's previous apartheid system this previous homeland is impoverished, has limited capacity and high institutional complexity. A systematic conservation planning approach was used to identify priority areas and was then complemented by a simi larly systematic approach to strategy development. The paper will compare the systematic approach used to develop a conservation strategy for this region with the development of other regional conservation strategies in South Africa. It focuses on the need to establish a common vision. We examine the process of prioritization, the conflict between generic principles and specific local needs and the importance of linking with existing initiatives. The need for stakeholders own the strategy is highlighted and we describe the involvement of implementing agencies to ensure that there are long term champions in place to support implementation.

351. USING SATELLITE IMAGES FOR CONSERVATION MANAGEMENT: MONITORING AND MANAGING WITH THE NASA PROTECTED AREA ARCHIVE. GELLER, GARY N. Jet Propulsion Laboratory MS171-264, 4800 Oak Grove Drive Pasadena, CA 91109-8099 USA (gary.n.geller@jpl.nasa.gov).

Satellite images can be a useful aid in monitoring and managing ecosystems and protected areas, but often require special expertise. The NASA Protected Area Archive (PAA) makes satellite images available to those lacking this expertise by bundling images with simple tools to view and use them. Several plans are underway to combine PAA with new satellite acquisitions to form a "monitoring loop" that provides multiple acquisitions of sensitive areas over time. One example is in monitoring conversion of natural cerrado to agriculture. First, a "baseline" collection of images will be created to capture the state of the cerrado in southern Brazil. Next, analysts will use these images and ground knowledge to determine which areas should be monitored, then submit a request for periodic (probably annual) acquisition of ASTER data of these sites. After the data are acquired the baseline collection will be updated with these additional ASTER images, allowing analysts to monitor and predict conversion rates, ensure conversion regulations are followed, and other functions. Combining PAA with periodic new acquisitions creates a very powerful, user-driven feedback loop, and similar plans are being made, and sought, with other groups in a variety of locations.

352. TRANSLOCATION AS A RECOVERY STRATEGY FOR THE CRITICALLY ENDANGERED TURKS AND CAICOS IGUANA. GERBER, GLENN P.; Alberts, Allison C. Center for Conservation and Research for Endangered Species,

Zoological Society of San Diego, 15600 San Pasqual Valley Road, Escondido, CA 92027-7000, USA, ggerber@sandiegozoo.org.

In response to threats from introduced mammalian predators and human development, Turks and Caicos iguanas (*Cyclura carinata*) were translocated in January 2002 and 2003 from two large but threatened island populations to four small protected islands with suitable habitat but lacking extant iguana populations. Translocation islands received 18-82 adult iguanas of equal sex ratio from one of the two source islands, depending upon their area (1-12 ha) and estimated adult carrying capacity. Source and translocated populations were monitored 2-3 times annually between 2002 and 2005. By five months post-translocation adult iguanas on translocation islands had established normal movement patterns and were exhibiting normal or increased growth rates relative to source populations. Successful reproduction has occurred on all translocation islands each year since reintroduction and iguanas hatched on translocation islands are exhibiting growth rates 2-4 times that of juveniles the same age on source islands. This has resulted in a decrease in age at maturity on translocation islands, relative to source islands, from 6-7 years to 2-4 years. We attribute increased growth rates on translocation islands to decreased intra-specific competition (i. e., density), relative to source populations, and predict that growth rates will return to baseline as carrying capacities are approached.

353. LANDSCAPE-LEVEL BIAS IN HARVEST PATTERNS AND WATERSHED PROTECTION: IMPLICATIONS FOR OLD-GROWTH RIPARIAN VEGETATION. GERGEL, SARAH; Agbayani, Selina; Pearson, Audrey. Centre for Applied Conservation Research, 3008-2424 Main Mall, University of British Columbia, Vancouver, BC, V6T 1Z4, Canada, sarah.gergel@ubc.ca.

When prioritizing watersheds for conservation, the percentage of a watershed logged may be used as a measure for determining which watersheds require protection. However, due to the keystone ecosystem services performed by riparian vegetation (critical habitat, maintaining in-stream temperatures, bank stabilization), watershed-level measures of logging provide little indication of the status or loss of riparian habitats and as such may be problematic. Historic harvests of old-growth forests in coastal British Columbia may have been preferentially located in riparian zones due their accessibility and high value timber. Because estimates of historical logging are generally reported over management units that may not be ecologically useful, determining the percentage of riparian areas logged historically is a challenge. First, we used ortho-rectified aerial photographs from 1952 to determine the extent of this bias towards historical logging in riparian areas in the Bamfield region of coastal BC. Second, we hypothesized that prioritizing watersheds for conservation based on the percentages of the watershed logged may differ substantially from rankings based on the percentage of the riparian zone harvested. Our results suggest that watersheds with highly disturbed riparian areas as a result of historic harvest may not be accurately represented in watershed rankings for conservation and/or restoration.

354. ECOLOGICAL NICHE MODELING OF STREAMS FISHES BASED ON PRESENCE/ABSENCE DATA, CORUMBATAÍ RIVER BASIN, SAO PAULO STATE, BRAZIL. GERHARD, PEDRO; Ferraz, Kátia M. P. B.; Verdade, Luciano M. Laboratório de Ecologia Animal, Departamento de Zootecnia, ESALQ, Univerdade de São Paulo, Piracicaba, Cx. P. 09, 13418-900, Brazil, kferraz@esalq.usp.br (PG, KMPMBF, LMV).

Ecological modeling can be a useful tool for species and habitat management and conservation. This study aimed to elaborate predictive models for rare and widespread species based on ecological niche modeling by GARP (Genetic Algorithm for Rule-set Prediction). Fish presence and absence data were collected in the field during 2003 and 2004 for 60 study sites in the Corumbataí river basin, São Paulo state, Brazil. This data and GIS environmental variables were used to generate individual models in Desktop GARP. Model validation was made by the confusion matrix, chi-square tests and quantitative indexes. The best subset of variables common to the most models were the satellite image, land use/land cover, digital elevation model, soil and the geology map. Predictions of presence and absence were highly statistically significant when tested with independent occurrence data for all species. The predictive models allowed identifying upland and lowland species as well as species that are sensitive to riparian deforestation. These models can be used to define priority areas for conservation. Based on that we strongly recommend the use of GARP to predict fish spatial distribution, at least in regional scale. Sponsor: FAPESP.

355. THE INFLUENCE OF LANDSCAPE ATTRIBUTES ON NON-VOLANT SMALL MAMMALS COMMUNITIES OF AGROECOSYSTEMS IN SOUTHEASTERN BRAZIL. GHELER-COSTA, CARLA; Verdade, Luciano M. Laboratório de Ecologia Animal, Departamento de Zootecnia, Escola Superior de Agricultura “Luiz de Queiroz”, Universidade de São Paulo, Piracicaba, SP, 13418-900, Brazil (cgcosta@esalq.usp.br).

Passa-Cinco river basin is used as one of the major water supplies for the metropolitan area of Campinas (approximately 3 million people) in southeastern Brazil. This basin can be considered a convenient model for the study of biodiversity conservation. In this study we surveyed small mammals from August 2002 to January 2005 with Sherman live-traps in 400 m line-transects in 16 sites of the four most important landscape attributes of the basin (native forest, *Eucalyptus* plantations, sugar-cane plantations and exotic pastures) taking the 4 largest patches of each, considering spatial distribution and logistics. Two hundred three individuals of eight species (2 order and 2 families) were captured with a sampling success of 0.70%. There was no difference among the environments above in sp ecies richness; however, exotic pastures had the smallest abundance and a clear separation between forested and open habitats was revealed. Even in relatively well conserved areas of southeastern Brazil remnant forest fragments no longer support the pristine diversity of small mammals, whose current community is basically formed by generalist species. In such conditions current environmental laws should be enforced in order to improve forest conservation and mitigate the impacts of agriculture, paper industry and livestock production.

356. BREEDING BIOLOGY OF THE ARARIPE MANAKIN *Antilophia bokermanni* (AVES: PIPRIDAE): SUBSIDIES FOR A CONSERVATION PLAN. GIRÃO, WEBER; Albano, Ciro; Brito, Paulo; Campos, Alberto; Rêgo, Péricles S.; Araripe, Juliana. AQUASIS - Associação de Pesquisa e Preservação de Ecossistemas Aquáticos, Praia de Iparana s/n, 61600-000, Caucaia, CE, Brazil, biodiversidade@aquasis.org.

The Araripe Manakin is a Critically Endangered bird endemic to the northeastern slope of the Araripe Chapada (plateau), in Ceará State, NE Brazil. As part of an integrated effort to produce a Conservation Plan for this highly endangered species, this work was

conducted to determine the main features of its breeding biology. Fourteen nests were found during the breeding season of 2004, between November 2^{nd} and December 29^{th}. The nests were located above water streams, at approximately 1,00 meter of height, except for one nest, higher than 4,00 meters. Only two of the nests were built on plant species not present in the Manakin's diet. The nest and the eggs are similar to those reported for the Helmeted Manakin (*Antilophia galeata*). The incubation period was determined as 20 to 22 days from egglaying to hatching. In eight of the nests we found eggs and/or nestlings, and in only one of the nests monitored the chicks managed to attain full development and leave the nest, curiously in the only nest built higher than 4,00 meters. In territories of females that had their eggs predated, recently built nests were found suggesting continuous breeding activity by the same individual.

357. ORGANISM-SPECIFIC HABITAT PATCH DELINEATION: IMPLICATIONS FOR CONSERVATION BIOLOGY. GIRVETZ, EVAN H.; Greco, Steven E. Department of Environmental Design, University of California, One Shields Avenue, Davis, CA 95616, USA.

Habitat patches should be analyzed and delineated in terms of a focus organism, because different organisms perceive landscape heterogeneity differently. Although many theories and models in conservation biology rely on habitat patches as a unit of analysis, the most common methods for geographically delineating habitat patches are based on rules of contiguity, which cannot account for perceptual differences between organisms. This paper presents a spatially-explicit algorithm-named PatchMorph-for delineating habitat patches based on organism-specific thresholds for land-cover density, habitat patch minimum thickness, and habitat gap maximum thickness. PatchMorph was applied to a random fractal landscape to show that increasing the input gap and spur thickness thresholds resulted in the delineation of fewer, but larger patches. For this landscape, the number of patches delineated ranged from 1 (high thresholds) to 59 (low thresholds) with no density filter, to 2 to 14 with a density filter. PatchMorph was used to delineate two hierarchically nested levels of forest patches relevant to the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), on the Sacramento River, California, USA. Other potential applications of PatchMorph in conservation biology include spatially-explicit modeling and analysis of habitat suitability, metapopulation dynamics, population viability, home ranges, connectivity/corridors, and wildland reserve networks.

358. CONSERVATION OF A THREATENED BIRD IN A HIGHLY FRAGMENTED LANDSCAPE: HOW USEFUL IS A SURROGATE? LESSONS FROM SE KENYA. GITHIRU, MWANGI; Lens, Luc; Matthysen, Erik. Laboratory of Animal Ecology, Department of Biology, University of Antwerp, Universiteitsplein 1, B-2610, Wilrijk, Belgium (MG, EM). Terrestrial Ecology Unit, Department of Biology, Ghent University, Ledeganckstraat 35, B-9000, Ghent, Belgium (LL).

Understanding how endangered species respond to fragmentation demands sound knowledge of the underlying demographic and genetic processes. In fragmented forest landscapes, threatened species are likely to have undergone local extinctions, making it difficult to study processes at a landscape scale. Related but commoner species, however, may provide insights that are germane in the management of the rarer species. In the highly-fragmented Taita Hills forest of south-east Kenya, the critically-endangered, endemic Taita thrush survives in 4 of the 12 remnant fragments only, while the related White-starred robin still occupies all 12 patches. The robin shows mixed responses to forest destruction, with a stronger negative effect from habitat disturbance than from fragmentation per se. Thrushes respond similarly to habitat disturbance while fragmentation affects genetic variability and inbreeding more severely due to the species' lower dispersal capacity. We derived three key conservation upshots from the robin data which matched conclusions based on an independent evaluation of the thrush data, hence confirming that the 'surrogate species' survived the test. This is encouraging because studying the robin furnished larger samples, was logistically easier and reduced the need for tampering with the endangered species (e. g., through removal experiments) in identifying causal mechanisms.

359. DISTRIBUTIONAL ANALYSIS OF THE DECLINE OF BREEDING RUSTY BLACKBIRDS IN MAINE, USA. GLANZ, WILLIAM E.; Hodgman, Thomas P. Department of Biological Sciences, University of Maine, Orono, ME 04469 USA, glanz@maine.edu (WEG). Maine Department of Inland Fisheries and Wildlife, 650 State St., Bangor, ME 04401 USA (TPH).

The Rusty Blackbird *Euphagus carolinus* breeds in wetlands of the boreal zone of northern North America, and winters in the southeastern United States. Indices of its abundance have declined dramatically, with winter estimates from Christmas Bird Counts decreasing by up to 97% since the 1960's. Historical records indicate this species bred throughout northern Maine in the early 20^{th} Century, but statewide surveys in 1978-1983 found a more restricted distribution. Regional surveys using roadside song playbacks from 2001 to 2005 show further range contraction, with it now being absent from seemingly suitable wetland habitat over distances of 60 km or more. By re-sampling recent breeding sites, we have found several major wetland complexes where Rusty Blackbirds predictably breed each year, but many breeding sites have been occupied only once, often by only one breeding pair. Most breeding sites are wetlands altered by beavers, but occupancy is not related in an obvious way to wetland succession. Anthropogenic disturbances in this region include acidification of wetlands, habitat changes during logging that favor potential blackbird competitors, and possible climatic warming, but none of these hypotheses is clearly supported by the current spatial pattern of this species' breeding presence versus absence in Maine.

360. LIVING IN AN EMPTY FOREST ISLAND: DENSITY AND POPULATION SIZE OF GAME BIRDS AND MAMMALS AT ILHABELA, SP, BRAZIL. GOBBO, SABRINA; Galetti, Mauro. Laboratório de Biologia da Conservação, Departamento de Ecologia, Universidade Estadual Paulistana (UNESP), Rio Claro, C.P. 199, 13506-900, Brazil. Institute for Biological Conservation (IBC), Rio Claro, Av. P-13, 293, Brazil (SKG, MG).

The Atlantic Forest is one of the most in threaten ecossystem in the world. Only 2% of the entire area is declared as Protected, but we still do not have any information if these areas have viable population of birds and mammals. Ilhabela is a land-bridge island, with 33,000 ha, where 27,025 ha is formally protected. We estimate the abundance and density of game birds and mammals at Ilhabela through 166,75 km line-transect method. We recorded only 5 species of game mammals and 4 of birds in the island. Squirrels (*Sciurus aestuans*) was, so far, the mammal with the highest density (6,27 individuals/km^2) while solitary tinamus (*Tinamus solitarius*) with 22,66 ind/km^2 and the jacutinga (*Pipile jacutinga*). Although highly impoverished, Ilhabela hold one of the highest population of jacutingas and tinamus in the region and it

is paramount to avoid hunting in this island. On the other hand, game mammals have a very low density and probably do not have minimum viable population in this island.

361. USING IMPORTANT BIRD AREAS AS A TOOL TO CONSERVING GLOBALLY THREATENED SPECIES. GOERCK, JAQUELINE M.; Develey, Pedro F. BirdLife International - Programa do Brasil, R. Fernão Dias 219 c.2, São Paulo, SP, 05427-010, Brazil (birdlifebrasil@uol.com.br).

The Important Bird Areas (IBA) Program of BirdLife International is a worldwide initiative that aims to identify and protect a network of critical sites for the conservation of the world's birds. IBAs identification follows rigorous standard scientific criteria including the presence of (1) globally threatened species; (2) endemic species; (3) biome-restricted assemblages and (4) congregatory species in globally important concentrations. These criteria have proven to be adaptable with slight modifications across all continents, countries and bird habitats throughout the world. Although implementation of actions takes place at a local level, the IBA concept is recognized and applied at an international level. It is therefore an important tool for the development of public policies worldwide. Sites identified as IBAs should be constantly monitored to ensu re that the most important conservation objectives are being attained. The IBA concept is pragmatic, as one important condition to consider a site as an IBA is the real chance to preserve the area. Thus, the program is not limited to the identification of priority areas for conservation, but the final goal is to promote on-the-ground conservation and to guarantee the long-term survival of birds and other biodiversity in critical areas.

362. BIRD COMMUNITY COMPOSITION ON A RESTINGA VEGETATION IN SE BRAZIL: THE IMPORTANCE OF DIFFERENT HABITATS. GOMES, VERÔNICA S. M.; Alves, Maria Alice S. Programa de Pós-Graduação em Ecologia, CCS, IB, UFRJ, CP 68020, 21941-540 Rio de Janeiro, RJ, Brasil. (vsmgomes@yahoo.com.br); Ecologia, IBRAG, Universidade do Estado do Rio de Janeiro (UERJ). Rua São Francisco Xavier, 524. Rio de Janeiro, RJ. Brasil. 20550-011.

Restingas are coastal ecosystems associated to the Atlantic Forest, highly threatened and poorly known. At Restinga de Jurubatiba, SE Brazil, the main vegetation formations are restinga formations (clumped plants covering 19% of the sand), followed by patches of forest formations. From August 2002 to August 2004 we mist-netted birds on two habitats of restinga (open and closed restinga) and two of forest (flooded and dry forests) to understand habitat preferences by terrestrial birds. From a total of 6720 net-hours and 733 captures, we recorded 57 species of diurnal birds, from which eight can be considered Indicator Species of the restinga formation (all common species of open areas), two of closed restinga and two of dry forest. Considering the same sample size for the four habitats, the dry forest was significantly less rich in species than the others, alth ough the total richness (assymptote) was not reached for the forests. The bird communities were different in the two formations (AnoSim, R= 0.433; P =0.01), and among the four habitats (R= 0.323; P =0.01). Thus, although less rich in species, the patches of forest increase the diversity of the area, preserving also a regionally threatened forest species (*Pipra pipra*). (Support: CNPq (PELD, site-5), CAPES, IdeaWild).

363. THE DISTRIBUTION OF THE ENDANGERED ASH-BREASTED TIT-TYRANT IN BOLIVIA THROUGH GIS MODELING. GÓMEZ, M. ISABEL; Zambrana, Carlos M.; Ocampo, Mauricio. Museo Nacional de Historia Natural, CotaCota Calle 26, Casilla 6394, La Paz, Bolivia, isabelgomez@entelnet.bo (MIG). Universidad Mayor de San Andrés, CotaCota Calle 27, La Paz, Bolivia (CMZ, MO).

The Ash-breasted Tit-Tyrant is one of the seven endangered bird species in Bolivia. It is endemic of the southern Andes and is found only in Polylepis woodlands in southern Peru and northern Bolivia. In Bolivia, there was no record of this species since 1935 and the species had been considered as extinct. The Tit-Tyrant was rediscovered in 1993 and since then only seven individuals had been seen in two localities. The objective of our study is to determine the distribution and population size of this highly endangered species in Bolivia. We used GIS modeling with topographic parameters to predict the potential distribution of Tit-Tyrants. Then we visited these predicted areas and conducted an intensive search and census using song playback. We visited 28 areas and found 80 individuals distributed in two metapopulations, one with five subpopulations in the Cordillera Apolobamba and the other with 14 subpopulations in the Cordillera de La Paz. As a result, our research i ncreased in 110% the known population of Ash-breasted Tit-Tyrants in Bolivia. Considering the current population size and the threats to its habitat, it is indispensable to begin a conservation action as soon as possible.

364. BIODIVERSITY AND CONSERVATION OF THE PAMPAS DEL HEATH SAVANNA, BOLIVIA. Gonzáles R., M. Jasivia; Ayala C., Jhonny M.; PANFIL, STEVEN N.; Terrán V., Marcos F.; Hurtado, Juan Carlos; Kauko C., German; Choque, Jaime. Amazon Conservation Association-Bolivia Campus Universitario Calle 25 Cota Cota La Paz, Bolivia spanfil@amazonconservation.org (SP).

Few Amazonian savannas remain intact, and cattle grazing, agriculture, and climate change threaten their biodiversity. The "Pampas del Heath" in Madidi National Park, Bolivia is among the best conserved Amazonian savannas and supports important populations of threatened species like marsh deer (*Blastocerus dichotomus*) and maned wolves (*Chrysocyon brachyurous*). In this savanna, we conducted mammal inventories and we also examined plant diversity and recruitment patterns at the forest edge. Aerial and ground surveys for *B. dichotomus* suggest that this savanna has the highest density ever reported for Bolivia. Forty-seven bat species have been recorded through capture and 11 through acoustic detection, with 3 new records for Bolivia. Vegetation plots have produced more than 1600 collections, with at least 88 families of vascular plants. Vegetation structure is highly variable across the savanna, with northern forest-savanna ecotones showing a gradual transition and the apparent conversion to woodland. Southern ecotones are more abrupt, suggesting that fire impact is concentrated in the south by prevailing northern winds. Conservation work in Bolivian savannas is in its infancy, and we will use these data to make management recommendations designed to assure the conservation of the "Pampas del Heath" to the administration of Madidi National Park.

365. PLANNING CONSERVATION SITES FOR ECOLOGICAL ORDER IN THE SIERRA SAN ANTONIO PENA NEVADA, ZARAGOZA, NUEVO LEON, MEXICO. GONZÁLEZ ROJAS, JOSÉ IGNACIO; Lazcano, David; Ruvalcaba-Ortega, Irene; Ballesteros Medrano, Oscar; Contreras Balderas, Armando Jesús; Moreno Talamantes, José Antonio; Torres Ayala, José Maria; Rodríguez Vela, Hidalgo; Solís Rojas, Carlos; Zúñiga, Miguel; González Fernando. Universidad Autónoma de Nuevo León, Facultad de Ciencias Biológicas, Laboratorio de Ornitología, Apartado Postal -25-F, CD (JIGR, IRO, OBM, AJCB); Universitaria y Laboratorio de Herpetología, Apartado Postal - 513, San Nicolás de los Garza, Nuevo León, México (DL); Tel: 81 83 52 96 49 (GRJI), josgonza@fcb.uanl.mx (JIGR), y Tel: 81 83 76 28 75 (DL) dvlazcano@hotmail.com.

The enormous and very diverse montane superficial of Mexico, makes the country an interesting landmark for conservation sites. With increasing world policies on human development and the urgent need for conservation sites for future generation y ecological stability, no area in the world can continue this exploding human develop without considering a sustainable ecological program. Here we first discuss the vertebrate diversity, plant community relationships and planning conservation sites within the mountain site of San Antonio Pena Nevada. It is known as Sierra San Antonio Pena Nevada located in the northeast part of Mexico and in the southeast portion of the state of Nuevo Leon, bordering with the state of Tamaulipas making up an area about 710 km 2 Composted of 6 plant communities such as Fir, Pine, Oak, Mix, Chaparral, Subalpine grassland, harboring 77 families, 150 genus and 407 plant species, that are deeply intergraded with the 8 families, 29 genus and 39 species of amphibians and reptiles, 35 families, 82 genus and 109 species of birds, and 12 families, 29 genus, and 36 species of mammal's; and a great number of aquatic insect's and arachnids that were also included in the inventory study, resulting in an interesting set of data, that will help in the near future consider this area as priority landmark for biological conservation.

366. THE URUGUAYAN EXPERIENCE IN CONSERVATION BIOLOGY TRAINING. GONZÁLEZ, SUSANA. Departamento de Citogenética, IIBCE -Unidad Asociada Facultad de Ciencias, PEDECIBA, Montevideo, Uruguay, sugonza@iibce.edu.uy.

Conservation Biology research and teaching began in the last decade specially related to genetics and ecology department in Facultad de Ciencias Universidad de la República-UdelaR. The first courses were organized for the postgraduate program PEDECIBA with topics related to conservation genetics with visiting lecturer from United States. In 2002 we organized and conducted the first conservation biology course for the Biology curricula. The course included as main topics conservation genetic, dynamic of small populations, the Arthropoda as a mega diverse and indicator group, conservation medicine and environmental education. The course was stru ctured with lectures with invited speakers and seminars. For the seminar sections, we prepared a bank of articles of the selected topics published in the main conservation journals. Also specific examples of conservation biology research in the Neotropical region focus in Uruguay were considered. The chosen examples included critical situations in endangered species in which were integrated research in population biology, genetics, diseases and education. The practical sections included laboratory sections consisted in population biology modeling population with the Vortex software and field work for training the students with population estimation field techniques, and specific field techniques for Arthropoda that aid in biodiversity analysis with indexes.

367. HUMAN DISTURBS IN ENDEMIC-RICH ULTRAMAFIC PLANT COMMUNITIES: THEIR CONSEQUENCES ON FLORISTIC COMPOSITION, RICHNESS AND VEGETATION. GONZALEZ-TORRES, LUIS ROBERTO; Berazaín, Rosalina; Bécquer, Eldis; Matos, Jesús; Palmarola, Alejandro; Vázquez, Alenna; Rodríguez, Yusleiby; Torres, Alberto. Jardín Botánico Nacional, Universidad de La Habana, Cuba. CP 19230. (luisro@fbio.uh.cu) (LRGT, RB, EB, AP, AV, YR) Área Protegida Sabanas de Santa Clara, Santa Clara, Cuba.

Ultramafic soils are characterized by low levels of nutrients and Ca, and very high levels of heavy metals (Ni, Co, Cr) and Mg. These features enhance the developing of specialized plants on ultramafic regions worldwide. Cuban ultramafic areas support the richest and highest endemic plant communities of the Caribbean hotspot. These areas have been strongly damaged by mining, logging, grazing, burning and quarrying. In this work we show floristic composition, richness and vegetation structure changes that take place in pine forested, grazed and burned ultramafic areas of Central Cuba. In general, disturbed areas have less species than non-disturbed ones. However, richness and floristic changes are not significant in pine forested areas but they are in grazed and burned areas. In the last ones, the rich ultramafic tickets could turn into mono-dominant communities. The typical patched herb layer of primary ultramafic ticket change into a continue layer in all disturbed areas considered but scrub layers recover slowly their physiognomy in pine plantation neither in grazed not in burned areas. In fact, grazed and burned areas use to become in less diverse grasslands. These disturbs are more severe for specialized endemic plants which remain only in primary vegetation areas.

368. REACHING THE CONVENTION OF BIOLOGICAL DIVERSITY 2010 TARGET - WHERE DO WE STAND? GOOD, TATJANA. Core Project Office Biodiscovery, Diversitas, Centro de Ecologia, IVIC, Apdo. 21827, Caracas 1020-A, Venezuela, tgood@ivic.ve.

The unprecedented loss of biodiversity prompted the nations attending the 2002 Johannesburg World Congress on Sustainable Development to commit th em selves to the central target of the Convention of Biological Diversity, of: "achieving, by 2010, a significant reduction of the current rate of biodiversity loss" (UNEP 2002). Participating governments are required to develop national biodiversity strategies and action plans, and to report their progress to the CBD in the form of national reports. I analyzed the 2nd national reports submitted by 100 countries to critically look at uses and limitations of their national indicators of biodiversity. While over half the countries are still in the process of identifying potential indicators, 17 have done so already. In light of recent articles on the choice and development of global indicators for measuring trends in components of biodiversity (Butchart et al. 2004, Balmford et al 2005), these national indicators were subject to a more in-depth evaluation. Furthermore, I assessed various strategies employed by the countries in assessing biodiversity with particular em phasis on article 7 of the Convention: "inventorying and monitoring". I describe the challenges and potential pitfalls the countries face in protecting biodiversity and evaluate their likelihood of meeting the CBD objectives by 2010.

369. CRIPTIC EFFECT OF THE ROADS IN THE AMAZON: QUANTIFICATION OF THE FAUNA MORTALITY FOR RUNNING OVER IN THE HIGHWAY BR174. GORDO, MARCELO; Venticinque, Eduardo M. Departamento de Biologia, Universidade Federal do Amazonas, Manaus, AM, 69077-000, Brazil, mgordo@ufam.edu.br (MG). Wildlife Conservation Society - Andes Amazon Conservation Program, Rua dos Jatobás 274, Manaus, AM, 69085-380, Brazil, (EMV).

The roads have an important role in the mortality of animals in the Brazilian Amazon. Due to a population and economical growth of the region, the tendency is that the roads will increase the mortality of the wild fauna in the future. In this work we analyzed the number of running over along of 120 km in BR 174 in the states of Amazon and Roraima inside of the Indigenous Land Waimiri-Atroari between 1997-2003. The data collection of dead animals was accomplished daily in the highway by the fiscalization team of the Projeto Waimiri Atroari. The total of 2460 running over was registered along this period. The group with larger number of running over was the snakes (N=739), Marsupialia (N=661), Saguinus midas (N=354), birds (N=253), Agouti paca (N=120), Dasyprocta agoutti (N=92), alligators (N=69), Eira barbara (N=29) and Tamadua tetradactyla (N=28), totalizing 95,1% of the running overs. There were running overs of some species of low density and with medium and big size as Felis pardalis (N=10), Panthera onca (N=6), Puma concolor (N=2), Tapirus terrestris (N=1), Harpia harpyja (N=1), and others. Those numbers take into account a low flow of vehicles and the night closing of the highway by indigenous.

370. LIVING IN THE GAPS: THE HUMAN DIMENSIONS OF EXPANDING THE GLOBAL PROTECTED AREA SYSTEM. GORENFLO, LARRY J.; Brandon, Katrina. Center for Applied Biodiversity Science, Conservation International, 1919 M Street, N.W. Suite 600, Washington, D.C. 20036 l.gorenflo@conservation.org.

A recent global gap analysis identified 1,396 cells as priority locations for the expansion of the global network of protected areas. This analysis examined the human context within the areas broadly defined as "gap cells," using datasets on human population, land cover, and agricultural suitability-to assess existing human presence and land use patterns, and the potential for agricultural production. When these variables were analyzed individually, and in combinations with one another, the majority of global priority gap locations have good potential for the creation of new protected areas aimed at conserving biodiversity, based on global-scale data. Proactive, regional-scale planning will make it possible to balance conservation and development objec tives within most priority gap locations. In gap locations with many people, land use incompatible with conservation, or high agricultural potential, approaches other than protected areas may be required. Linking global-scale priorities for biodiversity conservation with local knowledge of the sites, stakeholders, institutions, and opportunities to implement these priorities is an essential component of next steps.

371. AJEEVALI VILLAGE - A CASE STUDY OF SOCIO-ECONOMIC STRENGTH LEADING SELF GOVERNED CONSERVATION. GOTURKAR, SUPRIYA; Kanade, Radika; Pathak, Neema; Mahabaleshwarkar, Mukul; Patwardhan, Ankur. M E S Abasaheb Garware Collee, Pune - 411004, India (SG, RK, AP). Kalpavriksh, Apt. 5, Shree Datta Krupa, 908 Deccan Gymkhana, Pune - 411004, India (NP). RANWA, C - 26 / 1, Ketan heights, Kothrud, Pune - 411038, India (SG, RK, AP, MM).

Ajeevali (18.5^0 N, 73.52^0 E), an agro-pastoral village ecosystem, has a sacred grove that is a semi-evergreen forest patch traditionally conserved in the name of a local deity - *Waghjai*. The grove is well demarcated from the surrounding landscape of degraded forest. The village, comprised of the *Maratha* community, having agriculture as the main occupation and a tribal community that is mainly of hunter-gatherer type. It is situated in one of the 25 global biodiversity hotspots - the Western Ghats, and is under threat of rapid urbanization. Fishtail Palm (*Caryota urens*), found abundantly in the grove, is used for commercial extraction of *Maadi* (a popular local liquor). Every year the contract of *Maadi* extraction is auctioned by the temple trust (a local management committee) and is given to only local people. The revenue thus generated goes to the village welfare fund. Religious linkages coupled with sustainable economic benefits seem to have helped in protecting this ecosystem. The environmental movement in the recent past, though halted at present, still has a positive impact on the minds of elderly and middle aged people. Capacity building through activities such as eco-tourism, plantation of medicinal plants, formation of women's self help groups and environment education would help to revive the movement and encourage the existing conservation initiative.

372. THE AYUQUILA RIVER: A CASE STUDY OF CONFLICT AND COLLABORATION IN ENVIRONMENTAL RESTORATION IN WEST MEXICO. GRAF M., SERGIO; Santana C., Eduardo; Rivera, Luis M. Martínez; García R., Salvador; Rodríguez, Alejandra. Instituto Manantlán de Ecología y Conservación de la Biodiversidad-DERN, Universidad de Guadalajara-CUCSUR, Ave. Independencia Nacional 151, Autlán de Navarro, Jalisco C.P. 48900 Mexico (SGM, ESC, LMMR, SGR); Fundación Manantlán para la Biodiversidad de Occidente A.C. Carrillo Puerto 37-B, Autlàn de Navarro, Jalisco, México (SGM); Dirección de la Reserva de la Biosfera Sierra de Manantlán, Comisión Nacional de Areas Naturales Protegidas, Secretaría del Medio Ambiente y Recursos Naturales (AR). (sgraf@prodigy.net.mx).

The Ayuquila river watershed covers about 10,000 km2 of the states of Jalisco and Colima, Mexico. Mexico's federal government considers it among the 15 most important rivers in the Pacific drainage and a priority biodiversity conservation area. A strategic alliance between a local government agency (Sierra de Manantlan Biosphere Reserve-CONANP) and an academic institution (Manantlán Institute of Ecology and Conservation of Biodiversity-University of Guadalajara) served to catalyze innovative local environmental and socio-political watershed restoration processes. Over a 13-year period joint work has included participatory socio-environmental diagnosis, biodiversity inventories, biotic/physical/chemical monitoring program, aggressive public relations awareness campaign, community organization, and new inter-instit utional arrangements to address ecological deterioration and socio-political processes that generate environmental injustice. We developed a scheme by which research results on river/riparian areas feed directly into management and political decision-making processes, where poverty alleviation campaigns are integrally linked to environmental restoration projects, and citizen information/awareness assures continuity across political administrative changes. Through shared leadership, working at local scales and engaging municipal governments and NGOs,

novel approaches to managing and financing watershed management/restoration initiatives have emerged that have "bridged the gap" among researchers, managers and natural resource users.

373. MOUSE POPULATION DYNAMICS OPERATE OVER MULTIPLE SCALES IN A HABITAT UNDERGOING RESTORATION. Grand, James B.; Mitchell, Michael S.; SHARP, NICHOLAS W. USGS, Alabama Cooperative Fish and Wildlife Research Unit, School of Forestry and Wildlife Sciences, 108 M. White Smith Hall, Auburn University, Auburn, AL 36849 USA (JBG, MSM). School of Forestry and Wildlife Sciences, 108 M. White Smith Hall, Auburn University, Auburn, AL 36849 USA, sharpnw@auburn.edu (NWS).

Successfully restoring the ecosystem function of a small mammal community, as part of a holistic ecosystem restoration effort, requires focus on population dynamics that operate over multiple spatial scales. We participated in a replicated, manipulative experiment investigating the use of fire and fire alternatives to restore a longleaf pine ecosystem, formerly one of the most expansive and biologically diverse ecosystems of North America. We conducted a four-year mark-recapture study, comprising 119,700 trap nights, to assess demographic responses of small mammal populations to habitat alteration. Analyses incorporated the landscape distribution of source habitat for cotton mice (*Peromyscus gossypinus*), the dominant member of the community. While survival of mice o n experimental units was unaffected by small-scale restoration efforts, abundance of local populations changed as recruitment responded to both on-site habitat alteration and availability of immigrants from source habitat outside restoration areas. Restoring historic assemblages of animal communities requires assessment of changes in population demographics as they respond to habitat alteration at a local scale, within the context of the surrounding landscape.

374. NESTEDNESS OF ECOLOGICAL COMMUNITIES: DISTINGUISHING BETWEEN REGULARITY AND CONSISTENCY WITH PHYLOGENETIC ALGORITHMS. GRANDCOLAS, PHILIPPE; Pellens, Roseli; Guilbert, Eric; Legendre, Frédéric; Agolin, Mikaël. UMR 5202 CNRS, Département Systématique et Evolution, Muséum national d'Histoire naturelle, 45, rue Buffon, 75005 Paris, France. Tel: 33 1 40 79 38 48; Fax: 33 1 40 79 56 79. pg @mnhn.fr (PG, RP, EG, FL, MA). Universidade Federal do Rio de Janeiro, CCS, Bl. A, Ilha do Fundão, CEP 21941-590, Rio de Janeiro, Brazil, CNPq (RP).

Nested subset structure is one pattern of species composition in ecological communities that received considerable attention in forest fragmentation studies. Communities have a nested subset structure if the species of the poor are all present in the rich ones. Several algorithms were developed to verify the departure from the ideal nestedness, and nestedness was associated to fragment area, continuing the SLOSS discussion. As a way to advance in this subject, we propose to use the algorithms designed for phylogenetic analysis and especially parsimony analysis to find a tree of relationships between communities from different forest fragments, taking presence or absence of species as characters (Pellens et al., 2005. Cladistics 21: in press). Modern phylogenetics algorithms are more efficient to search for nestedness in species subsets. They discriminate between *regularity* and *consistency*, contrary to classical nestedness analysis. Therefore, species subsets can be classified as *consistently* nested in several groups even if not *regularly* nested from the poorest to the richest. Using these modern algorithms, nestedness can be now described in many cases when previous methods did not detect it. Possible species losses or gains can be inferred helping to understand better the importance of factors like interspecific competition, or habitat diversity.

375. UNRESOLVED ISSUES IN TESTING THE EFFECTIVENESS OF BIODIVERSITY SURROGATES. GRANTHAM, HEDLEY S.; Beattie, Andrew J.; Pressey, Robert L. Key Centre for Biodiversity and Bioresources, Macquarie University, North Ryde, Sydney, 2109, Australia hgrantha@ran.bio.mq.edu.au (HSG, AJB). Department of Environment and Conservation, PO Box 402, Armidale, 2350, Australia (RLP).

Testing the effectiveness of biodiversity surrogates was an important issue debated in the December 2004 issue of *Conservation Biology.* Surrogates are essential to conservation planning due to the lack of comprehensive data on the compositional, functional and structural attributes of biodiversity. Surrogate effectiveness is often assumed and seldom demonstrated. Methods for testing surrogates can be divided roughly into pattern-based and selection-based procedures. Pattern-based methods directly measure the spatial relationship between a surrogate and a set of test features. Although informative, they do not directly establish whether areas selected for conservation based on a surrogate will adequately represent the test features. Selection-based techniques usually involve the selection of notional conservation areas based on the surrogates, then measure how well test features have been represented. A relative disadvantage is that they assume a particular configuration of conservation areas or likelihood of areas being selected, both of which could be unrelated to actual conservation decisions. Here we compare several different selection-based tests and demonstrate that the relative effectiveness of surrogates depends on the method used and on parameters required for the methods. We conclude by stressing the importance of further investigation into the adequacy of testing methods.

376. NEW APPROACHES TO THE DEVELOPMENT OF POPULATION LEVEL INDICATORS OF BIODIVERSITY. GREGORY, RICHARD D.; van Strien, Arco; Vorisek, Petr; Meyling, Adriaan W. Gmelig; Noble, David G.; Foppen, Ruud P. B.; Gibbons, David W. European Bird Census Council & The Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire SG19 2DL, United Kingdom (RDG, DWG). Statistics Netherlands, PO Box 4000, 2270 JM Voorburg, The Netherlands (AS, AWGM), Czech Society for Ornithology, V Olsinach 449/41, CZ-100 00 Prague 10, Czech Republic. British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU. United Kingdom. SOVON, Rijksstraatweg 178, 6573 DG, Beek-Ubbergen, The Netherlands.

The global pledge to deliver "a significant reduction in the current rate of biodiversity loss by 2010" brings with it a need to measure progress towards the target at global, regional and national levels. Such measurement, however, is problematic because, first, we often lack robust trend information, and second, we lack agreement on adequate summary statistics. We use the example of European birds to show how robust population level indicators can be constructed. We show how multi-species indicators have been developed in a national context using the UK Government's wild bird index. Next, we extend the methods to create multi-species indicators for Europe. Supranational species' indices are constructed by combining the national species' indices weighted by national population sizes. Supranational multi-species indicators are then calculated by averaging the indices on a geometric

scale. We show that common birds living on European farmland have declined steeply over two decades, whereas forest birds have declined slightly, and other common species have increased. The driver of bird declines on farmland is agricultural intensification. Such indicators provide a tangible basis for measuring progress towards the 2010 target for one element of biodiversity and this approach could be usefully extended to other taxa and regions.

377. WHY DID THE TURTLE CROSS THE ROAD? CONSEQUENCES OF HABITAT FRAGMENTATION ON A PAINTED TURTLE POPULATION. GRIFFIN, KATHLEEN. Wildlife Biology Program, University of Montana, 32 Campus Drive, Missoula, MT 59812 USA. kathleen.griffin@umontana.edu.

Highways can affect populations directly through mortality and indirectly through loss of habitat connectivity. Recent studies examining the effects of roads on turtle populations have concluded that ponds adjacent to roads have a male-biased sex ratio as a result of disproportionate road mortality of females due to nesting movements. Additionally, modeling efforts imply that road mortality and movements can create a drain on population persistence. However, too little is known about the frequency and scale of movements to accurately parameterize such models. As part of a mark-recapture project, over 2,200 western painted turtles (*Chrysemys picta bellii*) were marked with a total of 10,200 captures. My results indicate no highway-induced sex-bias is occurring in this population. Eight ponds, both adjacent to and far from the highway, did not vary significantly from an equal sex ratio. Road mortality on 6.5 km of highway averaged 346 individuals a year and did not show a sex-bias. Over 490 individuals moved in the 3 seasons for a total of 686 movements, also with no sex-bias. These data were used to parameterize estimates of abundance and survival to further elucidate consequences of roads on turtle population dynamics and connectivity of the landscape.

378. A PLACE TO LAY THEIR EGGS: TOWARDS A SUSTAINABLE LAND-USE FOR THE THREATENED *Maculinea teleius* AND *M. nausithous* BUTTERFLIES IN CENTRAL EUROPE. GRILL, ANDREA; Cleary, Daniel F. R.; Stettmer, Christian; Settele, Josef. Institut of Zoology, Université de Neuchatel, Rue Emile Argant 11, CH-2000 Neuchatel, Switzerland, andrea.grill@unine.ch.

Human alterations of landscapes rarely promote other species. The case of *Maculinea* butterflies was one of those exceptions. Human land-use created a patchy landscape, increasing the number of *Maculinea* habitats. With the intensification of agriculture, however, *Maculinea* butterflies became extinct or threatened in large parts of Europe. We investigated how different mowing regimes influence the abundance of *M. teleius* and *M. nausithous* butterflies, focusing on their host ants and host plants. Long-term experimental plots with four different mowing regimes were established at three sites where the target species occur: (I) cut twice yearly before the 1st of June and after 1st September, (II) cut once yearly after 1st September, (III) cut every 2nd year, (IV) abandoned. Ant abundance and community composition were recorded as well as abundance of host plants, ground temperature, and vegetation structure and abundance. CCA ordination revealed a) litter cover and b) vertical vegetation cover in 0-10 cm height as the most important factors influencing ant abundance and species composition. Abandonment shifted the species composition of ant communities towards non-host-ant species and influenced host-plant phenology. We conclude that abandonment of agricultural land can be equally destructive as intensification. Conservation of *Maculinea* populations thus requires active management of the sites where they occur.

379. THE VALUE OF DATABASES AND INTERNATIONAL COOPERATION IN INFORMATION. GROSSE, ANDREA; Ziller, Silvia. U.S. Geological Survey, MS 302, National Center, Reston VA 20192, USA (agrosse@usgs.gov) (AG). Instituto Horus, Rua Dr. Manoel Pedro 495/906 Cabral, Curitiba, PR 80.035-030, Brazil (SZ).

Few countries have collected and organized their information and data on invasive alien species, and access to information that does exist is cumbersome. Customized informatics tools to collect and organize information are the first step for countries to deal with biological invasions. In the Americas, information from published and unpublished accounts and databases on invasive species is scattered in locations and formats not easily accessible even to local users. The Invasives Information Network (I3N) of the Inter-American Biodiversity Information Network, sponsored by the United States Department of State and the U. S. Geological Survey, created a distributed network of catalogs of invasivespecies lists, experts, projects and datasets. Software tools to assistwith cataloguing and distributed searching were developed by the U. S. National Biological Information Infrastructure. I3N is composed of in-country information providers working towards the use of common standards. Each provider controls its information, though information is documented and posted in a standard format. The public can search therecords for free from a single Web page. Interest in I3N tools isspreading to countries in Africa and Asia.

380. SCENT-MARKING IN BIRDS: IS THIS ANOTHER ISLAND STORY? GSELL, ANNA C.; Castro, Isabel. Ecology, Institute of Natural Resources, Massey University, Private Bag 11222, Palmerston North, New Zealand, A.C.Gsell@massey.ac.nz (ACG, ICC).

Scent-marking and scenting is rarely reported in birds, even though some bird-species show an unusual large bulbus olfactorius, which indicates a good sense of smell. Furthermore many bird species exude strong smells from glands, excretions and vomit. Results from a survey conducted among bird-specialists showed that phylogenetic relationship correlates with use of scent just as prominently as do factors such as living in colonies, the use of burrows and night activity. We suggest that birds living in locations that originally have been free from olfactory oriented predators or at locations that are difficult to approach like colonies, sea cliffs and rock faces, can afford olfaction for orientation, identification, chemical defence and sexual advertisement. As scents may be cheap by-products of hormones, their suppression might be the expensive trade-off due to the presence of predators. Precolonial New Zealand may serve as a good model for it harbours many scented bird-species, which evolved in the absence of mammalian predators, which are known to use scent to find their prey. We also discuss the existence of avian predators, which use scent to find their prey.

381. SPECIES, HABITATS, AREA AND ISOLATION: EMPIRICAL PATTERNS OF WATERBIRD ASSEMBLAGES IN FRAGMENTED WETLANDS. GUADAGNIN, DEMETRIO L.; Peter, Ângela S.; Perello, Luís F.C.; Stranz, Anamaria; Maltchik, Leonardo. Universidade do Vale do Rio dos

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The Theory of Island Biogeography predicts patterns of species richness according to area and isolation that can rise also either as a random effect or an effect of the increase in microhabitat richness with area. In opposition to true islands, these factors covariate in terrestrial landscapes, leading to complicate causal relationships. We investigated these relationships in 42 wetland fragments in South Brazil. A Path Analysis showed that the direct area effect (standardized coefficient=0.647) is the most important cause of variation in species richness. The total wetland area available in 5x5Km had significant direct effect on species richness (0.13). Isolation and microhabitat richness had no significant effects. The com bined effect of all factors other than area (0.54) is less important than the area effect alone. Larger fragments include most of the microhabitat types and most of the waterbird species, while smaller fragments tend to be homogenous and harbour random subsets of the species pool. Habitat loss in the main driving force of waterbird species loss, although landscape features (habitat availability) also plays a significant role. The active management of habitats and landscape has the potential to alleviate the effect of wetland loss on waterbird assemblages.

382. A NEW INDEX FOR PRIORITIZING SPECIES: THE ENDEMIC FLORA OF CHILEAN DESERT AND MEDITERRANEAN ECOSYSTEM AS EXAMPLE. GUERRERO, PABLO; León-Lobos, Pedro; Marticorena, C. Banco Base de Semillas, INIA, Casilla 73, Vicuña, Chile, pabloguerrero@tie.cl.(PLL) Centro Estudios Avanzados de Zonas Áridas, Casilla 599, La Serena, Chile. (CM) Universidad de Concepción, Casilla 160 - C, Concepción, Chile.

Prioritizing species is a crucial stage in conservation and managing programs, due limited resources and scarce biological information from many species. Mediterranean and desert ecosystems in Chile, a world hotspot, are characterized by the elevated number of endemic plants species (50%), which also are seriously threatened. We prioritized the endemic flora of Mediterranean and desert ecosystems for conservation purposes. We defined an index which weighs the geographic distribution and the phylogenetic uniqueness of species. Distributional range of species was assessed considering the twelve geopolitical division of Chile (regions), added with Isla de Pascua and archipelago Robinson Crusoe (Total = 14). Phylogenetic uniqueness was estimated counting the total number of species and genus of the genera and family of the evaluated specie (we considered exclusively those taxa occurring across Chile). This priority index allows us ranking the 98% (1869) of species, with values ranging from 0.3 (high priority) to 30.5 (low priority). Priority for conservation was higher for species with narrow distributions such species distributed only in one region and for species from mono specific families, compared with species with large distributions and/ or with families with multiple genus and/or species. (Acknowledgement: Millennium Seed Bank Project, Royal Botanic Garden Kew)

383. MECHANISMS FOR CONSERVATION OF PRIVATELY OWNED LANDS IN THE ABSENCE OF GOVERNMENTAL FRAMEWORKS, ARGENTINA. GUNN, ALISON. Fauna & Flora International.

An innovative public-private collaboration is enabling the protection and conservation management of a large tract of privately owned Patagonian landscape. The ecosystem comprises fragile habitats and supports a number of threatened species, including the largest known population of roosting and nesting Andean condors in the region. The landowner is sympathetic to conservation aims and has allowed an innovative land-holding mechanism to effectively secure the 850,000 hectare estate, which borders Los Glaciares National Park in Argentina, for conservation. Fauna & Flora International has headed the development of a sustainable management plan, which is now in its initial stages of implementation via a newly established NGO, la Fundación de la Conservación de la Condor de la Patagonia (FCCP). The aim is to combine species conservation, enforcement and habitat restoration activities, with the sensitive introduction of commercial eco-tourism to the area, in order to provide a sustainable income stream that will support its conservation management. By engaging with a private landowner, building the capacity of a local management entity and creating income through a private venture, this initiative is providing a model of best practice for sustainable land management in the region.

384. NEW POPULATIONS OF THE GREY-SHANKED DOUC LANGURS IN THE CENTRAL HIGHLAND OF VIETNAM. HA, LONG THANG. Wildlife Research Group, Anatomy Department, University of Cambridge, Selwyn College, Grante Street, CB3 9DQ, Cambridge, United Kingdom, tlh28@cam.ac.uk.

A research on distribution of a Vietnam's endemic primate, the grey-shanked douc langurs (*Pygathrix cinerea*) was carried out from $25^{th}$of July to 30^{th} of November, 2004 in Kon Cha Rang natural reserve area, Kon Ka Kinh national park and buffer zone area. The result has show that the grey-shanked douc exist in both the protected forests and in the buffer zone. It is the first time that the grey-shanked douc langur was observed at the elevation of 1400m. The boundary of the species the South Vietnam is much larger than what it has been knew. Confirmation of their distribution go up to the latitude $14^{0}13$'N. The main habitats are primary forest and secondary forest. Forest type is moist evergreen forest (900-1300m). Relative density estimate recorded that 49% of transects was found occurrence of the species. The DNA analys ing pointed out that population of grey-shanked douc langur in Kon Cha Rang genetically close to the populations found in Ba To, Quang Ngai. Main threats to the species are hunting, logging and wildlife trading. Conservation of the grey-shanked douc is challenged by logging activities in the area which supposed to become a corridor between to protected forest.

385. SUDDEN OAK DEATH AND PATTERNS OF TANOAK ACORN PRODUCTION: FEAST BEFORE FAMINE? HADJ-CHIKH, LEILA; Peterson, Ebba; Frangioso, Kerri; Bergemann, Sarah; Fischer, Keyt. Wildlife Conservation Society, 391 Westport Lane, Santa Cruz, CA 95060, USA, lhadjchikh@wcs.org (LH, KF, KF). Division of Physical and Biological Sciences, University of California, Santa Cruz, Santa Cruz, CA 95064, USA (EP). Department of Environmental Science, Policy & Management, Division of Ecosystem Science, University of California, Berkeley, Berkeley, CA 94720, USA (SB).

We conducted studies of acorn production in tanoaks (*Lithocarpus densiflorus*) to understand the potential impact of Sudden Oak Death (*Phytophthora ramorum*) on acorn availability to wildlife. In 2004 we conducted a survey of 333 tanoaks among 17 study sites in the Big Sur region of California. Surveys consisted of 30-sec counts of acorns in the crowns of individual trees. Acorn production was spatially correlated among uninfested sites (Mantel

test; $P < 0.01$) but not among infested sites ($P > 0.05$), suggesting that *P. ramorum* may disrupt patterns of tanoak acorn production. Results from similar surveys in 2003 and 2004 suggested that symptomatic tanoaks can produce unusually large crops of acorns. We hypothesized that girdling by *P. ramorum* cankers may increase reproductive effort in infected trees prior to death. To test this hypothesis, we studied acorn production in uninfected tanoaks that were mechanically girdled. Two observers conducted simultaneous 15-sec visual surveys of acorn production in 20 girdled and 20 ungirdled trees. Acorn counts of mechanically-girdled trees were significantly higher than those of ungirdled trees (Wilcoxon Rank Sum, $P < 0.0001$). These results suggest that infection by *P. ramorum* could theoretically trigger increased acorn production in trees succumbing to the disease.

386. BAT SURVEY IN THE SLOVENSKY RAJ NATIONAL PARK (SLOVAKIA). HAJKOVA, ANDREA; Janeckova, Katarina; Hajkova, Petra; Celuch, Martin; Kanuch, Peter; Hajek, Bedrich; Lehocky, Miroslav. Faculty of Science, Charles University in Prague, Vinicna 7, 128 44 Prague 2, Czech Republic, pipistrelka@pobox.sk (AH). Institute of Vertebrate Biology, AS CR, Kvetna 8, 603 65 Brno, Czech Republic & Department of Zoology and Ecology, Faculty of Science, Masaryk University, Kotlarska 2, 611 37 Brno, Czech Republic (KJ, PH). Department of Forest Protection & Game Management, Technical University in Zvolen, T.G. Masaryka 24, 960 53 Zvolen, Slovakia (MC). Institute of Forest Ecology, SAS, Sturova 2, 960 53 Zvolen, Slovakia (PK). Administration of Slovensky Raj National Park, Letecka 3, 052 01 Spisska Nova Ves, Slovakia (BH, ML).

Slovensky Raj National Park is a karst area with high number of caves and underground spaces, as well as many suitable buildings in surroundings. It is one of the most important habitats for bats within the country. The aim of the project was to assess species composition, abundance and distribution of bats in the S lovensky Raj National Park, evaluate current and potential threats to bat populations, and increase public awareness and support for bat conservation. The area was surveyed with an ultrasound bat detector and by checking of the buildings in the summer, mistnetting in the summer and autumn, and cave checking in the winter. Together, occurrence of 18 bat species was discovered. The most significant hibernating sites and maternal colonies were identified. Data obtained, together with data on current and potential threats, were used for the proposing conservation measures. Within the project, many educational activities were done, including providing information, lectures and training, and cooperation with local media.

387. CONSERVATION GENETICS OF EURASIAN OTTERS (*Lutra lutra*): NON-INVASIVE GENETIC SAMPLING AND MICROSATELLITE DNA VARIABILITY. HAJKOVA, PETRA; Bryja, Josef; Zemanova, Barbora; Hajek, Bedrich; Roche, Kevin; Zima, Jan. Institute of Vertebrate Biology, Academy of Sciences of the Czech Republic, Kvetna 8, 603 65 Brno, Czech Republic (PH, JB, BZ, JZ). Department of Zoology and Ecology, Faculty of Science, Masaryk University, Kotlarska 2, 611 37 Brno, Czech Republic (PH, JB, BZ). Administration of the Slovensky Raj National Park, Letecka 3, 052 01 Spisska Nova Ves, Slovak Republic (BH). Czech Otter Foundation Fund, P.O. Box 53, Trebon, Czech Republic (KR).

Many basic parameters of Eurasian otter (*Lutra lutra*) populations, important for successful conservation management, are still not fully understood. Otters are elusive animals, and spraints (otter faeces) often represent the only available biological material. The project aims to assess otter population size and structure in two different habitats in the Czech and Slovak Republics by a non-invasive genetic typing of spraints. Using microsatellite and SRY markers, the method can provide identification of individuals, their sex and relatedness, estimates of popula tion size, and the level of genetic polymorphism, all without direct contact with animals. The first phase of the project included testing and optimization of the method. The success rate of analysis was significantly increased (50-70% comparing with 20-30% from previous studies). To date, 11 otter individuals (eight males and three females) were identified from first study area. Some individuals were recorded several times, providing information on their movement and spatial distribution. Second part of the project was analysis of genetic diversity and population genetic structure of Czech and Slovak otter subpopulations, using tissue samples from carcasses. No evidence for increased level of inbreeding in subpopulations was found; however, moderate genetic differentiation of subpopulations indicates existence of a gene flow barrier.

388. SUSCEPTIBILITY OF NATIVE AMPHIBIANS TO CHYTRIDIOMYCOSIS IN THE VENEZUELAN ANDES. HAN, BARBARA A.; Nava, Francisco; La Marca, Enrique; Lampo, Margarita; Blaustein, Andrew R. Oregon State University 3029 Cordley Hall Corvallis, OR 97331 USA (BAH, ARB) hanba@science.oregonstate.edu. Universidad de Los Andes, Departamento de Geografía, Mérida, Venezuela (FN, EL). Instituto Venezolano de Investigaciones Científicas, Departamento de Ecología, Km 11 carretera Panamericana, Caracas 1020-A Venezuela (ML).

Amphibian chytridiomycosis is a globally emerging infectious disease of amphibians. Following the recent identification of the fungal pathogen *Batrachochytrium dendrobatidis* in Venezuela the numbers of species affected by chytridiomycosis and the rate of spread remain without estimate. The presence of an invasive disease vector, the American bullfrog (*Rana catesbeiana*), and high amphibian biodiversity in this region combine to present a significant conservation concern. We inoculated tadpoles of five native anurans (*Hyla crepitans*, *Hyla meri densis*, *Bufo marinus*, *Mannophryne collaris* and *Physalaemus pustulosus*) in the laboratory to quantitatively characterize chytridiomycosis using time to metamorphosis, infection severity, and mortality to assess potential disease concern in these species. These species exhibit various altitudinal ranges, and *Hyla meridensis* is sympatric with American bullfrogs. We present evidence that species ecology may play a significant role in the disease ecology of chytridiomycosis in this region, and cosmopolitan and low elevation species exhibit lower susceptibility to chytridiomycosis. This study presents the first assessment of chytridiomycosis risk to native species of the Venezuelan Andes.

389. EFFECTS OF FOREST FRAGMENTATION ON BEHAVIOUR AND POPULATION- ECOLOGY OF SELECTED BIRD SPECIES OF THE MATA ATLÂNTICA IN THE STATE OF SÃO PAULO. HANSBAUER, MIRIAM MELANIE; Storch, Ilse; Pimentel, Rafael; Metzger, Jean Paul; Leu, Stephan; Borntraeger, Robert; Nieto Holguin, Juan; Hettich, Ulf. Wildlife Research and Management Unit, Munich

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Deforestation proceeds rapidly due to urban development and agriculture, and is therefore a major challenge for biodiversity conservation - worldwide, as well as in the Brazilian Atlantic Rainforest. The objective of our study is to assess how forest fragmentation and landscape features affect the movements of different forest bird species, since survival of forest birds may partly depend on the species' ability to move between fragments. In the fragmented area of Caucaia (Cotia, SP) we use radio telemetry on three forest bird species: *Chiroxiphia caudata* (Pipridae), *Pyriglena leucoptera* (Thaminophilidae) and *Sclerurus scansor* (Furnariidae). The position and hence movements of tagged individuals are documented. Vegetation structure related to individual bird occurrence is analysed to see habitat preferences. The birds used areas of about 7 ha (*C. caudata*), 15 ha (*P. leucoptera*), and 11 ha (*S. scansor*). Results are preliminary and do not yet allow conclusions regarding bird response to fragmentation. All results will be analysed in a landscape context to see, if fragment size, vegetation structure within the fragments, connectivity of the fragments, matrix structure, or forest cover within the landscape have an influence on bird behaviour. This will contribute to optimising landscape planning for maintaining biodiversity within fragmented forest landscapes of the Mata Atlântica.

390. PLANTS IN THE HOOD: NEIGHBOURING VEGETATION STRUCTURE AFFECTS REPRODUCTION OF A DECLINING ENDEMIC ISLAND PLANT VIA ITS LIZARD POLLINATOR. HANSEN, DENNIS M.; Kiesbüy, Heine C.; Jones, Carl G.; Müller, Christine B. Institute of Environmental Sciences, University of Zurich, Winterthurerstrasse 190, 8057 Zurich, Switzerland (DMH, HCK, CBM), dhansen@uwinst.unizh.ch (DMH) Mauritian Wildlife Foundation, Grannum Road, Vacoas, Mauritius (CGJ).

Experimental work on indirect interactions between three or more species has focussed on negative effects that are mainly mediated by natural enemies. It is, however, equally possible that neighbouring species in a community affect each other positively. We studied the reproduction of the declining endemic plant *Trochetia blackburniana* (Malvaceae) on the island of Mauritius. This plant is pollinated by an endemic diurnal gecko, *Phelsuma cepediana*. Observations revealed a significantly higher gecko visitation rate and subsequently higher fruitset in *Trochetia* plants growing close to patches of *Pandanus* spp., a preferred microhabitat for the *Phelsuma* geckos. Exclusion experiments confirmed that *Pandanus* patches have a strong positive effect on the reproductive perfomance of *T. blackburniana*. If both plants occur close together in the field, the fruit set of *Trochetia* is significantly increased when geckos are allowed access to the flowers. Our results are especially relevant for endangered island plants, as lizard pollination has recently been shown to be largely an island phenomenon. The overall message for conservation biology is clear: rare endemic species cannot be rescued without considering a wider community context.

391. CONSERVING BIODIVERSITY IN AGRICULTURAL LANDSCAPES: A MULTI-TAXA ASSESSMENT OF THE CONSERVATION VALUE OF DIFFERENT AGRICULTURAL AND FOREST HABITATS. HARVEY, CELIA A.; Saenz, Joel C.; Montero, Jorge; Medina, Arnulfo; Sánchez, Dalia; Vílchez, Sergio; Hernández, Blas; González, Jorge; Sinclair, Ferg L. Department of Agriculture and Agroforestry, CATIE, Turrialba, Costa Rica, charvey@catie.ac.cr (CH), Programa Regional en Manejo de Vida Silvestre para Mesoamérica y el Caribe, Universidad Nacional, jsaenz@una.ac.cr (JS, JM, JG), Fundacion Cocibolca, Managua, Nicaragua dsanchez@catie.ac.cr (DS, AM, SV, BS), University of Wales, Bangor, Wales (FLS).

Most landscapes within Central America consist of complex mosaics of small forest patches, pastures, crops and other land uses. Although these highly modified landscapes are commonly viewed as biological wastelands, they often retain a conspicuous on-farm tree cover which may provide habitats, resources, and landscape connectivity for both plant and animal communities and thereby help maintain biodiversity. We explored the importance of six types of on-farm tree cover (forest patches, riparian forests, fallows, live fences, and pastures with different densities of trees) for the conservation of birds, bats, dung beetles and butterflies in 4 agricultural landscapes (two in Nicaragua and two in Costa Rica). Identical methods were employed in each landscape to allow cross-site comparisons. In total more than 50,000 dung beetles, 14,000 trees, 12,000 birds, 9,000 bats, and nearly 3,000 butterflies were registered. Individual types of tree cover varied in their ability to conserve biodiversity, but these patterns varied both across taxa and across the four landscapes studied. Our study suggests that on-farm tree cover can play an important role in conservation of biodiversity, but that the value of this tree cover will depend on the particular taxa of interest and in the way that farmers manage this tree cover.

392. FRAGMENTATION AND THE ROLE OF CONSERVATION UNITS IN BIODIVERSITY CONSERVATION. HASS, ADRIANI; Braz, Vivian da Silva; Cavalcanti, Roberto B. Departamento de Zoologia, Universidade de Brasília, 70910-900 Brasília, DF, Brazil.

Fragmentation in the cerrado region is known to produce significant species losses at the local level. Data from islands formed by the flooding of the Serra da Mesa Reservoir on the Tocantins River demonstrated 30-46% disappeareance of bird species within 3 years of isolation. Existing remnants of natural habitat in the region cannot be assumed to be sufficient to protect the native biota. The maintenance of biodiversity in the cerrado requires a well designed system of protected areas that provide both coverage of all species and furnish the means for their survival. The contribution of existing protected areas to the conservation of endemic and endangered cerrado bird species has been studied at various levels. Some parks are the only location for given species (P. N. Emas for *Caprimulgus candicans*) and are irreplaceable. Overall, 21 parks of the Cerrado larger than 10,000 hectares harbor 85% of the regional avifauna, including 97% of the endemics and 80% of the endangered birds. Land conversion of the Cerrado continues unabated, and it is expected to increase the importance of the protected areas as a the last stand for cerrado species.

393. THE IMPORTANCE OF COMPLEMENTARY FRUITING PHENOLOGY ON HABITAT PATCHES FOR FRUGIVOROUS BIRD SPECIES IN THE ATLANTIC FOREST, BRAZIL. HASUI, ÉRICA; Gomes, Verônica S. M.; Silva, Wesley R.; Trigo, José Roberto; Tamashiro, Jorge. Graduate Program in Ecology, Departamento de Zoologia, IB, Universidade Estadual de Campinas, CP 6109, 13083-970 Campinas, SP, Brazil, ericahasui@yahoo.com (EH); Graduate Program in Ecology, Departamento de Ecologia, CCS, IB, UFRJ, CP 68020, 21941-540 Rio de Janeiro, RJ, Brazil (VSMG); Laboratório de Interações Vertebrados-Plantas, Depto de Zoologia, IB, Universidade Estadual de Campinas, CP 6109, 13083-970 Campinas, SP, Brazil (WRS); Laboratório de Ecologia Química, Depto de Zoologia, IB, Universidade Estadual de Campinas, CP 6109, 13083-970 Campinas, SP, Brazil (JRT); Departamento de Botânica, IB, Universidade Estadual de Campinas, Campinas, SP, Brazil (JT).

Landscape-level changes in fruit quantity and quality may represent constant availability of food resources for frugivorous animals that may track assynchronous fruit peaks. To investigate spatio-temporal patterns of fruit availability and consumption by birds, fruit traits and production were compared with patterns of capture of frugivorous birds in four habitats in the Atlantic Forest (Secondary Forest-SF, Valley Bottom-VB, Middle Slope-MS and Hilltop-HT) sampled during 12 months each. Birds preferring large fruits (>1mm) were correlated to biomass of understory large fruits in time (R^2=0.16, P =0.005) and in space, being more captured in VB (F=8.49, P <0.05), where biomass of those fruits was greatest (F=26.88, P <0.05). From the six most abundant bird species, two showed significant positive correlat ions with nutritional traits: *Mionectes rufiventris* with insoluble sugar (R^2=0.15, P =0.03) and *Schiffornis virescens* with lipids (R^2=0.19, P= 0.009). So far, those are the only clear relationships found among fruit traits and frugivorous birds. However, sequential peaks of fruit and nutrient availability were observed among the four areas, suggesting interesting patterns of differential spatial and temporal resource availability for frugivorous animals that might be preserved only if they are not isolated from the resources in the mosaic of the landscape. Support: BIOTA/FAPESP Program, FAPESP and CNPq (scholarships).

394. PERPECTIVES FOR INDIGENOUS RESOURCE MANAGEMENT, LANDSCAPE, AND CONSERVATION IN THE SOUTHERN AMAZON, BRAZIL. HECKENBERGER, MICHAEL. Department of Anthropology, University of Florida, Turlington Hall, PO Box 117305, Gainesville, Florida 32611-7305, USA, kaiaiam@aol.com.

Recent participatory research on indigenous history (AD 1000-2000) in the Xingu Indigenous Park, Mato Grosso Brazil, is summarized and includes archaeology, oral history, and analysis of satellite imagery. The findings suggest a very complicated history of indigenous groups in this protected area, including substantial evidence of indigenous alteration of the forest and local environments around large settlements. This area is particularly relevant to current discussions of conservation and indigenous peoples not only because of the unexpected scale of pre-Columbian occupations, the continuity of indigenous groups through the present, or the degree of landscape alteration documented in the research, but also as on e of the few areas of the southern Amazonia periphery in Brazil where mechanized agriculture or ranching have not destroyed large tracts of forest. This talk touches on issues of indigenous cultural and property rights, as well as participatory research strategies to develop relevant perspectives on landscape, resource management, and conservation over the long term.

395. ON THE IMPLEMENTATION OF THE RAMSAR CONVENTION IN NEPAL AND ITS IMPLICATIONS FOR REGIONAL WATERFOWL CONSERVATION. HEINEN, JOEL T.; Sah, Jay P. Department of Environmental Studies, 11200 SW Eighth Street, Florida International University, Miami, FL, 33199, USA.

The 1971 Convention on Wetlands of International Importance, especially for Waterfowl Conservation (Ramsar) is important from several standpoints. It is the oldest international conservation convention and it is the only one that protects one general ecosystem type. Ramsar provides signatory nations with general and specific guidelines for conserving and managing wetlands resources and their associated wildlife. Here we consider the implementation of Ramsar within Nepal, a Party since 1987, based on the country's national policy that came into force in 2003. The most important site in Nepal is Koshi Tappu Wildlife Reserve, which contains: 1) habitat for the last Nepalese population of wild buffalo, 2) over-wintering habitat for many waterfowl and, 3) stopover habitat for many shorebirds. Koshi Tappu is also threats of encroachment. We conclude that the policy is well drafted based on legal requirements of Ramsar and policy directives from the Convention Bureau. Gaps in implementation are local and include: 1) jurisdictional issues among agencies, 2) less protection due to the Maoist insurrection and, 3) weak structures for fostering participatory management regimes. We discuss these issues with focus on migratory bird conservation and the implications that these gaps may have.

396. MEETING INDONESIA'S CAPACITY BUILDING NEEDS THROUGH A COLLABORATIVE FRAMEWORK: THE CONSERVATION TRAINING AND RESOURCE CENTER. Helvoort, Bas van; SUDIBYO,; Brickle, Nick. Conservation Training and Resource Center, SEAMEO-BIOTROP, Applied Biology Building, 2 nd floor, Jl. Raya Tajur km 6, Bogor, Indonesia, sudibyo@ctrc.or.id (BvH, S). Wildlife Conservation Society - Indonesia Program, Jl. Pangrango 8, Bogor 16151, Indonesia (NB).

Indonesia lacks sufficient capacity in biodiversity conservation management because 1) protected areas increased from 3 million hectares in 1974 to 23.1 million hectares in 2001, 2) since 2001, devolvement of government to lower levels increased the need for skilled practitioners and leaders beyond the central government, and beyond the 'classical' target groups of park managers and rangers: where biodiversity is highest, local capacity to undertake conservation is usually least developed, and 3) since 1998, when *reformasi* and *demokrasi* gained momentum and stirred demand for good governance, a plethora of mostly local NGOs and grass-root community groups were finally accepted as legitimate stakeholders. The three developments not only dramatically increased the number of individual and institutional stakeholders but also profoundly changed *the nature* of the skills and knowledge required to manage biodiversity sustainably and equitably. Therefore, in 2003, ten government and non-government organizations established the Conservation Training and Resource Centre (CTRC) in Indonesia as a partnership. The Center's mission is to work in partnership to deliver training, share information, and create an enabling environment for conservation capacity building at all levels of the state, civil society, and private sectors in Indonesia, envisioning that indigenous capacity in biodiversity conservation will effectively manage Indonesia's biodiversity sustainably

and equitably for its future much more so than externally-driven and -based efforts.

397. ON THE USE OF PHOTOGRAPHIC RATES TO ESTIMATE DENSITIES OF CRYPTIC MAMMALS: EVIDENCE FROM A STUDY ON AFRICAN LEOPARDS. HENSCHEL, PHILIPP; Ray, Justina. Wildlife Conservation Society, Gabon Program, B.P. 7847, Libreville, Gabon; phenschel@wcsgabon.org.

Camera trapping techniques have already been shown to be an effective means of making mark-recapture estimates of individually identifiable large carnivores. More recently, it has been suggested for tigers that the number of camera days/tiger photograph correlates with independent estimates of tiger density, and the use of a calibrated index was proposed to estimate densities of tigers and other cryptic mammals based on photographic rates. This approach has received some criticism lately, and one of the points raised was that site-specific detection probabilities cannot be accounted for by a calibrated index, hence greater uncertainty arises in estimates of density. In our study on leopards in the African rainforest we found no strong correlation between photographic rates and the actual number of individual leopards identified in an area. The major factor dictating leopard capture probability in a given area seems to be the availability of travel routes. To test this hypothesis we estimated trail density in every study site and found a strong correlation between photographic rate for leopards and trail density. In areas with relatively low trail density leopards have fewer choices for their travel, and capture probability, and hence capture rates, was found to increase along these trails.

398. FORAGING-BASED MODELS AS TOOLS IN WADER CONSERVATION AND MANAGEMENT. HERNANDEZ, DANIEL; Drake, David. Department of Ecology, Evolution & Natural Resources, Cook College, Rutgers University, New Brunswick, NJ 08901, USA, captdan@rci.rutgers.edu (DH, DD).

The red knot (*Calidris canutus*) and several other wader species have suffered drastic declines in Delaware Bay (USA), a critical staging area for many migratory waders, recently. The declines are thought to have been precipitated by a reduction in their main prey source, horseshoe crab (*Limulus polyphemus*) eggs and increased competition for this resource by other birds, such as gulls. Many of the waders which stop-over on the Bay depend on the eggs for acquiring the necessary fat reserves in order to make it to Arctic breeding grounds. The objective of the study was to create foraging-based models for each wader species, to be used in a comprehensive management/recovery plan. Data were collected on various foraging metrics and behavioral interactions for individual waders using video. Concurrent measurements of prey density and environmental characteristics were also obtained from the foraging area. Candidate models were tested using Bayesian statistical m ethods. Results suggest that a viable management framework for the recovery of wader species can be attained by using foraging-based models. General management priorities are presented along with specific recommendations for target egg densities on Delaware Bay beaches.

399. THE GREAT CHALLENGE OF DEVELOPMENT AND CONSERVATION: PARASITES THAT CROSS INFECT WILDLIFE AND DOMESTIC ANIMALS. HERRERA, HEITOR M.; Paes, Rita C. S.; Oliveira, Jakeline M. A.; Jansen, Ana M. Departamento de Protozoologia, Instituto Oswaldo Cruz, Fundação Oswaldo Cruz/FIOCRUZ. Av Brasil 4365, Rio de Janeiro Brazil, 21040-900 (herrera@ioc.fiocruz.br; mailto:herrera@ioc.fiocruz.br) (HMH, AMJ); Agência Estadual de Defesa Sanitária Animal e Vegetal de Mato Grosso do Sul. Av Senador Felinto Müller 1146, Bairro Universitário, Campo Grande/MS, 79 074-902, Brazil (RCSP, JMA).

Wildlife/livestock parasites interface may be a great problem in areas where livestock and wildlife share same habitats due to the difficulty in define and execute diseases control strategies. The economy of Brazilian Pantanal is essentially based on cattle ranches. This region presents a huge diversity of mammalian with abundant populations. Its seasonality favor the contact between infected and susceptible hosts. Here we searched infections by parasites that infect both domestic and wild animals. We found: high *T. evansi* prevalences in wild (coatis, capybaras, small mammals, bats, feral pigs, white-lipped peccary and collared peccary) and domestic (bovines, equines, buffaloes and dogs) mammals; *T. vivax*. infections in wild bovines (50%) and buffaloes (34%), pampas deer (88%) and sheep (37%); serum prevalence for Foot and Mouth Disease in free-ranging bovines (69%) and buffaloes (79%), feral pigs (20%), domestic pigs (35%) and sheep (42%). White-lipped peccary showed Brucelosis (7%). Feral pig was found infected by *T. cruzi* (28%) and Aujeszky's disease (70%). The large diversity of multihost parasites found in Pantanal and the necessity of developing and conserving this hotspot area turns fundamental a long termed surveillance besides local control strategies that do not threaten the land-use options and local biodiversity.

400. THERE'S AN ELK IN MY GARDEN! PERCEPTIONS REGARDING ELK AND ELK MANAGEMENT IN NORTHERN ARIZONA. HEYDLAUFF, ANDREA; Krausman, Paul; Shaw, William; Marsh, Stuart. University of Arizona, School of Renewable Natural Resources, 325 Biological Sciences East, Tucson, AZ 85721 (AH, PK, WS). Univ. of Arizona, Office of Arid Lands Studies, 1955 E. 6th Street, Tucson, AZ 85719, USA (SM).

Since 1970 controversy has surrounded the status and management of the elk population (*Cervus elaphus*) in northern Arizona. Concerns have focused on the effects of elk on private and public land, the size of the elk population, interactions between elk and cattle, and interactions between elk and humans. In 2001 we conducted a mail questionnaire to document perceptions of the general public, ranchers, and natural resource agency personnel regarding elk and elk management in northern Arizona, and to compare these responses among the 3 groups. Significant differences in perceptions of elk and elk management existed between ranchers and the public. The majority of the general public did not experience any conflicts with elk. The public knew little about elk management in Arizona and indicated that they wanted more information about the issue. Rancher's incurred monetary losses due to elk related damage and most did not believe elk were important to Arizona because they viewed Rocky Mountain elk as a nonnative species. Importantly, we documented similarities between ranchers and agencies as to the effects of elk seen on rancher's property. This common ground provides a needed platform for discussion and communication to occur among the resource agencies, ranchers, and general public.

401. THE EVOLUTION OF PRIDE: SOCIAL MARKETING AS A TOOL FOR COMMUNITY CONSERVATION. Hill, Megan; Butler, Paul; MANZANERO, RAFAEL. Rare, 1840 Wilson Blvd, Ste 204, Arlington, VA 22201;

mhill@rareconservation.org.

Conservationists increasingly recognize the human role in biodiversity conservation. In this paper we will discuss the evolution of a community outreach program that harnesses a basic human emotion-pride-to catalyze action and build constituencies for conservation. Using marketing techniques drawn from the business world to change attitudes and behavior towards environmental conservation, Pride uses fun, compelling activities to communicate positive environmental messages to an identified target audience. Born on the Caribbean island of St. Lucia where it is credited with saving the St. Lucia Parrot from extinction, we will discuss how the program works, how it reduces threats, and how it has evolved over the course of replication at over 62 sites around the world. The program now includes a university diploma component that provides the incentive of an academic degree to successful campaign implementation; a participatory methodology for community participation and detailed campaign planning process; as well as a thorough evaluation and learning program that is collecting and analyzing data to create a predictive model for campaign success. Now conducted at two university training centers, the program is expanding and building capacity for conservation in all of the world's major languages.

402. QUANTIFYING GECKO BEHAVIOURAL CHANGES INDUCED BY INVASIVE PREDATORS. HOARE, JOANNE M.; Russell, J. C.; Nelson, Nicola J.; Daugherty, Charles H. School of Biological Sciences, Victoria University of Wellington, P O Box 600, Wellington, New Zealand, joanne.hoare@vuw.ac.nz.

After an 80 my history of isolation from predatory mammals, New Zealand reptiles came into contact with Pacific rats (*Rattus exulans*) when Polynesian voyagers arrived c. 200 AD. The consequences of Pacific rat and subsequent mammalian introductions have been catastrophic for native reptiles, as evidenced by extinctions, severe range restrictions and population declines. In order to quantify behavioural consequences of mammalian predation pressure, we investigated spatial and temporal movement patterns of endemic New Zealand geckos (*Hoplodactylus* spp.) in the presence and absence of introduced Pacific rats. Geckos were located hourly by radio telemetry over a five day period on both Ohinau (Pacific rats present) and Ohinauiti (mammal-free) Islands in the summer of 2004/5. Rat movement patterns were monitored by tracking rats using cotton spooling on Ohinau Island, and compared with those of the geckos. Preliminary data show that spatial shifts in gecko habitat use have occurred following mammalian introductions. Changes in lizard habitat use may be enabling the coexistence of some species with mammals. However, continuing population declines suggest that, despite lizard behavioural changes, K-selected life history traits coupled with high rates of mammalian predation may leave many New Zealand lizard populations vulnerable to extinction.

403. INCREASING THE ELASTICITY OF CONSERVATION FUNDING: HOW FAR DOES MONEY "STRETCH" FROM WHERE IT IS RAISED TO WHERE IT IS SPENT? HOEKSTRA, JONATHAN M.; Sanjayan, M.; Boucher, Timothy M. The Nature Conservancy, Global Priorities Group, 217 Pine St., Suite 1100, Seattle, WA 98101 USA (JH), jhoekstra@tnc.org. The Nature Conservancy, Global Priorities Group, 4245 N. Fairfax Drive, Suite 100, Arlington, VA 22203 USA (TB, MS).

Conservationists have been long obsessed with determining where best to conserve nature. Despite the scientific rigor of these various priority-setting exercises, critics have pointed out that the allocation of conservation funding does not seem to match the biological priorities. A significant challenge for conservation organizations is to direct donations raised in one place to support work in far away places. Conservation - like politics - is local, and so there is an inertia to spend money close to home. Understanding how far money can be "stretched" from where it was raised to where it is spent, and identifying factors that make donations more or less "elastic" is essential to improving funding for global conservation priorities. To estimate a benchmark for just how far money may need to "stretch" to address global conservation priorities, we compare the distribution of global conservation priorities to global concentrations of wealth. We then examine a time series of data on major donations to The Nature Conservancy to identify incentives and strategies that have helped a predominantly U. S.-based organization support more international conservation. Our findings suggest ways to make conservation funding more elastic so that money can be directed more efficiently to the field.

404. ENVIRONMENTAL ENRICHMENT AND WELFARE MEASURING AS A TOOL FOR CONSERVATION EX SITTU. HOHENDORFF, RAQUEL VON; Carissimi, André Silva; Both, Maria do Carmo; Giacomini, Claudio; Furlaneto, Daiana S.; Silva, Moira Ansolch. Parque Zoológico do Rio Grande do Sul, Seção de Veterinária, Fundação Zoobotânica RS, Br 116 Parada 41, Sapucaia do Sul, RS, Brasil, 93212-220, vetraq@terra.com.br.

Environmental enrichment increases reproductive taxes and corrects behavioral deficiencies of captive animals that could be useful in conservation processes. The development of non invasive techniques for measuring stress ex sittu assists the work in sittu. The fecal streoid hormones are useful to measure stress, however validations are necessary for each species. In RS Zoo, alimentary enviromental enrichment for howler monkeys (*Alouatta* spp) was applied. Behavioral analysis were performed to assessment animal well being and we checked the potential use of the fecal dosage of corticos terona to meansure stress. There was three experimental phases where was offered to the animals vegetable leaves that are part of their wild diet. Throughout 105 days, were made behavior observation by focal animal continual method of six animals with sessions of 30 minutes daily. Twice a week, we collected first excrements of the day, for dosage of corticosterona by radioimmunoassay (30 samples per animal). The behavioral results suggest that the techniques are safe and functional (increase the species-specific behaviors and reduce the non adaptatives). The findings of fecal corticosterone not demonstrate significant difference, being necessary further studies.

405. EARTHWORM INVASION IS EXTENSIVE AND REDUCES PLANT DIVERSITY IN HARDWOOD FORESTS OF THE WESTERN GREAT LAKES (USA). HOLDSWORTH, ANDREW R.; Frelich, Lee E.; Reich, Peter B. Conservation Biology Graduate Program, University of Minnesota, Twin Cities, St. Paul, MN, USA, hold0094@umn.edu.

Invasive earthworms can cause significant declines in the abundance and diversity of forest herbs in temperate forests previously devoid of earthworms. However, our understanding of the landscape extent and effects of earthworm invasion and the native species most threatened by it is limited. We conducted a regional survey of invasive earthworms, plants, and soils on 291

plots of mature northern hardwood forests in two national forests of the western Great Lakes (U. S. A.). Using relationships between earthworm presence, habitat characteristics, and likely earthworm introduction points, we created a predictive model of invasive earthworm presence to map the extent of earthworm invasion and identify likely uninvaded areas. Earthworm presence is significantly related to soil texture and pH, tree basal area, and distance to roads, trails, cabins, lakeshores, and streams, but relationships and extent of invasion vary by earthworm species and national forest. *Lumbricus* species had a significantly negative effect on native plant species diversity. The abundance of over half of all plant species was negatively correlated with *Lumbricus* invasion. While invasion is extensive, our results identify earthworm-free areas where prevention of introductions should be focused and earthworm-sensitive herbs whose conservation status should be monitored closely.

406. BEYOND RESERVE SELECTION: INTEGRATING SYSTEMATIC CONSERVATION PLANNING PRINCIPLES INTO THE SPATIAL MANAGEMENT OF NATIONAL PARKS IN SOUTH AFRICA. HOLNESS, STEPHEN. South African National Parks, Arid Ecosystems Research Unit, PO Box 20419, Humewood, 6013, Port Elizabeth, South Africa.

Systematic conservation planning exercises often end with the selection of parcels of land for incorporation into protected areas. Once areas are incorporated within reserves they are considered to be conserved. However, within our current conservation paradigm protected areas are required to pay their way, which implies tourist and management access and infrastructure. The identification of use zones provides a powerful tool for spatially controlling development and management activity both strategically (e. g. new facilities) and operationally (e. g. vehicle access). This paper presents an overview of the landscape analysis process that SANParks is implementing within National Parks. The SANParks zoning is underpinned by examination of the landscapes' underlying biodiversity, heritage and aesthetic characteristics. "Sensitivity-value analysis" integrates systematic conservation planning with traditional site analysis. The approach attempts to bridge the divide between science and management. The suitability of an area for a particular type of development is seen to be a combination of its value (i. e. contribution to the national conservation estate) and its sensitivity (i. e. the vulnerability to disturbance). The paper outlines how we have attempted to combine biodiversity value, biodiversity sensitivity, aesthetics and heritage attributes at a landscape scale into an analysis useful for appropriate park management.

407. DYNAMICS OF THE OCCUPATION OF AMAZON FLOODPLAINS. HOMMA, ALFREDO KINGO OYAMA. Embrapa Amazônia Oriental, Tavessa Eneás Pinheiro, s/n, Bairro Marco, CEP 66095-100 Belém, Pará, Brasil, homma@cpatu.embrapa.br.

The pre-Colombian population that inhabited the floodplains, estimated in 950 thousand natives, was sustainable. The European occupation, starting with the foundation of Belém (1616), promoted the use and the destruction of the natural resources, forming cycles: cocoa, rubber, rosewood, jute, wood, fishes, livestock, açaí fruit. The rivers allowed the penetration and the consolidation of the Brazilian nationality, the improvement of the navigation and, more recently, the interconnection with the upland and serving as drainage for ores and soy, industrialized products from the Manaus, generation of energy, hydro ways. In spite of the relativity of the "floodplain civilization" in relation to the "upland civilization", the growth of cities as Iquitos, Manaus, Belém, Santarém, of the tourist flow, the deforestation in the headwaters and margins, in the neighboring countries and in the savannas, the release of the urban and industrial dejects, gold fields, extraction of petroleum, fishing pressure, public insecurity, they constitute future risks, as source of water and of biodiversity. Even the management activities can represent risks if spread in wide scale in the floodplains. The problems of the floodplain are not independent, being connected with national problems, justifying the formation of a condominium of the countries of the Amazon basin.

408. COST-BENEFIT ANALYSIS OF ECOLOGICAL (DISK PLOWING) TILLING VS. THE TRADITIONAL METHOD FOR CREATION OF NEW PASTURE-LAND IN THE TROPICS. Hoogesteijn, Almira L.; MONTEIRO, JOSE LEMOS. Wildlife Conservation Society, Jaguar Conservation Program, Ranchers Outreach Program, Rua Cayova 353, Barrio Chacara Vendas, Campo Grande, Mato Grosso do Sul 79003-150, ahoogesteyn@wcs.org (AH) Fazenda Bandeirantes, Aquidauana, MS, Brazil (JLM).

The costs and benefits associated with traditional and ecological tilling in the tropics was compared in one Brazilian ranch in Pantanal. Production data of the same ranch, before and after introduction of disk plowing that conserves original flora, allowed the gathering of data on pastureland formation costs, flora conservation, livestock production and cattle predation. Traditional tillage resulted in: 1) 29% additional tractor hours/hectare (ha) of soil preparation, 2) additional half hour/ha for planting, 2) increase of 1.75 - 2.5 kg/ha of seeds needed, 3) loss of soil nutrients, and 4) non-significant (5%) increased in cattle carrying capacity (kg/ha). Ecological practices resulted in: 1) 25% increased parturition, 2) over 3-fold increased number of finished heads sent to the slaughter house, 3) conservation of the original flora and fauna, and 5) absence of cattle mortality due to predators. Ecological tilling is compatible with flora and fauna conservation as well as increased economic livestock benefits.

409. ADVANTAGES OF WATER BUFFALOES OVER CATTLE WHEN AFFECTED BY LARGE FELINE PREDATION, A SOLUTION FOR RANCHERS IN FLOODED SAVANNAS IN SOUTH AMERICA. Hoogesteijn, Rafael J.; HOOGESTEIJN, ALMIRA L. Wildlife Conservation Society, Jaguar Conservation Program, Ranchers Outreach Program, Rua Cayova 353, Barrio Chacara Vendas, Campo Grande Mato Grosso do Sul 79003-150, Brazil, ahoogesteyn@wcs.org (ALH) Productora Hernandez S.A. Hato Merecure, Apure Venezuela (RJH).

Jaguar conservation in South America depends mainly on two factors, habitat destruction and ranchers tolerance to the felines. Water Buffalo (*Bubalus bubalis*) and bovine mortality associated with wild predators (*Panthera onca* and *Puma concolor*) were evaluated in three Venezuelan ranches with a cross-sectional and observational study. The number of killed cows (as percentage of all animals at risk) was significantly lower than that of buffaloes in all ranches ($P \leq 0.03$, X^2 test). Defensive behaviors, observed in buffaloes but not in bovines, supported these findings. It is suggested that cattle mortality due to large feline predators may be reduced when the species being raised is buffalo. We suggest that higher productivity and defensive behavior should make buffaloes, the livestock of choice in areas with severe jaguar and puma predation problems and flooded savanna conditions.

410. HISTORICAL COLLECTIONS AND CONSERVATION PLANNING IN AMAZONIAN PLANTS. HOPKINS, MICHAEL; Filer, Denis; Martins-da-Silva, Regina. Embrapa Amazonia Oriental, Belém, Pará, Brazil and University of Oxford, UK.

Sound conservation planning should be based on good knowledge of species distributions. For Amazonian plants this knowledge is inadequate due to inadequate collection density and coverage. Models suggest that many rare species have yet to be collected. Modeling of species distributions could help, but inadequate georeferencing of historical collections makes modeling of actual distributions difficult. Comparative accuracy of scaling of environmental variables and biological data is essential. In this paper we illustrate a two step georeferencing system for Amazonian plants, using images form various sources: herbarium sheets, literature and notebooks. Using the data-base system BRAHMS, the rough estimate of location can be more accurately plotted using various types of images of maps. The consequences of differences in species distribution modeling using different scales (using GARP) are illustrated.

411. THE EFFECT OF ALTERED FLOODPLAIN REGIMES ON THE TERRESTRIAL YELLOW-FOOTED ANTECHINUS AND SUBSEQUENT MANAGEMENT IMPLICATIONS. HORROCKS, GREGORY F.; Mac Nally, Ralph. Australian Centre for Conservation Biology, School of Biological Sciences, Monash University, Clayton, Victoria 3800, Australia. greg.horrocks@sci.monash.edu.au.

Alteration of normal flow regimes can significantly change the natural dynamics of the biota on lowland floodplains. As a response to surrounding agricultural development, the Murray River has undergone major hydrological change resulting in an irregular pattern of inundation. Floodplain areas that have previously been annually flooded have now remained dry for several years. Managers introduced an artificial flood and we investigated the post-flooding response of the numerically dominant terrestrial mammal, Yellow-footed Antechinus (a small carnivorous marsupial), after a series of dry years. Trapping was undertaken 18 months prior to the artificial flood and for another four years afterwards. After the flood, the normally low numbers increased tenfold and have gradually declined in subsequent dry years. The flooding appeared to produce a population surge engendered by the high availability of food, namely, large-bodied, flood-dependent invertebrates (e. g. carabid beetles). The antechinus is an opportunistic, explosive breeder that can respond rapidly to favorable food conditions following flooding. We suggest that without regular flooding, this species currently persists in unnaturally low numbers and may be at risk of local extinction in water-deprived areas.

412. THE STRUCTURE OF POLYPORE FUNGAL COMMUNITIES IN RELATION TO THE AMOUNT AND QUALITY OF DOWNED LOGS. HOTTOLA, JENNI; Ovaskainen, Otso; Hanski, Ilkka. Metapopulation Research Group, Department of Biological and Environmental Sciences, University of Helsinki, PO Box 65, FIN-00014 University of Helsinki, Finland. Corresponding author: E-mail: jenni.hottola@helsinki.fi (JH).

Our research addresses the dependence of the occurrence of wood-decomposing fungi on the local abundance and quality of dead wood and on the size and connectivity of the respective forest stand. Particular attention is paid to threatened and near-threatened species, which account 37% of all polypore species in Finland. The data consist of 13,000 dead trees and 4,000 occurrences of 116 species, of which 43 are classified as threatened or near-threatened. The occurrence of common species is not expected to be constrained by dispersal and they can use most of the dead wood available. In support of this, the occurrence of the common species is well explained by the number and diversity of downed logs in the forest stand. In contrast, the occurrence of the threatened species is best explained by the total volume of logs and particularly by the occurrence of large and much-decayed logs. Furthermore, the connectivity and size of the forest stand is significant for the occurrence of the threatened species. These results have the following management implications. For the common species it is helpful to increase the amount of dead wood much regardless of the quality and the current density of dead wood. In contrast, for the threatened species the quality of downed logs is important, and these species require a minimum amount of resource locally to have viable populations.

413. POPULATION GENETIC ANALYSIS OF *Arapaima gigas*: IMPLICATIONS FOR MANAGEMENT AND CONSERVATION. HRBEK, TOMAS; Crossa, Marcelo; Sampaio, Iracilda; Farias, Izeni P. Laboratório de Evolução e Genética Animal, Departamento de Biologia, I.C.B., Universidade Federal do Amazonas, Estrada do Contorno 3000, Manaus, AM, 60077-000, Brazil, tomas_hrbek@ufam.edu.br (TH, IPF). Biology Department, University of Puerto Rico - Rio Piedras, San Juan, PR, 00931-3360, Puerto Rico (TH). Projecto Várzea, Instituto de Pesquisa Ambiental da Amazônia (IPAM), Santarém, PA, 68005-080, Brazil (MC). Núcleo de Estudo Costeiros, Campus da Bragança, Universidade Federal do Pará, PA, 68600-000, Brazil (IS).

In the present study we report a population genetic analysis of *Arapaima gigas*, and its implication for conservation and management. *Arapaima* is an important, but critically over-exploited giant food fish of the Amazonian várzea. Analysis of 2347 b. p. of mtDNA, and 14 variable microsatellite loci from 139 individuals sampled in seven localities within the Amazon basin suggests that *Arapaima* forms a continuous population with extensive genetic exchange among localities. Weak effect of isolation-by-distance is observed in microsatellite data, but not mtDNA data. *Arapaima* has low genetic diversity, and it shows a signature of genetic bottleneck in the middle and lower reaches of the Amazon system, areas of heaviest exploitation. Spatial autocorrelation analysis of genetic and geographic data suggests that genetic exchange is significantly restricted at distances greater than 2800 km. We recommend implementing a source-sink metapopulation management and conservation model by creating high quality várzea reserves separated by distances less than 2800 km. This conservation strategy would: 1) preserve all of the current genetic diversity of *Arapaima*; 2) create a set of reserves to supply immigrants for locally depleted populations; 3) preserve core várzea areas in the Amazon basin on which many other species depend.

414. ECOLOGICAL STOICHIOMETRY BRIDGING LANDSCAPE AND SPECIES IN TROPICAL FORESTS: ANT FUNCTIONAL GROUPS SPATIALLY RESPONSE TO SOIL CARBON: PHOSPHORUS RATIO. HU, JACKSON CHENG-HENG. Conservation Biology Program, University of Minnesota, USA 1243 Fifield Ave, St. Paul, MN 55108, USA huxx0058@yahoo.com.

Ant diversity is an evolutionary outcome supported by stoichiometric flows of energy and matter between species and landscape. Elemental constraints in organism-substrate compositions can reg-

ulate growth and recolonization rates. Particularly, faster growing species might dominate P-rich landscape through feeding local P-rich food with higher RNA contents for protoplasmic growth. In Orchid Island, Taiwan, dominance of major 27 ant species and its associated landscape stoichiometry were examined in 2001-2002. Negative correlation exists between relative growth rate of ant species and its soil C:P ratio of selected habitats. With highest dominance to forage local overabundant mites and termites, three carnivorous functional groups favor the younger P-rich landscape. Slow growing species, such as detritus omnivores and specialized predators on springtails, show variable range of fitting either P-rich or P-limited landscapes. However, the local harvesting ants did not fit this ratio-dependent model and were only promoted by higher soil organic matter. It is specialized for carrying sufficient seasonal supplies of fallen seeds to overcome the nutrition-imbalanced landscape. Considering both physiological and behavioral adaptations, species-landscape stoichiometry illuminates that researches on biodiverse communities with a biogeochemical emphasis can offer meaningful insights to channel landscape ecology and ecosystem functioning.

415. A REGIONAL SCALE CONSERVATION PLAN FOR A HIGHLY FRAGMENTED LANDSCAPE IN THE SACRAMENTO VALLEY, CALIFORNIA, USA. HUBER, PATRICK R.; Girvetz, Evan H.; Greco, Steven E. Department of Environmental Design, University of California - Davis, One Shields Avenue, Davis, CA, 95616, USA.

The Sacramento Valley of California has undergone tremendous and urbanization conversion to agriculture over the last 150 years, which has resulted in less than 5% its once large expanses of freshwater wetlands, riparian forests, valley oak (*Quercus lobata*) woodlands, and perennial grasslands remain in their natural state. The goals of a regional scale conservation network for the Valley are based on establishing viable populations of a suite of focal species sensitive to important ecological processes, including cross-valley migration for wide-ranging species. A knowledge-based logic decision making system linked to a geographic information system (GIS) was used to evaluate landuse polygons for ecological value for these species. These results were used in the designation of core reserve areas for the network as well as potential corridors for linkage between these cores. Four priority core/corridor areas critical to the functional implementation of this conservation network are identified, and opportunities and constraints specific to each area are presented. Our results suggest that the highly altered state of this landscape necessitates the integration of agricultural areas into the network where appropriate and a focus on restoration of degraded land-including wildlife highways crossings-where current land uses are incompatible with ecological values.

416. SOIL RESTORATION IN A BACKYARD CULTURE WITH THE USE OF ENDOGEIC EARTHWORMS (GLOSSOSCOLECIDAE) AT NACAJUCA, TABASCO, MEXICO. HUERTA, E.; De la O, D.; Nuncio, G. Colegio de la Frontera Sur Unidad Villahermosa, km 15.5 carretera Villahermosa- Reforma. Tabasco. ehuerta@vhs.ecosur.mx. Instituto tecnológico agropecuario ITA 28 Villa de Ocuiltzapotlan. Tabasco.Mexico.

Soil conditions were improved by the use of earthworms and leguminous. A geostadistical study was performed to determine initial conditions of the area, total nitrogen, organic matter, available phosphorus, texture, bulk density, and earthworm density and biomass were measured. Fifty monoliths of 25 x 25 x 30 cm were installed in a grid of 16 x 8 m separated by 2 m of distance. In each monolith earthworms (Oligochaeta, Glossoscolecidae) were collected by hand-sorting and then they were taken for culture with different organic matter substrates (1.5% cow manure, 1.5% *M. pruriens* var. *utilis*, and a mixture of both) in controlled conditions of humidity and temperature. After 2 months the highest earthworm biomass was observed in substrates with *M. pruriens* var. *utilis*, but the highest density was observed in substrates with cow manure. The earthworms were reintroduced in the backyard from where they were taken. Before the reintroduction process we planted a regional common legumine (*Cannavalia ensiformis*) in one half of the backyard plot, to see differences between restoration with and without legumines. Soil parameters were determined before and after earthworms' reintroduction.

417. FOREST MANAGEMENT IN AMAZÔNIA: SOME LEARNED LESSONS. HUMMEL, ANTÔNIO CARLOS. Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis, Diretoria de Florestas, SCEN - Trecho 2, Edifício Sede IBAMA, 70.818-900 Brasília, DF, Brazil, antonio.hummel@ibama.gov.br.

The timber resources use in Amazonia, initiated in the Varzeas flooded forests due to exploitation and transport easiness, has not been done in a sustainable way, because of deforestation (licensed or not) as well as the great timber extraction without forest management. The absence of public policies stimulating forest management is a reality, while there is a set of support instruments to farming and cattle ranching. Besides the land tenure conflicts, the lack of efficient, feasible and transparent tools for the forest activities control and monitoring are a challenge for those who has the responsibility for forestry regulation. It is presented here a set of important learned lessons for the timber forest management consolidation. They are lessons about the partnership establishment, the community involvement with forest management, the need of technical support framework, and the dependence of state government's awareness and commitment. It is also discussed the requirement of a great effort of political articulation, including the preparation of solid arguments about the social, environmental and economical importance of tropical forests for the sustainable development to support the decision makers.

418. EVALUATING THE CONCEPTUAL TOOLS FOR FOREST BIODIVERSITY CONSERVATION. HUNTER JR., MALCOLM; Schulte, Lisa; Mitchell, Robert; Franklin, Jerry; Palik, Brian; McIntyre, Kevin. Department of Wildlife Ecology, University of Maine, Orono, ME 04469, USA, hunter@apollo.umenfa.maine.edu (MLH). Natural Resource Ecology and Management, Iowa State University, Ames, IA, USA (LS). Joseph W. Jones Ecological Research Center at Ichauway, Newton, GA 39870, USA (RM, KM). College of Forest Resources, University of Washington, Seattle, WA 98195-2100, USA (JF). USDA Forest Service North Central Research Station, Grand Rapids, MN 55744, USA (BP).

We surveyed ten large-scale forest conservation projects to determine which scientific concepts are commonly used by forest management planners to conserve forest biodiversity. We then reviewed the scientific literature to evaluate the degree to which these concepts are founded in antecedent theory and have been tested, and the limits of those tests. The concepts of Reserves, Matrix Management, Filters (Fine, Meso, Coarse), Hotspots, Using Nature's Template, Diversity Begets Diversity, Patchworks, Networks, and Gradients were identified and most of them received a

high utility score. Our literature review suggests that all of these concepts have extensive relationships with foundational ecological theories, such as natural selection and island biogeography. Further, all of the concepts have some empirical support and most have received some testing in an experimental framework. These tests are far from comprehensive, however, as many species are yet unknown and are difficult to measure, among other reasons. Significant constraints hinder further incorporation into forest planning, including lack of empirical support at the spatial and temporal scales at which forest management is implemented. Practical ways to advance these concepts include implementing effective, efficient monitoring protocols and establishing experimental tests in an operational context.

419. SELECTING AREAS FOR BIODIVERSITY CONSERVATION AND ECOLOGICAL RESTORATION IN OAXACA, MEXICO: A PRELIMINARY ANALYSIS. ILLOLDI-RANGEL, PATRICIA; Linaje, Miguel; Sanchez-Cordero, Victor; Pappas, Christopher; Fuller, Trevon; Garson, Justin; Sarkar, Sahotra. Departamento de Zoología, Instituto de Biologia, Universidad Nacional Autónoma de México, Aptdo. Postal 70-153, México, D.F., 04510, pilloldi@ibiologia.unam.mx (PIR, ML, VSC). Section of Integrative Biology and Department of Philosophy, University of Texas at Austin, Waggener Hall 316, Austin, TX 78712-1180, USA, sarkar@utexas.edu (SS, CP, TF, JG).

Oaxaca holds an exceptional mammalian diversity, but rampant deforestation threatens its conservation. However, it contains only 4 decreed natural protected areas (16.38% of the State's total area). GARP software package was used to produce two models each for the distribution of 183 mammal species used as surrogates for biodiversity. The more restrictive model included a known occurrence record of a species and was used to identify sites for conservation; the less restrictive model did not impose this requirement. Sites were selected using the Re sNet software package which incorporates a rarity-complementarity algorithm. The process was initialized using the existing conservation areas and 5, 10, 15, 20, 25, and 30% of Oaxaca were selected in successive runs. The less restrictive model was used to assess the restoration potential or "quality" of sites in the landscape matrix. Finally, restoration areas were selected using a graph-theoretic protocol (the LQGraph software package) to establish minimum connectivity between conservation areas while maximizing landscape quality. The methods we develop show how niche modeling can be used along with place prioritization and graph-theoretic algorithms to identify areas for integrated conservation and restoration planning.

420. GLOBAL BIODIVERSITY REGIME AND THE MAMIRAUÁ CASE. A GLOBAL-LOCAL APPROACH TO ASSESS BIODIVERSITY CONSERVATION EXPERIENCES. INOUE, CRISTINA Y.A. Instituto de Relações Internacionais, Universidade de Brasília, Brasília, DF, Caixa Postal 04359, CEP 70910-970, Brasil, cris1999@unb.br.

The concept of biodiversity international regime is familiar to international relations scholars who study global environmental issues. Usually, their focus is on interstate relations and processes around the creation and implementation of global environmental conventions. Conservation biologists, environmental NGOs, and agencies, on the other hand, tend to focus on biodiversity initiatives implemented at local level. However, fewer efforts are made to integrate the global and local levels. The first research objective was to construct a concept of global biodiversity regime. Such concept was constructed based on international relations theoretical perspectives and empirical observation. It integrates the global and local dimensions, allowing us to analyse experiences like Mamirauá, which was a biodiversity conservation and sustainable development project in a flooded forest area of the Brazilian Amazonia. The second objective was to briefly describe and discuss the Mamirauá case. Two major results emerged: the identification of (1) key factors around the elaboration and implementation of the Mamirauá Project, and (2) the international and transnational networks and dynamics that have acted locally, relating the case to the global biodiversity regime. Another major result indicated how local experiences can be a positive input for the global regime.

421. INTRINSIC AND EXTRINSIC COMPONENTS IN EXTINCTION RISK: A META-ANALYSIS OF PRIMATE RESPONSES TO FRAGMENTATION. ISAAC, NICK J.B.; Pettifor, Richard; Cowlishaw, Guy C. Institute of Zoology, Zoological Society of London, Regent's Park, London NW1 4RY, UK (nick.isaac@ioz.ac.uk).

Recent studies have shown that species' risk of extinction is influenced by intrinsic biological traits, as well as extrinsic factors, such as the nature and severity of pervasive threatening processes. However, none has tested the relative importance of intrinsic and extrinsic components of extinction risk. We present results from a meta-analysis of primate populations in fragmented landscapes. Our data include over 3000 presence-absence records for 60 species in 1000 fragments from all over the tropics (30 landscapes in all). We use Generalised Linear Mixed Models to partition the variance in response among landscapes and among species. As expected, primates are more likely to persist in large fragments compared with small ones, but there is no strong effect of isolation distance. Our results also show that species with large and specialised area requirements are more susceptible to fragmentation. Overall, we find that intrinsic and extrinsic factors are equally important in determining responses to fragmentation.

422. HOST-PARASITE INTERACTION AS BIOINDICATOR FOR ASSESS ENVIRONMENTAL STATUS IN THE PANTANAL, BRAZIL. JANSEN, ANA M.; D'Andrea, Paulo S.; Rademaker, Victor; Norek, Aneska; Freitas, Tatiana P. T.; Herrera, Heitor M. Instituto Oswaldo Cruz/FIOCRUZ. Av Brasil 4365, Rio de Janeiro Brazil, 21040-900 (AMJ, PSDA, VR, AN, HMH); Earthwatch Institute.(TPTF); Clock Tower Place, Suite 100, Box 75, Maynard, MA 01754, USA (jansen@ioc.fiocruz.br).

Infections due to multihost parasites, are considered as important indicators of the impact of human activities on the wild environment. We studied the transmission cycles of Trypanosomatidade (*Trypanosoma cruzi* and *T. evansi*) among domestic and small wild mammals in two areas of south Pantanal, Brazil with different degrees of disturbance and land-use: FNR that has been persevered during the last 10 years and FA, where intense economic activities based on cattle ranching is exerted. In both areas, mammals from five habitats - grassland, scrub, dense scrub, gallery forest and peri-domicile were examined. Wild (n=312) and domestic (n=150) mammals were tested by parasitological, serological and molecular tests. Our results showed that human action resulted in significant alteration on the relative frequency of small mammals and on the epidemiological profiles of both trypanosomatid species, mainly regarding *T. cruzi*. Human encroachment resulted in the increase of *T. evansi* transmission as expressed by higher prevalence rates in all habitats. Host/trypanosomes interactions and the relative frequency of small mammals showed to be a reli-

able indicator of environmental degradation. Infection patterns of trypanosomatids with their mammal hosts may be used as bioindicator of environmental changes and also to define conservation, animal and public health policies.

423. SPATIAL ANALYSIS OF PLANT GENETIC RESOURCE DISTRIBUTION: PROVIDING INFORMATION FOR TARGETING EX SITU COLLECTION AND IN SITU CONSERVATION. JARVIS, ANDY. International Plant Genetic Resources Institute (IPGRI) and the International Center for Tropical Agriculture (CIAT), Km. 13 Recta Cali- Palmira, AA6713, Cali, Colombia.

It is generally agreed that a rapid loss of plant diversity is occurring and the accelerating processes of habitat destruction and genetic erosion show no sign of abating. Those taxa that include crop species and their wild relatives are of particular concern from a conservation perspective. The economic and social consequences of such an irredeemable loss of plant diversity could be potentially disastrous. This paper presents methods for predicting the spatial distribution of plant genetic resources, and how they have been applied to ensure *ex situ* conservation (germplasm collection), and to target potential sites for *in situ* conservation. A number of complementary case studies are presented, at the genetic level and species level, for selected crops (both major crops and underutilized species), their wild relatives, and forest genetic resources. These case studies include a biogeographic analysis of wild peanuts (genus *Arachis*) in Latin America, field-based testing of predictive species distribution models for wild chili (genus *Capsicum*) in Paraguay, details of an atlas of plant genetic resources for Guatemala outlining the distribution of over 100 important species, and the application of models at the genetic level to map diversity in the *Araucaria* forests of Argentina and Chile.

424. LOWERING THE ARAL SEA WATER LEVEL: PAST, PRESENT AND FUTURE. JASHENKO, IRINA V.; Jashenko, Roman V. Tethys Scientific Society, Institute of Soil Science, 93 a Al-Farabi Str., Almaty, 480060, Kazakhstan, sokir@nursat.kz (IVJ). Institute of Zoology, 93 Al-Frabi Str., Almaty, 480060, Kazakhstan (RVJ).

Aral Sea appeared 3 000 000 years ago from ground water and stream of 2 rivers (Amu-Darya and Syr-Darya). About 10 000 years ago it achieved its in current shape and size. There were several drops of Aral Sea water level in the past (IV, XII, XI centuries), the current water drop is the biggest. The reason of current Aral Sea disaster is the rapid development of extensive irrigated agriculture along two main Central Asian rivers. The water balance of Aral Sea consisted of the income of rivers, atmospheric precipitation and underground flow with the deduction of evaporation loss. Until 1961 there was equality between water income and outcome (about 66.1 km^3). The water level dropped by 17 meters from 1961 until 2004. In 1990 the Aral Sea split into 2 separate parts. It allowed the environment changes in surroundings: aridization of climate, lowering the level and extension of ground water mineralization, soil degradation, salt distribution from the drying up bottom, delta desertifi cation, changing the humid natural complexes into arid ecosystems, an attention of fresh water type of organisms into salt water type in aquatic ecosystems. Current usage of agricultural chemicals caused chemical pollution of environment.

425. INTRASPECIFIC VARIABILITY OF THE POLISH CARMINE SCALE, *Porphyrophora polonica* (L.) (HOMOPTERA, MARGARODIDAE). JASHENKO, ROMAN V.; Jashenko, Irina V. Institute of Zoology, 93 Al-Frabi Str., Almaty, 480060, Kazakhstan, rjashenko@nursat.kz.(RVJ). Tethys Scientific Society, Institute of Soil Science, 93 a Al-Farabi Str., Almaty, 480060, Kazakhstan (IVJ).

Porphyrophora polonica inhabits Eurasian steppes, forest-steppes and penetrates to Tien-Shan steppe biotopes. The range of host-plants consists of species from 17 families. A total of 298 females were studied (29 populations) from Poland to Mongolia. Estimation of morphological similarity was done according to indices of intrapopulation diversity, rare morph frequency, and similarity among populations (by Zhivotovskiy, 1981) on the base of 15 characters. *Porphyrophora polonica* is very polymorphous species. The divergence of populations goes in two ways: 1) scale up the portion of rare and redistribution of dominated morphs, 2) formation the unique morphs and increasing their portion. The boundary populations show the most divergence. Close species *P. altaiensis* and *P. ussuriensis* in recent geological time were boundary populations of *P. polonica* in Altai and Far East. The species structure includes 2 types of populations: “chief populations” consisting of full genetic informa tion for each region and “filial populations” having only some part genetic potential of “chief population”. "Chief populations" are a base for "filials". The occupation of new ecological niche is provided by "filials". Biological role of "filial" population is its big capacity for genetic change. There is "chief population” and originated from it "filials" in each region.

426. TEACHING BOTANY IN PRACTICE - ACTIVITY FOR STUDENTS. Jasper, André; GONÇALVES, C. V.; Bruxel, J.; Musskopf, E. L.; Freitas, E. M. de. Setor de Botânica e Paleobotânica, Museu de Ciências Naturais, Centro Universitário UNIVATES, C.P. 155, 95.900-000, Lajeado, Rio Grande do Sul, Brazil, www.univates.br/sbp, sbp_mcn@univates.br.

Botany is an important branch of Biology; however, sometimes it is assigned to an inferior position in the Secondary School teaching, mainly due to the little practical experiencing by both teachers and students. Thus, considering teachers and students’ interest in bringing botany to practical experience, it was created the project “Naturalist for a day”, which enables Secondary School students to know the activities developed by the Natural Science Museum of UNIVATES specifically in the Botany and Paleobotany Sector (SBP/MCN/UNIVATES). Through several activities, students observe, collect, represent, compare and investigate the distinguishing aspects of morphology and physiology of the main vegetable groups. By doing this, it is possible to make students aware of botany, of its evolutionary history, of plant development, their adaptations and interactions with other elements of the ecosystem.

427. BRIDGING BIODIVERSITY AND TOURISM TOWARDS SUSTAINABLE DEVELOPMENT OF SANDY BEACHES. JEDRZEJCZAK, MARCIN FILIP; Chelazzi, Lorenzo; Colombini, Isabella; Scapini, Felicita; Weslawski, Jan Marcin. Academy of Ecology and Management, Wawelska 14,

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Sandy beach biodiversity, and impact of tourism on, is a subject currently generating great scientific interest in Europe. To meet challenge of progressing ICZM and governance, baseline interdisciplinary research is required. Present understanding of pressures exerted by tourism on biodiversity is difficult to apply. Baseline figures have been collected through surveys and questionnaires filled in by tourists. A study of the coastal ecology in the Baltic and Thyrrenian revealed a discrepancy between public perception, declarations, expressed will etc, and actual activity. This remark leaves us with a single question: what gaps are there in our knowledge of biodiversity (which includes humans and human ecology) that must be filled to allow us, tourists in our millions, to enjoy our holidays on beaches in a way that our living world can sustain? As to knowledge gaps, more sociological studies are needed about relations of developed populations and nature/biodiversity. This paper focuses on adaptation of communities and populations along coasts and it highlights a need of common protocols and frequent exchanges between partners of research network on beaches. It also intends to sensitize public opinion about scientific and social issues connected to biodiversity in Europe, and to link biodiversity to tourist impacts, using both a descriptive and an experimental approach.

428. THE INTERPLAY OF FIRE AND TIME IN THE EVERGLADES PRAIRIES. JENKINS, CLINTON; Pimm, Stuart. Nicholas School of the Environment and Earth Sciences, Duke University, Box 90329, Durham, NC 27708, USA, Clinton.Jenkins@duke.edu.

Fire is an integral part of the Everglades ecosystem and plays a pivotal role in the dynamics of many vegetation types. Understanding its influence is key for proper management of the Everglades and the maintenance of its biodiversity. One theorized effect of fire in the marl prairies of the Everglades is the exclusion of woody vegetation. Without enough fire in the system, woody vegetation may encroach into the prairies, which can be detrimental to some threatened species. We analyzed the changes in woody vegetation cover in the prairies of Everglades National Park using aerial photos from the 1940s and 1999. We then compared these changes to a digital fire history of the park to determine the influence of fire. A high frequency of fire does appear to reduce woody vegetation in prairies, although not in all cases. However, we do not find strong evidence that a lack of fire necessarily results in encroachment by woody vegetation. In some cases, sites with no fire for 15 years show no evidence of an increase in woody vegetation. This conflicts with traditional views of fire as necessary for the maintenance of prairie vegetation.

429. FALLING TO PIECES: GLOBAL ESTIMATES OF HABITAT LOSS AND FRAGMENTATION. JENNINGS, MICHAEL; Hoekstra, Jonathan M.; Boucher, Timothy M.; Molnar, Jennifer L. Nature Conservancy Global Priorities Group, 530 S. Asbury St., Suite 5, Moscow, ID, 83843, USA (mjennings@tnc.org; MJ); The Nature Conservancy Global Priorities Group, 217 Pine Street, Suite 1100, Seattle, WA, 98101, USA (JH, JLM); The Nature Conservancy Global Priorities Group, 4245 Fairfax Drive, Arlington, VA, 22203, USA (TB).

Habitat loss and fragmentation are widely recognized as the primary causes of biodiversity loss in terrestrial ecosystems. But how fragmented is the world? How does the degree of fragmentation change with the extent of habitat loss? Do relationships between habitat loss and fragmentation suggest processes that conservationists could manipulate to reduce the threat of fragmentation? To answer these questions, we analyzed global land cover data (1 km^2 resolution) to quantify the extent of habitat loss and the distribution of remaining habitat block sizes globally as well as across each of the world's terrestrial ecoregions. The observed relationship between the distribution of habitat block sizes and the total extent of habitat loss in ecoregions suggests a predictive model for the func tional linkage between habitat loss and fragmentation. We compare this relationship among different biomes to explore whether processes of habitat loss and fragmentation differ systematically. Our findings improve our understanding of the threats posed by ongoing habitat loss and fragmentation around the world, and suggest potential conservation strategies for minimizing adverse consequences for biodiversity.

430. THE ABUNDANCE AND DISTRIBUTION OF FALCONIFORMS IN THE CENTRAL AND WESTERN LLANOS OF VENEZUELA. Jensen, Wendy J.; Gregory, Mark S.; Baldassarre, Guy A.; VILELLA, FRANCISCO J.; Bildstein, Keith L. State University of New York, College of Environmental Science and Forestry, Syracuse, NY, 13210, USA (WJJ, MSG, GAB). USGS Biological Resources Division, Cooperative Research Units, Department of Wildlife and Fisheries, MS9691, Mississippi State, MS, 39762-9691, USA, fvilella@cfr.msstate.edu (FJV). Acopian Center for Conservation, Hawk Mountain Sanctuary, Orwigsburg, PA, 17961, USA (KLB).

The Llanos of Venezuela is a 275,000 Km^2 biome dominated by seasonal wetland savannas long recognized as important habitat for waterbirds. However, little information exists on the rich raptor community of the region. We conducted raptor surveys in 4 regions of the central and western Llanos during 2000-2002. We detected 28 species representing 19 genera. Six of the 14 most common species differed ($P < 0.05$) in mean number of individuals detected per route in the wet versus dry seasons. Eight differed overall between the southwestern and western llanos in number of individuals detected per route. Of the 14 less common species, six were detected only seasonally. Sampled areas of the Llanos contained 52% of all raptor species known to occur in Venezuela, and more than 70% of the kites, buteos, and sub-buteos known for the country. The southwestern and western Llanos appear to act as a spatially and temporally dynamic ecosystem that supports a rich raptor community of both wetland dependent and upland terrestrial species. We did not detect Collared Forest-Falcon (*Micrastur semitorquatus*), Bicolored Hawk (*Accipiter bicolor*), and Ornate Hawk-Eagle (*Spizaetus ornatus*); likely due to the inherent difficulty of detecting forest-dwelling species from roadside surveys.

431. MANAGEMENT AND CONSERVATION REQUIREMENTS FOR KOMODO DRAGON POPULATIONS IN KOMODO NATIONAL PARK, INDONESIA. JESSOP, TIM S.; Imansyah, Jeri; Purwandana, Deni; Rudiharto, Heru; Ciofi, Claudio. Beckmann centre for Conservation and Research of

Endangered Species, Zoological Society of San Diego, 1500 San Pasqual Road, Escondido, Ca, USA (TSJ, JI, DP), tjessop@sandiegozoo.org. Komodo National Park, Flores, Nusa Tenggara Timor, Indonesia (HR). Department of Animal Biology and Genetics, University of Florence, Via Romana 17, 50125 Florence, Italy (CC).

Within archipelagos, populations may exhibit intraspecific differences requiring plasticity in management and conservation practices. Four of the five island populations of the Komodo dragon (*Varanus komodoensis)* reside within the world heritage listed Komodo National Park, in eastern Indonesia. To identify current management and conservation requirements for the park's dragon populations a concerted long term research program has been established. Our results indicate that major differences in demography and ecology exist between dragon populations on the 2 large islands of Komodo and Rinca and the 2 small islands of Motang and Kode. Specifically, island area influences prey diversity and availability which, in turn, influences the density, growth and body size of dragons. The Motang Island population, estimated at 51± 6 post-hatchling individuals, has recorded a recent reduction in catch per unit effort, body condition and changes in population size structure. Such changes have resulted from a decreased abundance in the Timor deer, due to suspected poaching. Increased resource security and potential augmentation of prey density may be required to conserve this population. Overall, differences among island populations indicate that Komodo dragon related management activities within Komodo National Park must increasingly operate at an island level to maximize conservation efforts.

432. THE GLOBAL DISTRIBUTION OF THREATENED BIRDS - NULL MODELS, ENVIRONMENTAL DETERMINANTS, AND POTENTIAL BROAD-SCALE EFFECTS OF LAND USE CHANGE. JETZ, WALTER. Division of Biological Sciences, University of California, San Diego, 9500 Gilman Drive, La Jolla, CA 92093-0116, USA, wjetz@ucsd.edu.

The core global patterns in the distribution of threatened species of birds have been identified, but so far the ecological and environmental determinants of these patterns are not well understood and neither are the potential broad-scale effects of environmental change. I analyze a global distribution database of all 9,900 species of birds in 110km resolution. I first present a global analysis of the distribution of threatened in relation to non-threatened species, invoking several null models and testing basic hypotheses regarding the importance of core drivers such as isolation, topography, environment, and human impact. Several random draw models from the global pool offer good predictions of the number of threatened species observed locally, but strong deviations especially across islands and mountain regions occur. In a second analysis I evaluate how different types of land use change at the broad scale may interact with th e biogeography of birds and result in future extinctions. For different 'patch sizes', spatial autocorrelation, geographic biases and environmental correlates of impact I quantify potentially resulting extinctions and their phylogenetic and geographic distribution. This allows the highlighting of particularly threatened taxa and regions under different general scenarios of environmental change.

433. *Philornis downsi* ECTOPARASITE: WILD BIRDS AFFECTED AND DISTRIBUTION IN GALAPAGOS. JIMÉNEZ UZCÁTEGUI, GUSTAVO; Wiedenfeld, David. Vertebrate Ecology and Monitoring, Charles Darwin Foundation, Puerto Ayora, Galápagos, Ecuador PoBox 17-01-3891, gjimenez@fcdarwin.org.ec, 593-5-2-526-146.

In 1980 *Philornis downsi* was registered in Galápagos. In one stage of its cycle, this introduced fly is an ectoparasite. The eggs are found at the bottom of nests. The larvae are found there as well, leaving the nest at night to feed on the blood of finches. The clinical findings seem to indicate that small infestations probably cause anemia and slow growth rate; in large infestations finch mortality is between 18% and 27% in the nest (*Geospiza* spp. y *Camarhynchus* spp.). According to preliminary distribution studies this parasite has not been found on dry and less central islands like Española and Genovesa. We determine their presence by sampling old nests and looking for pupas (which metamorphose into the fly) in the bottom interior of the nest. The pupa are resistant and can survive years in a dry climate. The average pupa/nest range was 14.2. Greater quantities exist in humid zones, but the difference is not significant. This fly may be a risk factor to species in danger of extinction; therefore by understanding the distribution and life cycle one can hope to control or eradicate it.

434. CONSERVATION AND LOSS OF ECOSYSTEM BIOMASS AND CARBON (C) POOLS AFTER DEFORESTATION AND AGRICULTURAL LAND USE CONVERSIONS IN COSTA RICAN LANDSCAPES. JOBSE, JUDITH C.; Kauffman, J. Boone; Watson, V.; Hughes, R. Flint. Department of Fisheries and Wildlife, Oregon State University, 104 Nash Hall, Corvallis OR, 97330, USA, jobsej@onid.orst.edu (JCJ). Institute of Pacific Islands Forestry, Pacific Southwest Research Station, USDA Forest Service, 1151 Punchbowl St. Room 323, Honolulu HI, 96813, USA (JBK). Tropical Science Center, PO Box 8-3870-1000, San Jose, Costa Rica (VW). Pacific Southwest Research Station, Forest Research Laboratory, USDA Forest Service, 23 East Kawili St. Hilo, HI 96720, USA (RFH).

We determined total aboveground and soil carbon pools (1 m depth) in 31 Costa Rican pastures representing chronosequence sets within 6 different life zones that represent a precipitation/temperature gradient from tropical dry forest to lower montane rain forest. In addition we sampled banana (n=11), coffee (n=10) and sugarcane plantations (n=10) across their range of distribution. Sites were compared to corresponding mature forests that had been sampled in a companion study. Aboveground C pools decreased dramatically with forest-to-agriculture conversion (44 - 99% average loss); although one pasture lost only 25% of the aboveground C pools due to the presence of large remnant trees. Aboveground C pools in sugarcane plantations are equivalent to 17-58% of the C pools found in nearby forests. Soil C pools in pastures compared to mature forests are not significantly different in most life zones except for the tropical wet forest, where soil C pools in pastures are 85 Mg/ha higher then in forests. These results show that protection of wet/rain forests and large remnant trees in agricultural lands could conserve large amounts of carbon in tropical landscapes. It highlights the importance of land use management/history and climate in determining C pool dynamics and potential C sequestration.

435. INTEGRATING POLITICS INTO CONSERVATION: SOME LESSONS THAT INCREASE EFFECTIVENESS. JOHNS, DAVID M. School of Government (also affiliated with the Wildlands Project) Portland State University PO Box 751 Portland, OR 97207 USA.

Effective conservation requires biological knowledge *and* political knowledge and effectiveness. Generally conservationists know

more about the biology than the politics of the problems they confront. This seriously limits the capacity of conservationists to protect and restore species and ecosystems. An analysis of several conservation efforts from around the globe demonstrates that 1) absent political understanding and efficacy, even large amounts of biological information are inadequate to achieve conservation goals; 2) the relationship between biological and political knowledge is not well understood by many conservation practitioners 3) good political understanding and effectiveness often means much less biological information is needed to achieve conservation goals; 4) conservation practitioners trained in the biological sciences can most easily and directly obtain political understanding through developing relationships with a combination of political practitioners and social scientists.

436. COMPARING BIODIVERSITY DATA-POOR AND DATA-RICH SCENARIOS FOR NATIONAL CONSERVATION ASSESSMENT: TOWARDS MINIMAL DATA REQUIREMENT. JONAS, ZUZIWE; Mathieu, Rouget; Cowling, Richard M.; Bulelwa, Mohamed. South African National Biodiversity Institute, P/Bag X 7 Rhodes avenue Claremont 7735, South Africa; jonas@sanbi.org (ZJ, MR, BM). Botany Department, University of Cape Town, P/Bag X Rondebosch, Cape Town 8000, South Africa (MR). Terrestrial Ecology Research Unit, Department of Zoology, University of Port Elizabeth, P.O. Box 1600, Port Elizabeth 6000, South Africa (RMC).

Conservation planning aims to guide strategies intended to halt biodiversity loss. It has been argued that systematic conservation planning is of limited use in countries with little biodiversity information (data-poor countries) and that it requires complex and expensive biodiversity data information (the case of data-rich countries). South Africa offers an opportunity to test this, as biodiversity information is available at different resolution levels. In this paper, we created two scenarios (biodiversity data-rich and data-poor) for identifying broad conservation priority areas in South Africa, in order to compare their outputs and the implications for selecting priority areas. The data poor scenario used the worldwide data available on the Internet. Such comparisons allow evaluating the performance of broad datasets that can be readily applied in data-poor countries. In general, both scenarios identified the same areas. The data-poor scenario failed to identify two (out of nine) priority areas from the data-rich scenario. Although information on species and ecological processes did not significantly alter the priority identification, vegetation types and land use data had a greater impact on the results. Such a study highlights the value of coarse datasets for identifying broad conservation priority areas and designing nationwide conservation strategies in data-poor regions.

437. COMMUNITY STRUCTURE OF SOIL INVERTEBRATES IN AN ENVIRONMENTAL MOSAIC. JONER, FERNANDO; Fonseca, Carlos Roberto. Laboratório de Interação Animal - Planta, Centro 2, Universidade do Vale do Rio dos Sinos, São Leopoldo, RS, 93022-000, Brazil, cfonseca@bios.unisinos.br.

We investigate how the community structure of soil invertebrates is affected by the replacement of Araucaria Forest, an important biome in Southern Brazil, by tree monocultures. The study was performed in the Floresta Nacional de São Francisco de Paula that is an environmental mosaic constituted by native Araucaria Forest and tree monocultures of *Araucaria angustifolia*, *Pinus* and *Eucalyptus*. In September of 2003, invertebrates were sampled in three one-hectare areas of each one of the four habitats with randomly located pitfall traps that remained open for eight consecutive days. The collected specimens were not identified to the species level, but classified into a higher taxonomic category following a standardized protocol. A total of 9526 specimens, distributed in 25 higher taxa, was recorded. Invertebrates were two times more abundant in Araucaria Forest than in the tree monocultures. Most taxonomic groups were present in the four habitats but a discriminant analysis clearly separated the Araucaria Forest from the others habitats, mostly due to the abundance of Isopoda, Hymenoptera, Psocoptera, Gastropoda and Acarina. By affecting the invertebrate community structure, the replacement of Araucaria Forests by tree monocultures is possibly affecting nutrient cycling and the input of energy to higher trophic levels.

438. VALIDATING PARTICIPATORY MAPPING AS A METHOD FOR MONITORING SPATIAL PATTERNS OF FOREST RESOURCE USE. JONES, JULIA P. G.; Hockley, Neal J.; Andriahajaina, Fortunat B.; Ranambitsoa, Emma H.; Andriamarovololona, Mijasoa. Vokatry ny Ala, BP1067, Fianarantsoa 301, Madagascar jules@wanadoo.mg (NJH, JPGJ, FBA, HER, MA). School of Agricultural and Forest Sciences, University of Wales, Bangor, Gwynedd. LL57 2UW. UK (NJH).

Knowing where and how much of various wildlife resources local people are harvesting is essential in studies of sustainability and is important in zoning protected areas to reduce conflict with local people. Many methods have been used to assess forest product use with an inevitable trade-off between quality of information and the cost of the study. Rapid Rural Appraisal (RRA) combines semi-structured interviews with participatory tools and is increasingly widely used but few studies are available which validate the techniques. We compare data from an RRA of natural resource use in a village close to a National Park in Madagascar with a 24 month long study involving daily interviews for 8 days each month with the same villagers. Our analysis focuses on two forest products: crayfish and fuel wood. The RRA data described the spatial extent of forest use well and allowed sites to be ranked correctly according to their importance. However harvesters consistently overestimated the volume of products collected at a site and the number of days a month they spent harvesting. We conclude that RRA is a useful tool but that researchers should consider what level of detail is reasonable for people to recall and design studies appropriately.

439. ITEROPAROUS SPECIES MADE SEMELPAROUS BY NEW WILDLIFE DISEASE: IMPLICATIONS FOR CONSERVATION MANAGEMENT OF TASMANIAN DEVILS. JONES, MENNA E.; Mooney, Nicholas J.; Hawkins, Clare E.; Lazenby, Billie; Mann, Dydee; Wiersma, Jason; Hesterman, Heather; Pemberton, David. Nature Conservation Branch, Department of Primary Industries, Fisheries and Environment, GPO Box 44A, Hobart, Tasmania 7001, Australia (MEJ, NJM, CEH, BL, JW, HH), menna.jones@utas.edu.au. School of Zoology, University of Tasmania, Private Bag 5, Hobart, Tasmania 7001, Australia (MEJ, DM). Tasmanian Museum and Art Gallery, Hobart, Tasmania, 7000 (DP).

Devil Facial Tumour Disease (DFTD) is a new wildlife disease that has caused an estimated 50% population reduction and has spread over two thirds of the range of Tasmanian devils (*Sarcophilus harrisii*) since it was first detected in 1996. Cancerous lesions around the head grow rapidly, causing death in about six months. A broadscale trapping program, including before and after sites, is being used to study disease progression, epidemiology, and demographic impacts. Geographic spread suggests infectious

transmission, possibly thorugh biting. DFTD results in 100% mortality of the resident devil population. Some population recovery occurs through immigration and subsequent breeding of dispersing juveniles. However, disease prevalence remains high (about 30%) up to eight years after disease arrival. A disturbing result is virtual semelparity in a species that usually lives for six years and breeds four times in the wild. Most devils succumb to DFTD once they reach adulthood at two years old. Reproductive failure is high among affected devils. Conservation management of wild populations will require an understanding of the trade-off between disease suppression/transmission and reproductive value/longevity of diseased devils and will include a combination of field experiments and modelling.

440. USING CAMERA TRAPS TO CONDUCT A POPULATION SURVEY OF FISHERS *(Martes pennanti)* IN CALIFORNIA. JORDAN, MARK J.; Barrett, Reginald H.; Purcell, Kathryn L. Department of Environmental Science, Policy, and Management, University of California, Berkeley, CA, USA, 94611, mjordan@nature.berkeley.edu (MJJ, RHB). Sierra Nevada Research Center, USDA Forest Service, Fresno, CA, USA, 93710 (KLP).

In the state of California, USA, fishers (*Martes pennanti*) have experienced a range reduction over the past century that has isolated populations in the southern Sierra Nevada mountains from their counterparts in northern California by approximately 400 km. We used camera traps to estimate the abundance and population dynamics of a subpopulation occupying a 350 km^2 area in this southern region. Animals were trapped with live traps and marked with ear tags then subsequently resighted using remotely-triggered cameras at baited stations. Using a Lincoln-Peterson estimator of abundance, population sizes were 78 (95% CI: 49 to 107) in 2002 and 94 (53 to 136) in 2003. Longer data sets are necessary for precise estimation of vital rates. These data, along with a simultaneously collected set of data using DNA mark-recapture with hair snares, will be used to inform managers about the status of this population. These preliminary results suggest that camera resight can be used to monitor populations of this elusive animal.

441. OPTIMAL MONITORING FOR LISTING THREATENED SPECIES. JOSEPH, LIANA N.; Field, Scott; Wilcox, Chris; Possingham, Hugh P. The Ecology Centre, University of Queensland, Brisbane, Australia, 4072, l.joseph@uq.edu.au.

Threatened species lists, such as the IUCN Red List, play a key role in providing legislative protection and determining funding allocation for vulnerable species. Information from monitoring is crucial for compiling and updating species' threat status on these lists. Despite this, there has been little research into the most appropriate methods for monitoring to adequately detect population changes in order to qualify for listing. Many monitoring strategies may not sufficiently detect population declines, while other, more resource intensive methods, may provide greater detail and estimate rates of decline more accurately. Given limited budgets for conservation, the type and frequency of data collected is often compromised and it is unclear which monitoring regimes are most effective. We model a declining population and simulate survey processes to investigate the best monitoring technique for threatened species. We compare the success of two commonly used monitoring techniques at correctly categorizing the species threat status under the IUCN Red List criteria given financial constraints. We demonstrate that the optimal monitoring strategy depends on the budget available and the type and magnitude of the decline. Using these results we suggest guidelines for optimal monitoring for accurately listing species on the IUCN Red List.

442. BETTER CONSERVATION THROUGH CREATIVE COMMUNICATION: SIX STEPS FOR BIOLOGISTS WHO DARE TO SHARE. JUKOFSKY, DIANE; Krenke, Melissa; Bolaños, Nuria. Rainforest Alliance, Apdo. 138-2150, Moravia, Costa Rica, djukofsky@ra.org.

While few biologists would argue that sharing information about their work with colleagues and those living near their research sites will help ensure that their research contributes to long-term conservation success, a surprisingly small percentage makes the extra effort to disseminate information beyond articles published in journals. Between June 2004 and 2005, we invited authors whose articles were published in *Conservation Biology* and *Biotropica* and whose research was done in the Neotropics, to participate in a frequently visited (more than 30,000 visits monthly) trilingual (English, Spanish, Portuguese) Web site and database managed by the Rainforest Alliance called the Eco-Index (www·eco-index·org), where descriptions of their work could be easily searchable and available to the entire conservation community. We describe the results of our outreach and also describe, with examples from biologists who have done research in the Neotropics, six ways that biologists can communicate in order to ensure their research contributes to conservation success, including posting information in the Eco-Index and other Web sites; working with local and international media outlets; giving presentations to local residents, government officials, and NGOs; and preparing posters and brochures.

443. ECOLOGICAL FUNCTIONING OF THE VÁRZEA. JUNK, WOLFGANG J. Max-Planck-Institute of Limnolgy, Tropical Ecology Working Group, August-Thienemann Str. 2, 24306 Ploen, Germany, wjj@mpil-ploen.mpg.de (WJJ).

The large whitewater rivers of the Amazon region, such as the Amazon, Madeira, Purús, Juruá and Japurá Rivers transport large amounts of nutrient rich sediments from the Andes and the pre-Andean region to the Atlantic Ocean. They form extended floodplains along their middle and lower courses, which become every year flooded to a depth of up to 15m, and are locally called Várzea. The flood pulse is rather predictable, because he follows the pattern of dry and rainy season, and has a very strong impact on life history traits of plants and animals. Predictability favours also the development of anatomical, morphological and physiological adaptations to periodic flooding and drought and results in the occurrence of a high number of endemic species. Furthermore, the flood pulse profoundly influences nutrient cycles, primary and secondary production, and decomposition of organic matter. He drives the exchange of organisms, nutrients and organic carbon between the river channel, the floodplain and the connected upland. The hydraulic energy of the river leads to high habitat diversity because it results in small-scale pattern of sediments of different grain size and the formation of different geomorphological units, such as lakes, channels, backwaters, mud flats, sand bars and levees. This favours community diversity and species diversity.

444. AMAZONIAN WETLANDS: CURRENT KNOWLEDGE, ONGOING RESEARCH, AND RESEARCH NEEDS. JUNK, WOLFGANG J.; Piedade, Maria Teresa F. Max-Planck

Institute for Limnology, Tropical Ecology Group, P.O. Box 165, 24302 Ploen, Germany, wjj@mpil-ploen.mpg.de (WJJ); INPA-INPA/Max-Planck Project, Av. André Araújo 2936, P.O. Box 478, 69011-970 Manaus/AM, Brazil, maitepp@inpa.gov.br (MTFP).

Occupation of the Amazon basin by Europeans started in the 17th century, but only since about 1970 has the Brazilian government given priority to connect the Amazon basin to the industrialized southern part of the country. This new policy required scientific research on the natural resources of the area. Wetlands cover about 20% of the Amazon basin. Inland fishery, fertile floodplain soils, and hydroelectric energy offer a large potential for economic development. Although the Amazon River floodplain belongs to the best studied tropical river floodplains in the world, studies in other amazonian wetland areas suffer from lack of inventory and classification. Accelerated economic development is not accompanied by wetland research. Insufficient knowledge about distributio n, size, structure and function of many wetlands leads to increasing degradation and loss of biodiversity. The low number of scientists working in the area and lack of funding require close cooperation in problem-oriented multidisciplinary projects (scientific clustering) to optimize scientific outcome. Intensive, long-term cooperation and scientific exchange with institutions from southern Brazil and from abroad is recommended to improve the scientific infrastructure in Amazonian institutions, to accelerate the transfer of new scientific methods and technology, and to intensify the training program for local human resources.

445. CAPACITY BUILDING NEEDS IN AFRICA. KAHUMBU, PAULA. Lafarge Eco Systems P 0 Box 81995-80100, Mombasa, Kenya, paula.kahumbu@bamburi.lafarge.com.

The future of African biodiversity will depend on the continents ability to protect and manage her natural resources. A global survey was designed to examine what inspires conservationists to work in Africa. Results reveal that most conservationists are driven by the same inspiration, values and ideals, and despite challenges, most western educated Africans return to work in their home countries. Field opportunity at an early age ranked as the most important event influencing interest to work in Africa. However, differential access to resources make it more challenging for Africans to chose a career in conservation compared to expatriates. Weak formal education, lack of jobs, poverty, government red tape, lack of access to finance and access to scientific information were all cited. The survey concludes that African conservationists highly value collaborations with western expatriates for educational and knowledge sharing. While most expatriate conservationists in Africa were content, same aged Africans aspired to achieve much more. We conclude that hooking more Africans onto conservation is essential for the long term survival of the continents heritage. It will involve targeting the young by providing field opportunities and better educational facilities. Once hooked, young conservationists need financial and academic support to be effective. Capacity building needs on the continent are basic, - traditional tertiary education as well as information access, equipment, tools, transport, labs, funds and importantly, good professional support.

446. A FRAMEWORK FOR GRADUATE EDUCATION FOR TROPICAL CONSERVATION AND DEVELOPMENT. Kainer, Karen A.; SCHMINK, MARIANNE; Stepp, John Richard; Covert, Hannah; Bruna, Emilio M.; Dain, Jonathan L. Tropical Conservation and Development Program, Center for Latin American Studies, University of Florida, 319 Grinter Hall, Gainesville, FL 32611-5530, USA (KAK, MS, RJS, HC, EMB, JLD); School of Forest Resources and Conservation, University of Florida, 210 Newins-Ziegler Hall, Gainesville, FL 32611-0410, USA (KAK); Presenter's email: schmink@latam.ufl.edu (MS); Department of Anthropology, University of Florida, 1112 Turlington Hall, Gainesville, FL 32611-7305, USA (JRS); Department of Wildlife Ecology and Conservation, University of Florida, 110 Newins-Ziegler Hall, Gainesville, FL 32611-0430, USA (EMB).

This paper presents a framework for bridging the interface between graduate education in tropical conservation and development, broadening students' skills sets to learn outside their immediate disciplines and think in terms of linked socio-ecological systems, work in teams, negotiate among competing interests, communicate in non-academic formats, and reflect critically on their own perspectives and actions. The University of Florida 's Tropical Conservation and Development program has adopted a learning and action platform that blends theory, skills and praxis to create an intellectual, social, and professionally safe space where students, faculty and other participants can creatively address the multifaceted, complex challenges of tropical conservation and development. This non-degree granting program includes core courses that are team-taught by biophysical and social scientists and a range of alternative learning spaces. Student-led workshops, retreats, incorporation of visiting professionals, practitioner experiences, and a weekly student-led seminar encourage both students and faculty to enhance their skills and systematically and thoroughly reflect on program activities. Challenges include increased service demands on faculty, a redefinition of what constitutes appropriate and quality graduate student research to include effective and equitable collaboration with host country partners, and the tradeoffs and uncertainties inherent in more collaborative, interdisciplinary research.

447. INDIRECT EFFECTS BETWEEN INVASIVE AND NATIVE PLANT SPECIES VIA POLLINATORS: AN EXPERIMENTAL APPROACH. KAISER, CHRISTOPHER N.; Mueller, Christine B. Institute of Environmental Sciences, University of Zurich, Winterthurerstrasse 190, 8057 Zurich, Switzerland, chkaiser@uwinst.unizh.ch (CNK, CBM).

Invasive alien plant species are known to interact with native plants in several ways. There is recent evidence that biotic mutualistic interactions, such as facilitation or competition for pollination can influence plant community composition. In Mauritius, *Psidium cattleianum* is heavily invasive to the upland rain forest, where its flowering season corresponds with that of many endemic plant species. We hypothesised that the presence of *P. cattleianum* flowers will affect the reproductive success of the endemic plant *Bertiera zaluzania* in co-occurring communities. A flower removal experiment was conducted in the Black River Gorges National Park in Mauritius between November 2003 and February 2004. We selected 20 areas of high *P. cattleianum* abundance that had a single *B. zaluzania* female in the centre. Within a 5m radius around 10 target plants, all flowers of the surrounding *P. cattleianum* plants were removed. Pollinator observations and self-pollination experiments were conducted for all target plants. The most abundant pollinator of both plant species was the introduced *Apis mellifera* but there was no significant difference in visitation rate between treatments. Results of fruit and seed set suggested that the reproductive success of *B. zaluzania* was not influenced by the presence of *P. cattleianum* flowers.

448. ARTISANAL FISHING TECHNIQUES IN THE WAZA-LOGONE FLOODPLAIN, CAMEROON: ANALYSIS FOR SUSTAINABLE MANAGEMENT OF HALIEUTIC RESOURCES. KAMOU, EDOUARD. The Jane Goodall Institute, B.P. 11317, Yaoundé Cameroon, (Kamoued@yahoo.fr).

The Waza-Logone floodplain was dramatically altered after construction of the Lake Maga dyke in 1979, and the natural drought of 1980. Reduction of the floodplain area, and alteration of flooding seasons greatly reduced the productivity of fishing in the region The objective of this study was to analyze artisanal fishing techniques; to identify causes of the drastic decline in fishing productivity after the restoration of the floodplain; and to identify participatory community solutions for sustainable management of halieutic resources. Four representative community fishing sites were chosen; data was collected using qualitative and quantitative methods including direct observation, experimental fishing, biometric parameters (sex, height, weight age), fish dissection, and community interviews. Results indicate general degradation of the ichthyofauna; reduced size of caught fish, elimination of *Pellonula miri* and endangerment of thirty one species. Further pressures were placed on halieutic resources through use of non-artisanal fishing equipment, of which 70% is inappropriate for sustainable fishing, as well as population increase by fisherman and their families post-rehabilitation of the floodplain. Results contributed to the development of community activities and revision of the IUCN project. Long term mechanisms to enable local management of fish stock and foodplain resources were implemented.

449. RUSSIAN CASE STUDIES OF ENDANGERED FORESTS. KARPACHEVSKIY, MIKHAIL. Biodiversity Conservation Center. 41, Vavilova street, office 2. 117312 Moscow, Russia. forest@biodiversity.ru.

Russian forests present a wide array of conservation opportunities from the last old-growth forests in Europe in boreal Northern European Russia to the mixed deciduous and conifer forests that are home to the Far Eastern leopard and the Amur tiger in the Russian Far East. Many of these forests are threatened by industrial development and pressure for logging as trade increases with Pacific Rim and European countries. This talk will present the areas of greatest need for conservation in Russian forests and the mapping processes underway to identify them by Greenpeace Russia, the World Wildlife Fund, Global Forest Watch and other agencies and organizations.

450. EFFECT OF LIFE HISTORY TRAITS ON CLIMATIC DEPENDENCY OF SPECIES DISTRIBUTIONS. KARVE, ANJALI D.; Manne, Lisa L. Department of Zoology, University of Toronto, 1265 Military Trail, Scarborough, ON M1C 1A4, Canada, (karve@utsc.utoronto.ca).

Species distributions are partly governed by climatic tolerances. Different species distributions are characterized by different climatic variables, but with some broad generality across species (e. g., many species are limited by extreme temperatures). Identification of these key variables for individual species will improve predictions of their distributions with projected change in climate over time. Species with similar ecology or life history may be linked to the same climatic variables, and thus would be expected to respond similarly to change in those variables. We analyze distribution models for climatic tolerances of South American mammals, and we find that in some cases, climatic dependencies covary with life history traits. As well, the strength of the climatic dependence can be predicted by some life history traits. If strong climatic dependence among ecological groups is a general phenomenon, then in the absence of complete information, life history traits provide a preliminary expectation for how a poorly known species might respond to change in climate.

451. TRADITIONAL KNOWLEDGE FROM CBD TO WTO: A CASE STUDY OF INDIA. KEMEPALI, LENIN BABU; Puttaiah, ET; Pattanayak, Shobhan Kumar; Krishnan, MG. Department of Environmental Sciences, Bangalore University, J.B. Campus, Bangalore, India, klenin@rediffmail.com.

Knowledge of medicinal and economic value of biodiversity can be said to exist at two levels in India, i. e. at society level and at individual level. The knowledge existing at society level is often put to use by the community at many times in general. However, the knowledge at individual level is offered for a cost (however nominal it may be) for instance, medicine for hepatitis. With adoption of WTO and consequent Trade Related Intellectual Property Rights, this knowledge developed over long period is threatened on account of following factors. 1. The individuals are not interested to commercialize the information and they consider this knowledge only to serve the society. 2. Generally, this knowledge is passed only to the male heir of the family. 3. the process of getting patent is to o cumbersome. Lastly, 4. So far hardly any attempt is made by the state to increase awareness of WTO and TRIPS. Similar situation is prevailing in most of the biodiversity rich nations. Unless remeidial action undertaken, we will not only loose the Traditional knowledge but also will be in receiving end on account of TRIPS.

452. PLANNING AROUND WILDIFE AS AN INCENTIVE TO INVOLVE PRIVATE ENTERPRISE IN THE ACHIEVEMENT OF CONSERVATION TARGETS. KERLEY, GRAHAM; Boshoff, André F.; Sims-Castley, Rebecca; Wilson, Sharon L. Terrestrial Ecology Research Unit, Department of Zoology, Nelson Mandela Metropolitan University, P O Box 77000, Port Elizabeth 6031, South Africa, graham.kerley@nmmu.ac.za.

Governments are unlikely to be able to mobilize sufficient resources to meet conservation targets, particularly in developing countries. Involving private enterprise in biodiversity conservation is an option where conservation-orientated landuses are profitable. In the thicket biome, Eastern Cape Province, South Africa, we show that the private game reserve-based ecotourism industry is more lucrative than traditional forms of landuse, and is attracting considerable investment. The number of private game reserves is growing exponentially, and the most important attraction is the wildlife. However, this wildlife is not evenly distributed across the landscape, particularly the charismatic megafauna (e. g elephant and black rhinoceros). Systematic conservation planning, using wildlife populations as biodiversity features, shows areas where private game reserves can be located in order to maximise wildlife species mixes, as well as where further conservation is urgently required. Existing private reserves tend to be located in areas of high wildlife biodiversity and align with regional conservation plans, and contribute significantly to the achievement of conservation targets for selected medium and large-sized mammals. Identified shortcomings in this approach include the overemphasis of areas containing the megafauna in the private conservation estate while neglecting other aspects of biodiversity, and the generally small size of private game reserves.

453. CURRENT CONSERVATION STATUS OF THE YELLOW-BREASTED CAPUCHIN MONKEY (*Cebus xanthosternos*). Kierulff, M. Cecília M.; Santos, Gabriel R.; CANALE, GUSTAVO R.; Guidorizzi, Carlos E.; Cassano, Camila R.; Gouveia, Priscila S.; Gatto, Cassiano A.F.R. Conservação Internacional, Av. Getúlio Vargas 1.300 7o andar, Belo Horizonte, MG, 30.112-021, Brazil (MCMK); Instituto de Estudos Sócio-Ambientais do Sul da Bahia - IESB, Rua Major Homem Del Rey, 147, Ilhéus, BA, 45652-180, Brazil (GRS, GC, CEG, CC, PSG, CAFRG).

Cebus xanthosternos is endemic to a restricted area of the Atlantic Forest of eastern Brazil and one of the 25 most endangered primates in the world. In 2002-2004, we conducted a survey of remaining yellow-breasted capuchin populations throughout its original distribution in order to establish the current status of the species and to identify precisely the threats to its survival. The study has shown that *C. xanthosternos* is one of the most hunted primates for subsistence and it is the preferred pet of the local people. The densities found for the species are very low and a group of 15 individuals needs around 400 ha to survive. The remaining populations are fragmented and isolated and there is no forest large enough to support a viable population of *C. xanthosternos*. Simulations using the Vortex have shown that small population size and hunting are the main cause of the populations extinctions, and the management of the species as a metapopulation will be possible (or recommended) only in few areas - due to the distance between forests, and after a genetic analyzes - we found geographic variation in the color pattern of populations located in the extremes of the species distribution.

454. EXAMINING THE EFFECTS OF AN ENRICHED HATCHERY ENVIRONMENT ON THE NEURAL AND BEHAVIORAL DEVELOPMENT OF SALMON. KIHSLINGER, REBECCA L.; Nevitt, Gabrielle A. Section Neurobiology, Physiology and Behavior, 196 Briggs Hall, University of California, Davis, CA, 95616, USA, rlkihs@ucdavis.edu.

It is well known that hatchery salmon vary phenotypically from their wild counterparts. We have also recently demonstrated that the relative brain size is larger in wild salmon than in fish reared in a hatchery. Together, these phenotypic changes likely contribute to low survival observed when hatchery fish are released into the wild. A number of hatcheries have attempted to improve the post release survival of hatchery fish by implementing enriched hatchery rearing environments. Here we examine how one enrichment strategy influences the phenotypic development of genetically similar strains of steelhead salmon (*Onchorhynchus mykiss*). Results suggest that early exposure (i. e., before yolk absorption) to structural enrichment influences both the neural and behavioral development of young fish. One brain subdivision, the cerebellum, was significantly larger in fish reared with structure. In addition, young fish reared with structure hold more stable positions as alevins (yolk fry), emerge later, and are less aggressive at swim-up than fish reared without structure. Our results suggest that the rearing strategy employed by a hatchery can differentially influence the development of the brain and behavior in salmon, and that management strategies should consider enrichment regimes when designing conservation hatcheries.

455. AN EVALUATION OF THE CONTRIVUTION OF CULTIVATED ALLSPICE (*Pimenta dioca*) TO VERTEBRATE BIODIVERSITY. KING, DAVID I.; Hernandez-Mayorga, Martin D.; Trubey, Richard; Raudales, Raul; Rappole, John H. USDA Forest Service Northeastern Research Station, University of Massachusetts, Amherst, Massachusetts, USA 01003, USA dking@fs.fed.us (DK). Cooperativa CoopeSiuna, Siuna. Nicaragua (MH). Mesoamerican Development Institute, 669 Stevens Street, Lowell, MA 01851-4519, USA (RT, RR). Smithsonian Conservation and Research Center, 1500 Remount Road, Front Royal, VA 22630, USA. (JR).

Tropical deforestation is an important conservation challenge, both because of the high species diversity and rates of endemism of tropical forests, and because of the rapid rate at which this process is proceeding. Recent studies indicate that areas of low-intensity agroforestry have similar levels of vertebrate diversity as some primary habitats, leading some researchers and conservationists to conclude that this type of commodity production could contribute to the conservation of biodiversity. We compared the composition of bird, mammal and herpetofaunal communities in primary forest, secondary forest, and pasture-and within the allspice productive systems that have replaced pasture. We found that mammal species richness was higher in primary forest than all other habitats, however for resident and migrant birds, amphibians and reptiles, species richness was similar between primary forest and the other habitats. Despite similarities in overall numbers of species, there were numerous species that were encountered only in primary habitats. We conclude that the cultivation of allspice in a mixed productive system can offset some of the losses to biodiversity, however it should be complemented by the establishment and maintenance of protected areas to accommodate populations of primary forest specialists that are unable to persist in altered habitats.

456. THE MALAYSIAN BAT CONSERVATION RESEARCH UNIT: RESEARCH, CAPACITY BUILDING AND EDUCATION IN AN OLD WORLD HOTSPOT. KINGSTON, TIGGA; Akbar, Zubaid. Department of Geography, Boston University, 675 Commonwealth Avenue, Boston Massachussets 02215, USA, tigga@bu.edu (TK) School of Environmental & Natural Resource Sciences, Faculty of Science & Technology, University Kebangsaan Malaysia, 43600 UKM Bangi, Malaysia, zubaid@pkrisc.cc.ukm.my (ZA).

Insectivorous bats are a highly diverse yet vulnerable component of vertebrate diversity in Old World rainforests. Nowhere is this more evident than in peninsular Malaysia, a critical country for bat conservation, with over 100 known species of which more than a third are IUCN red-listed. Local species richness can exceed 50 species, and many species are tied by ecomorphological specializations to intact stands of forest. The Malaysian Bat Conservation Research Unit (MBCRU) was established in 2001 to promote research and conservation education of this unique fauna. It is a collaboration between scientists and educators from the USA, Malaysia, and the UK. The primary objectives of the unit are: long-term research on bat diversity and conservation, capacity building, and education and outreach. We present the activities of the MBCRU's first three years with particular emphasis on our efforts to develop a predictive framework to determine local extinction risk in diverse, intact systems. We detail how composite risk profiles are generated from acknowledged vulnerability predictors (abundance, spatial distribution, reproductive phenology, home range, longevity and population turnover rates, and land-

scape and temporal population variability) derived from a simple but standardized, spatially-explicit trapping protocol.

457. CHANGES IN LAND USE AND EFFECTS ON CERRADO CARBON CYCLING. KLINK, CARLOS; Rodin, Patricia; Aduan, Roberto E. Departamento de Ecologia, Instituto de Biologia, Universidade de Brasilia, Brasilia, DF, 70919-970, Brazil, klink@unb.br. Embrapa-Cerrados, Planaltina, DF, 71300-000, Brazil (REA, In Memorium).

Our knowledge about Cerrado carbon cycling has improved. This allows us to compare carbon pools and fluxes of natural savannas with that of Cerrado's most extensive type of land use, planted pastures. Synthesis of estimation shows that fluxes are faster in pastures. Soil respiration is seasonally more variable in pastures than natural savannas and is correlated to soil temperature and cumulative precipitation. Pools in biomass (both above and belowground) are much larger in natural ecosystems than in pastures. Soil organic matter in pastures is slightly larger than in natural Cerrado. Most Cerrado biomass is belowground. Between 70 and 87% of belowground coarse biomass is lost when natural Cerrado is converted to pastures. Conversion of Cerrado is causing changes of the belowground component of ecosystems and raises concern regarding conservation of ec osystem services.

458. CONVERSATION PLANNING IN THE FISH RIVER CATCHMENT, SOUTH AFRICA: PROVIDING STAKEHOLDERS A VOICE IN DESIGNING RURAL FUTURES. KNIGHT, ANDREW T.; Cowling, Richard M.; Campbell, Bruce M. Department of Botany and Terrestrial Ecology Research Unit, University of Port Elizabeth, P.O. Box 1600, Port Elizabeth, 6000, South Africa (ATK, RMC); Research School of Environmental Studies, Charles Darwin University, Darwin 0909, Northern Territory, Australia. (BMC).

Land managers values for natural resources and their vision for their personal futures define the ways they manage landscapes. People's values therefore have implications for conservation planning initiatives. However, systematic conservation assessments and scheduling analyses, cornerstones of conservation planning initiatives, rarely manifest land managers values for nature. Absence of a more representative range of values marginalizes experiential knowledge, and fails to empower land managers. This has implications for the effectiveness of: 1) scheduling analyses; 2) the approaches adopted for mainstreaming systematic assessment outputs; 3) the characteristics of enabling activities; 4) and the types of implementation activities undertaken. Using a suite of tools, we have begun to locally enact a regional conservation plan by providing local land managers a process for voicing and aligning their values for natural resources in the Fish River catchment, in the Eastern Cape, South Africa. Interactive dynamic systems modeling provides a visioning process for exploring sustainable rural futures, participatory rural appraisal techniques empower land managers to voice their values, spatial optimization techniques provides a scheduling tool, and facilitated workshop sessions aim to provide fora for synthesizing the results into a coherent Action Plan.

459. CONTRIBUTION OF THE RED LIST INDEX TO MEASURING SUCCESS ON BIODIVERSITY CONSERVATION: THE CASE FOR MADAGASCAR. KNOX, DAVID; Andriamaro, L.; Brooks, Thomas; Hawkins, F.; Kennedy, E.; Langhammer, Penny; Rabarison, H.; Rakotobe, Z.; Randrianasolo, H.H.; Vynne, S. Center for Applied Biodiversity Science, Conservation International, 1919 M St, NW, Suite 600 Washington DC 20036, USA, d.knox@conservation.org (DHK, TMB, PL). Conservation International - Madagascar, 6 Rue Razafindratandra, PO Box 5178 Antananarivo, 101, Madagascar (LA, FH, HR, ZR, HHR). Conservation International, 1919 M St. NW Suite 600 Washington DC 20036, USA. (EK, SV).

Through the Convention on Biological Diversity, many nations of the world have agreed to significantly reduce the rate of biodiversity loss by 2010. How can we measure changes in the rate of biodiversity loss to track our progress towards this target? Here, we use data from the IUCN Red List to derive a Red List Index (RLI) for the birds, mammals and amphibians of Madagascar. The RLI uses the number of species in each Red List category and tracks the number of species that change categories between assessments due to a genuine improvement or deterioration in status. This study is the first to apply the RLI a cross taxa at a sub-global scale, and reveals continuing deterioration in the status of Madagascar's fauna over the last two decades. The development of RLIs at regional or national scales is one of the most robust indicators that governments can use to report on progress in their contribution to reducing biodiversity loss. We hope that cases where negative RLIs are found will spur further investment in the conservation of species at high extinction risk and of the habitats where they occur - as has happened over the last two years in Madagascar.

460. REINDEER HERDING AND ENVIRONMENTAL PROBLEMS OF TERSKIJ COAST (MURMANSK REGION, THE NORTHWEST OF EUROPEAN RUSSIA). KOVALSKIY, STEPAN. Lab. of Forest Ecology and Typology, Institute of Forest Science Rus. Acad. Sci., Uspenskoje, Odintzovskij district, Prov. Moscow, 143030, Russian Federation, bryum@newmail.ru; "ShanEco" Environmental Firm, 17/2, 2 nd Vysheslavtzev per., Moscow, 127018, Russian Federation, bryum@shaneco.ru.

Researches have been carried out in the neighborhoods of Chavan'ga settlement in the southeast of Murmansk region (the northwest of European Russia), 66° 08' North, 37° 45' East. Our tasks included carrying out multidisciplinary researches and environmental investigation. The most serious environmental problem is soil erosion. The low strength of the sod in the conditions of relatively high latitudes aggravates the situation. Due to absence of a road system in the territory and the small number of settlements, these difficulties, extremely strongly expressed in the neighbourhoods of the settlements, do not threaten essentially the landscape as a whole. A decrease in sheep quantity has been an additional positive influence. We have also found erosive soil damages far from inhabited settlements. There were no other indications of anthropogenic influence in those places. The cause of these damages is increasing pasture of reindeer. The wild reindeer destroy the sod, contribute to erosion processes in the natural landscapes, and reduce their pastoral value, competing with the herded reindeer. The wild reindeer population is actually bounded only by productivity of the pastures. Regulation "from above" does not take place, as there are no capable predators after wolves were eliminated. Global erosive damage of the soil cover in the natural landscapes of Terskij coast can be resulted from excess numbers of reindeer due to absence of predators, extensive deer-herding and legal problems with hunting.

461. LICHEN COMMUNITY STRUCTURE AND DIVERSITY IN NATIVE FORESTS AND FOREST MOCULTURES OF SOUTHERN BRAZIL. KRÄFFER, MARCIA; Ganade, Gislene; Marcelli, Marcelo. Laboratório de Ecologia da Restauração, Biologia, UNISINOS, cp 275, São leopoldo, RS, CEP: 93022970, Brazil, gganade@bios.unisinos.br (GG, MK). Instituto de Botânica de São Paulo, cp 4005, São Paulo, SP, CEP 01061970, Brazil (MM).

Anthropogenic alterations of forest habitats could lead to substantial modifications in lichen diversity. This work investigates possible changes in lichen composition and diversity when native forest is replaced by forest monocultures. Lichen surveys were performed at the National Forest of São Francisco de Paula, southern Brazil in four habitats: native Araucaria forest, and plantations of *Araucaria*, *Pinus* and *Eucalyptus*, three replicates each, 12 areas in total. In each area, ten host-trees were randomly chosen and surveyed from 30 to 150 cm in trunk height. We registered 78 lichen species. Most shade tolerant species were in the native forest while most light demanding species were in the exotic tree plantations. Araucaria plantations showed signific antly higher diversity, probably because *Araucaria angustifolia* is an excellent host-tree. Additionally the high light levels found in the Araucaria plantations favored the establishment of lichens from the native forest canopy. In conclusion, the conversion of native Araucaria forests to forest monocultures could lead to losses of shade tolerant species. The establishment of forest monocultures using the native tree *Araucaria angustifolia* instead of exotic tree species led to the preservation of a higher lichen diversity in the landscape.

462. A LONG TERM BIODIVERSITY INVENTORY IN THE EASTERN CHACO OF ARGENTINA. KRAPOVICKAS, SANTIAGO; Di Giacomo, Alejandro G.; Götz, Pablo. Departamento de Conservación, Aves Argentinas/AOP. 25 de mayo 749 2º p Of. 6, C1002ABO Buenos Aires, Argentina, krapovickas@avesargentinas.org.ar (SK, AGDG). Estancia El Bagual, San Francisco de Laishi, 3601, Formosa, Argentina, info@alparamis.com.ar (PG).

El Bagual Ecological Reserve is a private protected area of 3,300 hectares located in the eastern Chaco savanna in the Province of Formosa, Argentina (26° 11' S; 58° 57' W). The reserve has a permanent biological station. From 1987 to 2004 one resident naturalist and several visiting researchers conducted biodiversity surveys and compiled an inventory of vascular plants and vertebrate animals. The numbers of species recorded at El Bagual were: 567 plants, 44 fishes, 33 amphibians, 54 reptiles, 336 birds and 56 mammals. At least 59 of the animal species are of high national conservation concern, and 21 are included in the 2004 Red List of the IUCN. Birds were the focus of one of the largest ornithological research program in the Chaco region. A total of 147 migratory species (Neotropical and Austral), and 197 breeding species were recorded. Extensive nest monitoring was performed, with 4133 nests belonging to 125 species, rendering new data on breeding biology and behavior. Next steps include the development of population and behavioral studies on threatened species.

463. POPULATION SIZE, INTERPOPULATION DISPERSAL RATE, INBREEDING, AND POPULATION STRUCTURE IN *Sistrurus catenatus catenatus*. KROPIEWNICKI, RACHAEL M.; Moore, Jennifer A.; Swanson, Bradley J. Central Michigan University, 217 Brooks, Mt. Pleasant, MI, 48858, USA, kropi1rm@cmich.edu.

Eastern massasauga (*Sistrurus catenatus catenatus*) populations are in decline. Outside of Michigan, they form genetically unique, isolated populations with limited interpopulation dispersal. Currently, Michigan serves as their last stronghold in the United States. With an estimated 77% of historical populations remaining, this suggests a unique situation allowing for their prolonged persistence. We examined the amount of gene flow between Michigan populations to determine the degree of population structure and interpopulation dispersal. We analyzed ten microsatellite loci from five populations in Michigan with STRUCTURe which indicated that Michigan consists of a single large population. However, we found less allelic diversity (A=4.9) and lower heterozygosity (H=0.49) than previous studies. Using BOTTLENECK, we found significantly more heterozygosity than expected for the observed allelic diversity, indicating Michigan's eastern massassauga populations have recently experienced a bottleneck. We suggest that Michigan's populations have persisted due to greater gene flow between populations. However, the recent bottleneck suggests that Michigan's populations should be carefully monitored for evidence of future decline and genetic problems arising from reduced interpopulation dispersal.

464. FECAL STEROID EVALUATION FROM FEMALE HOWLER MONKEYS (*Alouatta caraya*) MEASURED BY RADIOIMMUNOASSAY. KUGELMEIER, TATIANA; Carvalho, Reinaldo A.; Guimarães, Marcelo A. B. V.; Felippe, Érika C. G.; Castro, Paulo H.; Oliveira, Claudio A. Departamento de Reprodução Animal, Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo, São Paulo, 05508-000, Brazil, tkvet@hotmail.com (TK, MABVG, ECGF, CAO). Centro Nacional de Primatas, Secretaria de Vigilância em Saúde, Ministério da Saúde, Ananindeua, Pará, 67030 - 000, Brazil (RAC, PHC).

The goal of this work was to develop a non-invasive technique for the study on females *Alouatta caraya* reproduction. Feces from five females mantained in captivity at the Centro Nacional de Primatas (CENP), Brazil, were collected on alternated days during five months, for fecal estradiol and progesterone metabolites measurement by radioimmunoassay. Fecal estradiol and progesterone metabolites concentrations were significantly lower for two females (2.00 ± 0.04ng/g and 25.36 ± 7.00ng/g of wet feces, respectively), which presented almost no variation along the study period. The median ± SEM of fecal estrogens concentrations for the other females was 711.55 ± 79.67ng/g for peak values and 130.51 ± 10.83ng/g of wet feces for basal values. The interval between two estradiol peaks was 20.00 ± 0.51 days, and the values remained elevated for a period of 10.00 ± 0.59 days. Progestins median of peak and basal concentrations were 2653.54 ± 106.96ng/g and 149.88 ± 12.10ng/g of wet feces, respectively. The period between two estradiol peaks found in this study is very similar from the ovarian cycle duration described in other studies based on vaginal cytology and behavioral observation. These results demonstrate the efficacy of fecal steroid metabolites measurement in studies about howler monkey's endocrinology of reproduction. We are thankful for CENP and FAPESP (protocol 02/10920-5).

465. TESTING THE USE OF A LAND COVER MAPFOR HABITAT RANKING IN BOREAL FORESTS. KUITUNEN, MARKKU; Hilli, Milla. Department of Biological and Environmental Science, University of Jyväskylä, P.O. Box 35, FIN-40014 University of Jyväskylä, Finland, markku.kuitunen@jyu.fi.

Habitat loss and modification is one of the major threats to biodiversity and the preservation of conservation values. The importance of identifying and preserving conservation values has increased with the decline in biodiversity and the adoption of more stringent environmental legislation. In this study, conservation values were considered in the context of land use planning and the rapidly increasing demand for more accurate methods of predicting and identifying these values. We used a *k* -nearest neighbour's interpreted satellite (Landsat TM) image classified in 61 classes to assess sites with potential conservation values at the regional and landscape planning scale. Classification was made at the National Land Survey of Finland for main tree species, timber volume, land use category and soil on basis of reflectance in satellite image and a wide reference data. As indicators we used the number and rarity of vascular plant species observed in the field. We stated that if there were significant differences in the species richness, rarity or composition of flora between the satellite image classes, there would also be a difference in conservation value between these classes. The original satellite image classification was correct for 70% of the sites studied. We concluded that interpreted satellite data can serve as a useful source for evaluating habitat classes on the basis of plant species richness and rarity. Benefits of interpreted satellite image reclassification as a rapid conservation value assessment tool for land use planners would be great.

466. CATCH ME A COLOBUS? EFFECTS OF HUNTING ON VULNERABLE SPECIES IN EQUATORIAL GUINEA. KÜMPEL, NOËLLE F. Institute of Zoology, Zoological Society of London, Regent's Park, London NW1 4RY, UK and Department of Environmental Science and Technology, Imperial College London, South Kensington Campus, Exhibition Road, London SW7 2AZ, UK. noelle.kumpel@ioz.ac.uk.

The bushmeat trade is threatening wildlife populations across West/Central Africa. However, species vary in their ability to withstand hunting. In continental Equatorial Guinea most bushmeat is trapped, but shotgun-hunting is increasing as guns become more available and affordable and terrestrial prey becomes scarce. The effects of hunting on different species were studied over 15 months, using a market survey in the city of Bata (recording 14,000 animals), and for the village of Sendje and sites within nearby Monte Alén National Park (PNMA), an offtake survey (recording 10,000 animals), hunter follows and mammal surveys covering 400km of permanent line transects in two sites with differing hunting histories. 35 km from Sendje inside PNMA, gun-hunting pressure was recent and light and the density of black colobus (*Colobus satanus*) high at 57 ind./km^2. However around Sendje itself, where gun-hunting was long-established, *C. satanus* were virtually absent. Being slow and large-bodied, *C. satanus* are susceptible to gun-hunting, hence are good indicators of overhunting. About half the primates recorded in Sendje's offtake were *C. satanus*, compared to one-tenth in Bata's market sample, suggesting that PNMA is an important stronghold for this species. Enforcement of protected species and areas is needed to safeguard the future of such vulnerable species.

467. NESTING SUCCESS IN CRITICALLY THREATENED BLUE-THROATED MACAWS *Ara glaucogularis* IN BOLIVIA: INTERVENTION TECHNIQUES AND RECRUITMENT ENHANCEMENT. KYLE, TOA; Gilardi, James D. World Parrot Trust-Bolivia, Casilla #101, Trinidad, Beni, Bolivia, kyle@worldparrottrust.org. World Parrot Trust, 725 Peach Place, Davis, CA, USA, 95616, gilardi@worldparrottrust.org.

Harvested to a near-extinction for the international pet trade, the Blue-throated Macaw *Ara glaucogularis* is now the most critically threatened wild macaw; 70-100 individuals remain loosely distributed over a vast area of 27,000 km². Concerns about disturbance of adults and low recruitment prompted an initial study of nesting in 2002. We report here on 22 nesting attempts during 2003 and 2004. Nests were frequently usurped by larger Blue-and-Yellow Macaws (*Ara ararauna*, 27%, n=6) or suffered predation (18%, n = 4) by Toco Toucan *Ramphastos toco* (n=2), Crane Hawk *Geranospiza caerulescens* (n=1), and one unidentified predator (n=1). Permission to actively intervene and facilitate nesting success was granted late in 2004 when two nests remained active, each with one chick. Both nests were actively managed to successful fledging in late January 2005. These nesting pairs faced manifold threats including harassment from other parrots, raptors, and bats, as well as ecto- and endoparasites and undiagnosed weight loss in one chick. Remedies to most threats proved straightforward and effective, suggesting that intensive and active management of Blue-throated Macaw nests enhances recruitment. Disease studies in sympatric parrots and conservation management of select captive birds may also play essential roles in the species' recovery.

468. DETECTING AND PREDICTING LAND COVER CHANGE IN THE VENEZUELAN NORTH-CENTRAL REGION: A SEARCH FOR LOCAL CONSERVATION PRIORITIES. LACABANA, PABLO; Portillo-Quintero, Carlos; Carrasquel, Fabián. Asociación Civil PROVITA, Av. Las Acacias, Los Caobos. Edif. Torre La Previsora, Piso 15, Ofic. 15-1, Caracas, Venezuela, biodiversidad@provitaonline.org (PL, FC, CPQ).

Based on the fact that detection and prediction of changes in regional critical areas may lead to more effective conservation efforts, we conducted a supervised classification of Landsat images from 1986 and 2001 over the north-central terrestrial ecosystems of Venezuela, a region of high biodiversity but also intensive human pressure. Tropical evergreen forest (EGF), semideciduous forests (SDF) and dry forests (DF) were mapped with an overall accuracy of 87%. Comparisons showed that 30%, 13% and 3% of DF, SDF and EGF disappeared in 15 years, respectively. The probability of total conversion of the three forest ecosystems to non-forest in the next 100 years was assessed using Markov Chain Analysis obtaining a probability of 0.91, 0.64 and 0.29 for the DF, SDF and E GF, respectively. Further analysis indicated a greater risk for the DF fragments to disappear given their critical size, non-protected status and rate of deforestation. Current trends predict high-stress scenarios for the DF related animal and plant communities in the future. To address this, we recommend implementing special protection to relatively large DF remnants and promoting the sustainable management of heavily fragmented DF areas. We also recommend establishing an ecological corridor that connects four important protected areas.

469. USE OF TRACK STATIONS TO EVALUATE THE OCCURRENCE OF DOMESTIC DOG AND WILD MAMMALS AT BRASILIA NATIONAL PARK, BRAZIL. LACERDA, ANA CRISTYNA R.; Moraes Tomás, Walfrido; Marinho-Filho, Jader. PG Biologia Animal, Depto Zoologia, Uni-

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The occurrence of domestic dog (*Canis familiaris*), maned wolf (*Chrysocyon brachyurus*), giant anteater (*Myrmecophaga tridactyla*), crab-eating raccoon (*Procyon cancrivorous*) and tapir (*Tapirus terrestris*) with regard to habitat variables was studied at Brasília National Park (PNB), central Brazil. Track stations (n = 143) consisting of a 2 x 2 m box filled with sand, separated from each other by one kilometer were constructed along dirt roads in the PNB. They were examined for tracks of the studied species. A stepwise logistic regression showed a significantly negative association between the occurrence of *C. familiaris* and distance from the park edge (P = 0.0246, df = 1) and the presence of dogs in PNB is considered as an edge effect. A simulation of the probability of occurrence of each species conducted using the combination of habitat variables in a resource selection probability function showed the occurrence of maned wolf was positively associated to the distance of the dumping site (P = 0.0101, df = 1), and negatively associated to presence of dogs tracks in the tracks stations (P = 0.001, df = 1). In areas where domestic dogs were present, the probability of maned wolf occurrence was 0.268, and in areas with no dog signs it was 0.634. The occurrence of crab-eating raccoon was associated to the ecotone of "campo sujo" and gallery forest (P=0.0250, df = 1) and giant anteaters were positively associated to the ecotone of "cerrado *sensu strictu* "and "campo cerrado" (P=0.0089, df = 1). Tapirs were not significantly associated to the habitat variables examined in this study (c2 = 35.17, P < 0.0001). Control programs for domestic dogs should be addressed to the matrix surrounding the park, as the results suggest that dogs are restricted to its border and to human settlements, especially urban and sub-urban areas.

470. ONE RESTORATION EFFORT DOES NOT BEGET ANOTHER: NATIVE ANTS IN MAURITIUS DO NOT BENEFIT FROM PLANT RESTORATION EFFORTS. LACH, LORI; Suarez, Andrew V. Mauritian Wildlife Foundation, Grannum Road, Vacoas, Mauritius, Indian Ocean (LL) University of Illinois, School of Integrative Biology, Depts. Of Entomology and Animal Biology, 320 Morrill Hall, 505 S. Goodwin Avenue, Urbana, IL 61801, USA (LL, AVS) (llach@uiuc.edu).

Mauritius, like many other small island states, suffers from on onslaught of invasive floral and faunal species. Native plant restoration projects have been ongoing for several decades, but their effects on native invertebrate populations have never been measured. Ants are of particular interest because they play important and varied roles in the ecosystem and because of their usefulness as indicators of community health. We used four methods (pitfall traps, Berlese funnels, baiting, and direct observations) to survey 10 sites that have been cleared of invasive plants and 10 paired adjacent sites that have not been weeded in upland and lowland forests and heath habitats to determine whether native ants have persisted and whether they are associated with native vegetat ion. Results to date from all methods combined indicate that native ants are more likely to be found in non-weeded sites. Weeded and non-weeded sites do not differ in ant species richness, but weeded sites have greater ant abundance and a higher proportion of introduced ants than non-weeded sites. Disturbance created by weeding and higher levels of human foot traffic in weeded sites may increase the likelihood of non-native ants being introduced and persisting in weeded sites.

471. CLIMATE, DUST, AND DISEASE: THE CAUSE OF THE LATE PLEISTOCENE MEGAFAUNAL EXTINCTIONS? LACKEY, JAMES ALDEN. Department of Biology, Oswego State University, Oswego, NY 13126, USA, lackey@oswego.edu.

The cause of the mammalian megafaunal extinction occurring at the Pleistocene-Holocene transition (ca. 11,000-9,000 years ago) when the earth's climate shifted from ice age conditions to present conditions continues to elude identification. The "overkill," "climate," and "hyperdisease" proposals to account for that extinction have been championed vigorously for many years but none has achieved general consensus because each, as a single cause, is perceived as having fatal drawbacks. Severe climatic conditions that caused dust storms in which disease organisms were transported are proposed here as the primary cause of much of that megafaunal extinction. Transport of disease organisms by dust storms in modern times is now well documented in the literature. Immense dust storms occurred at the Pleistocene-Holocene transition (and earlier in the Pleistocene), and they occur today although probably are not as severe. Eastern Asia and northern Africa commonly were (and are) origins of dust storms; southern Asia and northern Africa are proposed as primary sources of pertinent disease organisms. The possible reoccurrence of climatic conditions like those of the past, and the associated transport of disease organisms, represents an immediate threat to existing ecosystems. It is imperative that new ideas about extinction events be generated and evaluated.

472. A BEHAVIORAL ECOLOGY APPROACH MOTIVATES COMMUNITY-BASED CONSERVATION. LAFLAMME, MICHAEL. Center for Research on Occupational and Environmental Toxicology, Oregon Health Sciences University, 3181 Sam Jackson Park Rd, Portland OR (USA) laflamme@ohsu.edu.

Sustainable conservation requires that human communities learn to care for other species. I developed and tested a method for motivating communities to conserve endangered native fish. Indigenous and non-Indigenous participants from children to adults (n=1200) assessed native fish habitats and behavior in the field and in microcosms. A strategy involving participants in both animal behavior and ecology was necessary to increase non-material benefits for helping. This strategy enabled participants to interpret detailed fish behavioral interactions with a range of habitat qualities. The resulting understanding increased perception of: fish worldviews; human impacts on fish and microhabitats; similarities with fish physiology, behavior, and lives; non-material benefits in return for helping fish; social benefits among observers; and a conservation-based social identity. For example, perceptions of negative effects of runoff on fish behavior were 50% higher than perception of runoff effects on habitat. Participants developed 65 concepts about fish-human-habitat interdependence and designed effective conservation plans, resulting in a 6-step behavioral ecology model for community-based conservation planning. I am applying this model with tribal and non-tribal communities in the Columbia River Basin (USA) to reduce exposure to toxins that affect the development and behavior of fish and people.

473. EVALUATING THE INFLUENCE OF EL NIÑO SOUTHERN OSCILLATION CLIMATIC CYCLES ON VICUÑA (*Vicugna vicugna*) HABITAT QUALITY IN THE CHILEAN ALTIPLANO. LAKER, JERRY; Herreros de Lartundo, Jorge; Muñoz, Alejandra; Bonacic, Cristian; Gordon, Iain. Macaulay Institute, Craigiebuckler, Aberdeen. AB15 8QH, UK. Email: j.laker@macaulay.ac.uk (JL); Corporacion Nacional Forestal (CONAF), Tarapacá, Chile. (JHL); Fauna Australis, Pontificia Universidad Catolica de Chile, Santiago, Chile. (AM); CSIRO, Townsville Australia. (CB).

Following the introduction of protection measures for vicuña in the Chilean altiplano, the population recovered from 2,500 in 1975 to more than 26,000 in 1990. Since that peak, numbers have been steadily falling. The most recent population census, in 2003, recorded 15,000 individuals. With recent development of management systems for capture, shearing and release of wild vicuñas, it is important to evaluate the conservation risk, given that this population has apparently not stabilized. Previous studies by Bonacic *et al.* indicated that density-independent factors (primarily climate) appear to have an important impact on vicuña population biology. The present study investigates the interaction between variation in habitat quality and vicuña reproductive success. Using satellite imagery (NASA-AVHRR and SPOT VEGETATION) a detailed picture of biomass distribution, and resource phenology was prepared for the study zone since 1981. This clearly shows the profound influence that El Niño Southern Oscillation (ENSO) climate cycles have on altiplano vegetation. There are strong indications that the alternating 4-7 year cycle of drought and rain has interacted with local herbivore distribution and abundance, and possibly contributed to the observed fall in vicuña numbers, which occurred primarily in more marginal (sink) areas of available habitat.

474. CHYTRIDIOMYCOSIS EPIDEMICS AND A SEVERE DRY SEASON PRECEDE THE LOCAL DISAPPEARANCE OF THREE ATELOPUS SPECIES FROM THE VENEZUELAN ANDES. LAMPO, MARGARITA; Rodríguez, Argelia; La Marca, Enrique; Daszak, Peter. Centro de Ecología, Instituto Venezolano de Investigaciones Científicas, Apartado 21827, Caracas 1020-A, Venezuela. Facultad de Ciencias, Núcleo La Hechicera, Universidad de los Andes, Mérida 5101, Venezuela. Museo de Historia Natural La Salle. Apartado 1930. Caracas, Venezuela.dc Laboratorio de Biogeografía, Facultad de Ciencias Forestales y Ambientales, Universidad de Los Andes, Apartado 116, Mérida 5101-A, Venezuela. Consortium for Conservation Medicine, Wildlife Trust, 61 Route 9W, Palisades, NY 10964, USA.

Chytridiomycosis has been implicated in the population declines of many amphibian species. Between 1988 and 1994, five *Atelopus* species endemic to the Venezuelan Andes disappeared from this region. Here, we examine histological samples of all Andean *Atelopus* specimens available in the major Venezuelan museum collections for the presence of *Batrachochytrium dendrobatidis*. Where infection was detected other species were also examined to investigate how widespread the pathogen occurred. *B. dendrobatidis* was observed in seven *Atelopus*, one *Mannophryne* and one *Leptodactylus* species. The spatio-temporal patterns of the prevalence of this pathogen in *Atelopus* individuals, with all infections concentrated in one year but spread over distant locations, suggests that synchronized epidemic outbreaks occurred in populations of *A. carbonerensis*, *A. mucubajiensis* and *A. sorianoi* in the years prior to their disappearances. Local climatic data indicates that one of the most severe dry seasons recorded in the region coincided with these epidemic events. The climatic-linked hypothesis seem as a plausible explanation for the coincidence between the observed *Atelopus* declines, the chytridiomycosis outbreaks and the droughts recorded in that area, although the lack of evidence of other epidemic outbreaks represents an important gap in the information available.

475. SEED DISPERSAL DISTANCE BY GOLDEN LION TAMARINS (*Leontopithecus rosalia*): CONTRIBUTION FOR THE RAIN FOREST CONSERVATION. LAPENTA, MARINA J.; Procópio de Oliveira, Paula. Pós-Graduação em Ecologia, IB-USP; marina@micoleao.org.br (MJL). Associação Mico-Leão-Dourado (AMLD). C.P. 109-995 Casimiro de Abreu, RJ-Brasil 28860-000 (MJL, PPO).

Two groups of golden lion tamarins were studied from April, 2003 to March, 2004, in the União Biological Reserve, RJ. Seed dispersal and diet data were collected during six complete days each month. All the trees where the tamarins eaten fruits were marked and the position were located in a map of the area. Also all the tamarins feces collected with seeds had their registered position. The distance of seed dispersal was calculated for 131 defecations (33 species) through ArcView GIS 3.2 (Environmental System Research Institute) - Animal movement extension to Arcview ver. 2.0. The mean distance for all species was 110,2 meters and vary from 0 (for *Calycorectes* sp.1) until 748,13 meters (*Cecropia pachystachya*). The seed dispersal through long distances may help pioneer trees to invade gaps inside forest, where the adults' densities are very low. The Golden Lion Tamarin Association, as a tool for the tamarin conservation, is establishing forest corridors, linking isolated populations located on fragments. This work will help in the chosen of plant species to be used in the corridors, fundamental for the species conservation and their habitat restoration.

476. LOW GENETIC VARIABILITY AND DISTINCT MANAGEMENT UNITS IN POPULATIONS OF THE ENDANGERED *Bradypus torquatus* (XENARTHRA), DEFINED BY mtDNA ANALYSES. LARA-RUIZ, PAULA; Santos, Fabrício R.; Garcia Chiarello, Adriano. Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, 31.271-010, Brazil, paula_lara@yahoo.com (FRS, PLR). Programa de Mestrado em Zoologia de Vertebrados, Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte, MG, 30.535-610, Brazil (AGC).

B. torquatus is a poorly-known endangered species restricted to Atlantic Forest fragments in four states of southeastern Brazil. This work analyzed data of animals from the three largest remnant populations. The objective was to identify genetic patterns that could indicate population substructuring, and to produce genetic diversity estimates. The analysis of sequences from the mitochondrial control region indicated that the populations from each state (BA, RJ and ES) are historically isolated. There were no shared haplotypes between these populations and hierarchical variance analysis indicated a high degree of population differentiation (F_{ST} = 0.96). Network analysis evidenced an extremely discontinuous distribution, thus, the species displays a strongly marked phylogeographic pattern. Besides, there is high genetic differentiation between clusters of haplotypes found in each state and the haplotype diversity estimator (*h*) calculated for each cluster varies between 0 and 0.6±0.3. These results indicated that populations from each state can be considered as evolutionary significant units (ESUs) and emphasize the need to manage separately each of the remaining sloth populations. The results have strong conserva-

tion implications since current management actions undertaken by Brazilian managers may not be appropriate to preserve the genetic diversity of the species and the evolutionary distinctiveness of its populations.

477. WHICH SURROGATES TO USE FOR PRIORITY-SETTING? A COMPARISON OF HIGHER-TAXON DATA AND SINGLE TAXON INDICATOR GROUPS. LARSEN, FRANK WUGT. Zoological Museum, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen, Denmark, fwlarsen@zmuc.ku.dk.

Faced with an urgent need to identify key areas for conservation and an inadequate knowledge on the distribution of biodiversity, conservation biologists need to test which surrogates for biodiversity that may provide a pragmatic shortcut for rapid identification of key areas for conservation. I used an extensive data set on the distribution of 939 mammals and 1922 birds in sub-Saharan Africa to perform a study that directly compares the relative performance of two biodiversity surrogates: the use of higher-taxon data (i. e. genus and family) versus the use of species in a single taxon. E. g. if we aim to conserve mammals, would it then be genus and family data for mammals or species data for birds that provide best guidance for conservation? Networks of priority areas were identified for the two surrogates and the analyses reveal that none of the two approaches performs consistently better in representing species than the other. This pattern holds for representation of range-restricted and threatened species.

478. CONSEQUENTIAL COPROPHAGES: DIVERSITY PATTERNS, SPECIES RANGES & INTERACTIONS BETWEEN DISTURBANCE REGIMES, DUNG BEETLE COMMUNITIES & PLANT REGENERATION. LARSEN, TROND. Dept. of Ecology & Evolutionary Biology, Princeton University, Princeton, NJ 08544, USA. tlarsen@princeton.edu.

Various anthropogenic disturbances are rapidly altering biological communities and further destabilizing ecosystem integrity by disrupting species-driven functional processes. Tropical dung beetles can be highly diverse and abundant, and perform several ecosystem functions. In various neotropical forests, I found that beetle communities changed distinctly across habitat types. Even within one Amazonian habitat type, species composition turned over rapidly with only a few hundred kilometers. Along elevational gradients, species showed narrow vertical ranges, and congeners were strongly spatially segregated. Beetle communities were negatively impacted by fragmentation, hunting, logging history, plantations, cattle-ranching, agriculture and other kinds of land-use. Most disturbed habitats showed reduced beetle species richness, abundance and biomass compared to primary habitat. Habitat degradation also altered composition and shifted species' range distributions. In forest fragments, the largest beetles were most extinction-prone and most functionally important for dung burial. Dung beetles act as secondary seed dispersers by burying seed-laden dung. Because plant species had different optimal burial depths, interspecific differences in size and behavior may cause dung beetle diversity to promote plant diversity. Many disturbance regimes are probably disrupting plant regeneration by negatively influencing dung beetles. Understanding functional consequences of how disturbances affect biodiversity is essential for protecting ecological processes sustaining healthy ecosystems.

479. THE INVASIVE NATURE OF VINES: A CONTRAST OF NATIVE AND INVASIVE CONGENERS. LARSON, KATHERINE. Department of Biology, University of Central Arkansas, Conway, AR, 72058, USA, klarson@uca.edu.

Vines are overrepresented as invaders on a global scale, and are overwhelming competitors once established. By depending on other plants to provide support, vines can allocate resources to shoot elongation rather than stem girth. The result of increased allocation to apical meristems is rapid growth of vine shoots through a habitat of comparatively immobile plants. *Lonicera japonica* is a serious global invader, with invasive populations in the USA and New Zealand, and establishment in Brazil and Chile. I examine the traits that contribute to invasiveness in vines, specifically comparing the movement of *L. japonica* to its native, non-invasive congener, *L. sempervirens*. Both congeners are highly mobile compared to non-vines, but *L. japonica* moves more rapidly through a matrix of relatively immobile plants than *L. sempervirens* due to its more specialized circumnutation patterns and its greater morphological plasticity. The result of this greater mobility is a 20% increase in colonization of artificial support hosts compared to the non-invasive *L. sempervirens*. Five other congeneric vine pairs support my conclusion that vines are a unique class of invaders that gain their advantage through great mobility. The traits associated with mobility in vines could be used to screen ornamentals before their sale.

480. REINTRODUCTION DOES NOT AFFECT HABITAT SELECTION MODALITIES OF GRIFFON VULTURES. LE GOUAR, PASCALINE; Lecomte, Nicolas; Sarrazin, François. UMR 5173 MNHN/CNRS "Conservation des espèces, restauration et suivi des populations" (CERSP), case postale n° 50, 61 rue Buffon, 1er étage, 75 005 Paris, France, legouar@mnhn.fr.

Local dispersal and local colonization events are important factors for population's long term viability and thus they could be decisive for reintroduction success. Little is known on how reintroduction could affect breeding dispersal modalities of reintroduced populations and how dispersal modalities, such as breeding habitat selection, could affect the settlement of reintroduced animals. We compared two colonies of Griffon vultures (*Gyps fulvus*) in South of France, one natural and one reintroduced. In those colonies, nesting cliffs were monitored between 1970 and 1998 for the natural one and since reintroduction event in 1982 for the reintroduced one. Each year, number of breeding pairs and feldged birds were checked. We showed that in both colonies breeding habitat sel ection seemed to be affected by conspecific reproductive success with no difference between natural and reintroduced populations. In the reintroduced colony, we analysed the local dispersal histories of breeding pairs identified in regard to density, to genetic structure and to spatial factors (location and characteristics of nests). Results confirmed that conspecific reproductive success was the main factor which determined local dispersal and local colonization events in this species. This should be considered in planning reintroduction strategies and management of spreading of reintroduced colonies.

481. CASE STUDIES OF ENDANGERED FORESTS: CANADIAN BOREAL FORESTS. LEE, PETER. Global Forest Watch Canada. 10337 146 Street, Edmonton, Alberta, Canada. T5N 3A3. gfwcanada@shaw.ca.

The Canadian Boreal forest is one of the largest remaining intact wilderness forests on the planet. It is one of the last regions with wide-scale, intact predator-prey relationships, with relatively

undisturbed habitat of 50,000 hectares and greater. The region is critical for protecting caribou and other large mammals, migratory songbirds and waterfowl and maintaining ever-diminishing forests where natural systems predominate. Although these forests have escaped large-scale conversion, they are being rapidly opened up for their timber, energy and mineral resources and recreational opportunities. Developing maps of High Conservation Value Forests and Endangered Forests across the Canadian Boreal forest will require mapping of intact ecosystems, focal conservation species' habitat such as woodland caribou, wolverine, migratory songbirds and waterfowl, as well as watershed and carbon storage values.

482. THOUSANDS MISSING? THE STATUS OF MYANMAR'S ELEPHANTS. LEIMGRUBER, PETER; Wemmer, Chris; Kelly, Dan; Müller, Thomas. Smithsonian's National Zoological Park, Conservation and Research Center, 1500 Remount Road, Front Royal, VA 22630, USA, leimgruberp@si.edu (PL, CW, DM, TM). California Academy of Sciences, 875 Howard Street, San Francisco, CA 94103, USA (CW).

No other country in Asia has been so closely identified in the popular imagination with elephants than Myanmar (Burma). Books by J. H. Williams-better known as "Elephant Bill"-have greatly contributed to this popular fame. Yet, despite this prominence, little is known about the status of remaining Asian elephant populations in that country. In collaboration with the Myanmar Forest Department, the Smithsonian conducted a National Elephant Conservation Workshop and Symposium in May 2004. Elephant experts from around the country met in Myanmar's capital city to discuss the distribution and status of wild elephant populations. In addition, the experts evaluated current people-elephant conflicts and other threats to the survival of wild elephants in Myanmar. We have combined the information from the workshop with data from population surveys, tracking and people-elephant conflict studies the Smithsonian has conducted. The results indicate that Myanmar's wild elephant population is probably much lower than the previously estimated 6,000 to 10,000.

483. DOES SERRA DO CIPÓ NATIONAL PARK - MG, BRAZIL ASSURE ANUROFAUNA CONSERVATION ON A REGIONAL EXTENT? LEITE, FELIPE S. F.; Pacheco, Bruno G. Mestrado em Zoologia de Vertebrados, PUC Minas, Belo Horizonte, MG, 30430-020 Brazil, pjandaia@yahoo.com.br (FSFL). Departamento de Biologia Geral, Universidade Federal de Minas Gerais, Belo Horizonte, MG, 31170-370, Brazil (BGP).

Serra do Cipó National Park (Cipó) located in Minas Gerais, is considered one of the best sampled areas of the state and has been pointed out as one of the greatest spots for conservation of "campos ruprestres" amphibians. Most of its area is located at the southwestern portion of the Espinhaço Range and the contribution of Cerrado's species on the local anurofauna is high. Due to disparities biome (Cerrado / Atlantic Forest) influences at each slope of the Espinhaço, some species typical of these phytophysiognomies occurred only at one slope. The Cipó has, according to previous studies and personal new registers, 49 anuran species, while 36 have been registered at the opposite slope hitherto, of which, eight are exclusive. Although "campos rupestres" and Cerrado species are well represented in Cipó, the conservation of the eastern slope's exclusive species isn't there assure because its area doesn't include significantly that hogback. So small parks maintenance, such Ribeirão do Campo Park neighbouring Cipó, helps the conservation of oriental slope exclusive species. The dissimilarity found between the slopes reinforces the idea of the Espinhaço as a biogeographic barrier that splits different communities that should be conserved integrally, so the regional anurofauna could be better protected.

484. HISTORICAL CHANGE IN BIRD MOBILITY PREDICTS IMPACT OF RECENT FOREST FRAGMENTATION IN SOUTH-EAST KENYA. LENS, LUC; Githiru, Mwangi. Ghent University, Department of Biology, Terrestrial Ecology Unit, Ledeganckstraat 35, 9000 Ghent, Belgium, Luc.Lens@UGent.be (LL). University of Antwerp, Department of Biology, Laboratory of Animal Ecology, Universiteitsplein 1, 2610 Wilrijk, Belgium (MG).

Predicting effects of habitat change on species viability is a major goal in conservation biology. Yet, high between-species variability in demographic and genetic responses often hampers general conclusions. To understand which species are most affected by forest fragmentation, we combined data on historical gene flow, genetic bottlenecks and migration-drift disequilibria with current capture-recapture data of five sympatric Kenyan forest bird species. Historical (pre-fragmentation) dispersal rates were estimated from microsatellite-based F_{st} - values. Current (post-fragmentation) rates were estimated from multi-strata mark-recapture models. Three species showed moderate to high levels of current as well as historical dispersal. One of the two remaining species with low levels of current di spersal showed moderate historical dispersal and thus suffered the strongest decrease in mobility. This species further showed F_{st} - disequilibrium, lowest mean numbers of alleles and allelic richness, and recent bottlenecks in all remnant populations. Though it is not endangered itself, observed and expected levels of heterozygosity were comparable to those found in various endangered bird species. We conclude that the genetic signature of recent habitat fragmentation can differ markedly even between sympatric bird species, and is linked with differential changes in mobility. Consequently, genetic impacts of fragmentation may not be predictable by assessing current mobility alone.

485. SUSTAINABLE USE OF COMMUNAL RESOURCES IN LESOTHO: INTERFACING SCIENTIFIC ANALYTICAL METHODS WITH LOCAL WISDOM. LETSELA, TALEO; Witkowski, E. T. F.; Balkwill, K. Department of Biology, National University of Lesotho, P.O. Roma 180, Lesotho, tj.letsela@nul.ls. School of Animal, Plant and Environmental Sciences, University of the Witwatersrand, Private Bag 3, WITS 2050, Johanneburg, South Africa.

Researchers and policy makers around the world recognize that resources, especially communal resources are socially, politically and culturally influenced. Yet many continue to leave or marginalize local communities in analysis and policy formulation. Lesotho is no exception in this approach. We conducted an ecological assessment of key household resources; firewood, wild vegetables, medicinal plants and handcraft resources with the aid of local participants, analyzed the data and drew scientific conclusions. We then organized community workshops, grouping community participants into organic formations, such as, traditional healers, initiation schools, herd-boys, livestock owners, and community based cooperatives. The aim of the workshops was for the participants to analyze, synthesize, internalize and interpret the scientific findings of our earlier ecological survey and chart policy options for sustainable use. These workshops were in sharp contrast to conventional participatory rural appraisal (PRA) techniques in which the primary purpose is extracting data from the subjects. In this case,

the participants were engaged in broad management debates interrogating data that was hitherto incomprehensible to them. Amazingly there was significant similarity in conclusions and the final product was a matrix of policy options that touched on government policy, community structure, endogenous cultural values, household roles, local leadership, economic hardships, stewardship, harvesting quotas and recovery strategies. These recommendations were all-encompassing proving how insightful integrating local observations and wisdom is in sustainable resource management.

486. LANDSCAPE CONTINUITY ANALYSIS. LEVIN, NOAM; Heller, Ayelet; Sagi, Yoav; Ramon, Uri; Lahav, Hava. Department of Geography and Human Environment, Tel Aviv University, Israel (NL, levinnoa@post.tau.ac.il). Open Landscape Institute, Society for the Protection of Nature in Israel, Tel Aviv, Israel (AH, YS, UR, HL).

Mitigating the conflict between population growth and consequent urban development and infrastructure, with that of preserving the natural environment and open landscapes, requires appropriate tools of spatial analysis. Fragmentation is one of the dominant problems of ecological systems and open landscape continuity is an important factor to consider while conducting nature and landscape sensitivity evaluations, in addition to traditional multi-layers methods such as gap analysis. The new method that we term as the landscape continuity analysis is based on spatial relationships of land-uses, and provides a sensitivity layer that can direct the planning process by applying a quantitative tool to compare alternative land-use plans in order to maintain maximum continuity of open areas. In contrast with the methodology of ecological networks, our method does not assume any natural core areas. Rather, it assigns a value to grid cells, based on their distance from built areas, the type of the nearest built area, and the land uses in between the two. We demonstrate two case studies of using this tool, one for analyzing open landscape in Israel on a national scale, the second regarding alternative planned routes for Israel's cross highway no. 6, that is traversing many open landscape areas.

487. FIND A BALANCE BETWEEN THE BIODIVERSITY CONSERVATION VS. RESOURCES USE IN THE LIAOHE RIVER DELTA WETLANDS. LI, XIAOWEN; Baoshan, Cui; Zhifeng, Yang. School of Environmental Sciences, Beijing Normal University, 19 Xinjiekouwai Street, Beijing 100875, China.

The Liaohe River Delta wetlands has over 80,000 hectares of the world's most important natural wetlands of coastal reed marsh, supporting an wide range of important biological diversity, The economic values and social benefits of wetlands are also enormous in Liaohe Delta, the large area of rice growing and oil supplying areas in Liaohe Delta provide an essential contribution to the sustainable development needs locally and nationally. However, in the past decades, the wetlands in the Liaohe River Delta and the biodiversity they support are under a constant threat of degradation, mostly associated with human development pressures. To compromise the conflicting landuse between human needs vs. nature conservation, a spatial planning in the Liaohe Delta was explored, in which three landuse scenarios were elaborated, each scenario includes its landuse targets, ecological objectives, spatial strategies and management types. By using a GIS-based expert model (LEDESS), ecological consequences on the indicator species (i. e. Red Crowned Crane and Saunders Gull) were modelled, The results indicated there exist the possibility through spatial solution to mitigate the competing landuse between the ecological conservation and human needs, and to maintain the "no-net-loss" of wetland habitats.

488. MOTIVATIONS AND CONSTRAINTS FOR SUSTAINABLE USE OF VÁRZEA RESOURCES BY *RIBEIRINHOS*. LIMA, DEBORAH. Departamento de Sociologia e Antropologia, Faculdade de Filosofia e Ciências Humanas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, 31.270-901, Brazil, deb.lima@terra.com.br.

Ribeirinhos are floodplain peasants who derive their livelihood from a combination of small scale fishing, agriculture, logging and cattle raising. Depletion of fish stocks by commercial fisheries and the impact of cattle ranching on the floodplains have motivated riverine communities to develop local conservation initiatives. Lake reserves and fishing and cattle raising accords were validated in the 1980's and have since then received both government and non-governmental support. However, fishing and cattle raising are the most effective commercial activities for várzea dwellers. Conflict between sustainable and profit oriented strategies divide not only community insiders and outsiders but also community residents themselves. Urban migration is another cause of increasing pressure on várzea resources, as migra nts find commercial fishing one of the few economic opportunities available in towns. Given this scenario, partnerships between ribeirinhos and conservation institutions provide crucial support for the maintenance of local sustainable management initiatives.

489. ASSESSMENT OF TRAFFIC DISTURBANCE TO MIGRATION OF TIBETAN ANTELOPES IN HOH-XIL NATIONAL NATURE RESERVE, CHINA. LIN, XIA; Yang, Qisen; Li, Zengchao; Wu, Yonghua; Xiang, Yu; Feng, Zuojian. Institute of Zoology, Chinese Academy of Sciences. 25 Beisihuanxi Road, Beijing, 100080, China, Xial@ioz.ac.cn.

The Tibetan antelope or chiru is the only genus of large mammal endemic to the Tibetan Plateau. Its population has declined in numbers during last one century. Hunt grazing used to be the main threat to this species until these years the actions of governments and wildlife protection organisations have brought poaching under control. With the development of Northwest China, the conflicts between development of transportation facilities and conservation become more and more acute. Both of the heavy traffic on Golmud-Lhasa highway and the construction of Qinghai-Tibet railway on their migration corridors disturbed the migration of chirus. During June to August, we monitored the movement of chirus along the railway and highway, recorded their passes at wildlife crossing structures which was fist-use in china. Our results show that the efficiency of passages was greatly improved than last year; the efficiency of wildlife corridors was affected by the structure of the passages, wolf, un-recovered vegetation and etc. The disturbance to migration of chirus included infrastructures human activities, road traffic, construction of railway and so on. The impact of infrastructure especially transportation development on the habitat and migration of chirus are main factors that will threaten this species now and in the future.

490. REAL AND VIRTUAL ISLANDS - NEW INSIGHTS FROM A SERIES OF LARGE-SCALE EMPIRICAL "NATURAL LANDSCAPE EXPERIMENTS" IN SOUTH-EASTERN AUSTRALIA. LINDENMAYER, DAVID; Fischer, J.; Manning, A. D.; Cunningham, R. B. Centre for Re-

source & Environmental Studies, The Australian National University, Canberra, ACT, 0200 Australia. davidl@cres.anu.edu.au.

We have been conducting large-scale "natural experiments" in five landscapes in south-eastern Australia over the past 5-22 years. These landscapes span wood production native forests, exotic pine plantations, remnant woodland/agricultural production areas, and a nature reserve dominated by forests, woodlands and heath. Extensive empirical data have been gathered on the response of birds, mammals, reptiles and frogs to natural and human disturbances in these landscapes. A wide range of responses within and among different vertebrate groups have been identified - including novel responses to patch size, matrix conditions only rarely been observed in other studies in modified landscapes. In the vast majority of cases, species-specific responses were recorded - with few responses shared widely among large numbers of species - findings which pose real challenges for management strategies that aim to promote the biodiversity conservation. The results are interpreted in terms of existing models of landscape cover and species response such as the Island Model, Corridor-Patch-Matrix model. In addition, a new hybrid model, termed the landscape continuum model, is presented for improving the understanding of how biota can be best conserved in naturally disturbed areas as well as landscapes subject to human uses and landscape modification.

491. THE GREATER MASAI MARA COMMUNITY SCOUT PROGRAMME. LINKIE, MATTHEW; Walpole, Matthew; Kisotu, Stephen; Hartley, Richard; Leader-Williams, Nigel. Durrell Institute of Conservation & Ecology, University of Kent, Canterbury, Kent CT2 7NS, UK, m.linkie@kent.ac.uk (ML, SK, NLW). Fauna and Flora International, Great Eastern House, Tenison Road, Cambridge CB1 2TT, UK (MW). Friends of Conservation, P.O. Box 74901 Nairobi, Kenya (RH).

Some 70% of Kenya's wildlife exists outside protected areas, and its survival depends on continued tolerance, and sustainable natural resource management, by surrounding local communities. Yet competition for space and resources between wildlife and local communities often results in conflict such as crop raiding by elephants or livestock depredation by lions and leopards. These economic costs threaten the livelihood security of local communities, who may kill these animals in retribution. Part of the solution to mitigating this human-wildlife conflict involves prudent wildlife management that incorporates reliable data on the location, abundance and movement of these species. Here, we present a community-driven wildlife and threat monitoring programme for the Greater Masai Mara ecosystem. We use a newly developed detection/non-detection survey method, implemented by trained community members themselves, to investigate the landscape factors salient to wildlife abundance and to monitor wildlife population trends. We also present a novel model developed for this ecosystem that aims to secure the sustainability of the programme with financial support from responsible ecotourism operators in an innovative public-private conservation partnership.

492. BLACK RHINOCEROS OLFACTORY COMMUNICATION AND POST-RELEASE BEHAVIOURAL MANAGEMENT. LINKLATER, WAYNE L.; Swaisgood, Ron R. School of Biological Sciences, Victoria University of Wellington, P.O. Box 600, Wellington, New Zealand, wayne.linklater@vuw.ac.nz, and Terrestrial Ecology Research Unit, University of Port Elizabeth, South Africa (WLL). Conservation and Research for Endangered Species, Zoological Society of San Diego, P.O. Box 120551, San Diego, CA92115, USA (WLL, RRS).

Seventy-three of 435 translocations of endangered black rhinoceroses (*Diceros bicornis*) resulted in death, particularly from fighting and accident (12% of reintroductions, 27% for genetic and demographic rescue). We investigated scent broadcasting for facilitating post-release habitat and conspecific familiarization. Dung presentation tests (256 presentations, 44 rhino, 126 hours) determined that dung conveys relevant information that persists long enough to serve as the media for scent broadcasting. Dung, field-aged up to 32 days, elicited a measurable behavioral response (cf. control substrates), and rhino discriminated between dung from other rhino of different sex, age class, and familiarity. Horn-implant transmitters were installed in 33 rhino released at 12 reserves (8-450 km^2) and monitored after release. Six reserves served as treatment- and 6 as control-sites. At treatment sites we spread the dung of half the rhino subsequently released. Dung broadcasting changed rhino post-release movements (e. g., initial travel distance per unit reserve size; treatment 0.85±0.14, control 1.27±0.34), but the response was not specific to those rhino whose own dung was spread (own dung, 0.84±0.21; other rhino's dung, 0.82±0.17). Results indicate that dung broadcasting shows promise as a tool for facilitating novel habitat exploration, site fidelity, and social relationships in black rhinoceros post-release.

493. USE OF A FRAGMENTED LANDSCAPE BY MARSUPIALS IN SOUTHEASTERN BRAZIL. LIRA, PAULA K.; Carlos, Henrique S. A.; Curzio, Patrícia L.; Fernandez, Fernando A. S. Departamento de Ecologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, 21941-590, Brazil, rodentia@biologia.ufrj.br (PKL, PLC, FASF). Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, 31270-901, Brazil (HSAC).

Space use patterns are important to understand species response to fragmentation. Spatial patterns of the opossums *Caluromys philander* (four individuals), *Micoureus demerarae* (four) and *Philander frenata* (eight) were studied, through radio-tracking, in eight Atlantic Forest fragments surrounded by a grassland matrix in southeastern Brazil. Individuals were fitted with radio-collar transmi tters and fixes were obtained by the "homing in on the animal" method. Numbers of locations of each individual varied from six to 117. Home ranges sizes, estimated through the minimum convex polygon method, were larger than those estimated in capture-mark-recapture studies and ranged from 2.54 to 6.97ha for *C. philander*, 0.77 to 1.71ha for *M. demerarae* and 0.63 to 7.43ha for *P. frenata*. *M. demerarae* moved shorter distances than *C. philander* and *P. frenata*. Five movements between fragments were carried out by two male *P. frenata* and three other individuals visited the matrix. For *C. philander* and *M. demerarae* no interfragment movement was detected, but a female of *C. philander* was found in the matrix. Fragments, both edges and interiors, were used more often than matrix; they are the primary habitat f or these marsupials in the landscape, although the matrix is used for foraging and occasionally traversed in longer movements.

494. STATUS AND CONSERVATION OF CHIHUAHUA'S WILD BISON (*Bison bison*). LIST, RURIK; Ceballos, Gerardo; Pacheco, Jesús. Instituto de Ecología, UNAM, 3er Circuito Ex-

teriror Ciudad Universitaria, Coyoacán, 04510 México, D.F. Mexico (rlist@ecologia.unam.mx).

The bison (*Bison bison*) was both, a keystone species and a symbol of the North American grasslands, but its historical presence in Mexico has often been denied. Today, the only wild bison herd in Mexico moves freely between Janos, Chihuahua, Mexico where it is considered endangered, and Hidalgo County, New Mexico, USA where it is considered livestock. Its historical presence in the region, origin, status and ownership are controversial. We found solid bibliographic evidence that supports the pre-historical and historical presence of the bison in Mexico, from the pre-Hispanic times to at least the XIX Century, and discuss why the most likely origin of the current herd is from individuals brought to Mexico from Arizona in the 1920's, refuting the claim of ownership by a New Mexican ranch. We estimated the size of the herd in ca. 130 individuals and recorded the use of two properties in the USA and six in Mexico, and suggest conservation actions for the largest migratory land mammal of Mexico in the driest and southernmost part of its range.

495. RED-TAILED HAWK HOME RANGE AND ACTIVITY PATTERNS IN MOIST KARST FOREST PROPOSED FOR REINTRODUCTION OF THE PUERTO RICAN PARROT. LLERANDI-ROMAN, IVAN C.; Vilella, Francisco J. USGS Biological Resources Division, Cooperative Fish and Wildlife Research Unit, Mail Stop 9691, Department of Wildlife and Fisheries, Mississippi State, MS 39762, USA.

The Red-tailed Hawk (*Buteo jamaicensis jamaicensis*, RTHA) is a known predator of the endangered Puerto Rican Parrot (*Amazona vittata*, PRPA). PRPA are confined to rainforest of eastern Puerto Rico. Captive-reared PRPA are scheduled for release in the moist karst forest of Rio Abajo in 2006. We determined home range (HR) and movements for 12 radiomarked RTHAs in Rio Abajo forest and surrounding lands during 2003-2004. Fixed kernel 95% and 50% annual home range (AHR) sizes of radiomarked RTHAs averaged 6274.7 ha (range 114.9 - 22771.4 ha) and 978.5 ha (range 11.4 - 3547.3 ha), respectively. Annual home range (P = 0.0179) and core area sizes (P = 0.0137) differed between age of radiomarked individuals. Adult HR and core area sizes, and juveniles HR and core area size did not differ between seasons. Mean weekly movements (MWM) averaged 2816.5 m (range 538.6 - 7248.5 m). Adult MWM increased in the middle of breeding season. Juvenile MWM was greater during early breeding season due to interactions with paired RTHAs. Approximately 1.66% of RTHA locations (12 of 719) occurred inside the Rio Abajo forest boundaries. Encounters between RTHA and released PRPA may increase as parrots venture beyond the boundaries of Rio Abajo forest.

496. CONSERVATION CORRIDORS: PLANNING FOR SUSTAINABLE LANDSCAPES IN THE GOURITS RIVER CATCHMENT, SOUTH AFRICA. LOMBARD, AMANDA T.; Vlok, Jan; Cowling, Richard M.; Wolf, Trevor; Strauss, Taniia; Rouget, Mathieu. Department of Botany, University of Port Elizabeth, P.O. Box 1600, Port Elizabeth, 6000, South Africa, gemsbok@mweb.co.za (ATL, RMC). Regalis Environmental Services, P.O. Box 1512, Oudtshoorn, 6620, South Africa (JV). Conservation Systems, PO Box 1465, Sedgefield, 6573, South Africa (ATL, TW, TS). Kirstenbosch Research Centre, South African National Biodiversity Institute, Claremont 7735, South Africa (MR).

Large scale ecological processes are not only difficult to identify and map, they are also difficult to sustain within landscapes of competing land uses. Within the Cape Floristic Region of South Africa, the Gourits River catchment was identified as an area appropriate for megareserve status, owing to it's relatively low percent of irreversible transformation (13%). In addition, it spans a north-south altitudinal gradient (~200 km) and an east-west climatic gradient (~450 km). We mapped vegetation patterns and ma jor landforms to use as surrogates for nine biological processes (various movement corridors; quartz patches; thicket vegetation; koppies; pollination routes; lowland fine-scale processes). We also mapped threats to biodiversity patterns and processes (agriculture; alien vegetation; water extraction; flood control; urbanisation; plantations) as well as conservation opportunities (sustainable agriculture; conservation tourism). All the maps were integrated to produce one map of broad management units, each with a specific land use management plan and set of project proposals. The plans and projects addressed both broad and fine scale biodiversity patterns and processes, and were developed in association with local land use decision makers, for implementation by the local conservation agency. Some projects are already underway, addressing issues such as institutional strengthening, policy development, management interventions, and academic research.

497. GENETIC STATUS AND CONSERVATION OF TWO STORK SPECIES IN THE BRAZILIAN PANTANAL BASED ON MITOCHONDRIAL DNA CONTROL REGION SEQUENCES. LOPES, IARA F.; Del Lama, Silvia N.; Haig, Susan M. Departamento de Genética e Evolução, Universidade Federal de São Carlos, São Carlos, SP, 13565-905, Brazil, pifl@iris.ufscar.br (IFL, SNDL). USGS Forest and Rangeland Ecosystem Science Center, Corvallis, OR, 97330, USA (SMH).

Wood Storks (WS, *Mycteria americana*) and Jabiru Storks (JS, *Jabiru mycteria*) are long-legged wading birds that occur in Neotropical wetland areas. The U. S. WS population is listed as endangered under ESA and the JS is listed by CITES in Appendix I. We investigated the current genetic status of WS and JS populations in the Brazilian Pantanal wetland using the control region of mitochondrial DNA (mtDNA). Sixty-two WS (8 colonies, 460 bp) and 19 JS (3 locations, 492bp) non-related individuals sampled in the Pantanal area were analyzed. JS had a higher haplotype diversity index (h=0.92) than WS (h=0.63) and no significant levels of genetic differentiation among sampling points were observed (Fst_{WS}=0.04, Fst_{JS}= -0.007), suggesting the occurrence of considerable gene flow among sampled areas. Mismatch distribution pattern and significantly negative Fu's F test suggested the occurrence of a recent geographic expansion of both species in the Pantanal, which may also explain the absence of genetic structuring. Our results suggest that both stork populations can be considered panmictic, and that they should be managed as a single population in the Pantanal. Additional studies using mtDNA will be conducted to access the genetic status of other WS and JS populations in the American continent.

498. FUNCTIONAL REDUNDANCY AND IDIOSYNCRATIC RESPONSES FOR A PLANT-POLLINATOR SYSTEM IN A FRAGMENTED LANDSCAPE. LOPES, LUCIANO E.; Buzato, Silvana. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, travessa 14, 321, 05508-900, São Paulo, SP, Brazil, sbuzato@ib.usp.br.

We evaluated the contributions of floral visitors of *Psychotria suterella* to its pollination, applying current hypotheses concerning biodiversity and ecosystem function to a plant-pollinator system in a fragmented landscape. Being a generalist pollination system, *P. suterella* was visited by 35 floral visitors. These floral visitors were not equivalent in stigma pollen load per visit. *Bombus brasiliensis* had the highest pollinator importance. Habitat fragmentation brought additional floral visitors, mainly butterflies, to the *P. suterella* system, resulting in greater pollinator species richness. We found no differences between fragmented and non-fragmented areas regarding the pollen tubes in the style. This may be due to the presence of *B. brasiliensis* at these sites. There was little ecological redundancy among *P. suterella* floral visitors, and functional or taxonomic grouping would hardly explain equivalence in pollination effectiveness among the species. Despite the fact that this generalist system was resilient to habitat fragmentation, as evidenced by the similar levels of pollination in fragmented and non-fragmented sites, we found no simple relation between species richness and pollination effectiveness. Even if plant-pollinator system functions were modified by diversity, the magnitude and direction of the responses would be unpredictable, reinforcing the hypothesis that such responses are idiosyncratic. (FAPESP 99/12704-3 e 99/05123-4)

499. SUSTAINABILITY OF MANGROVE HARVESTING: CONTRASTS BETWEEN DEMOGRAPHIC ANALYSES AND HARVESTERS' PERCEPTIONS. LOPEZ-HOFFMAN, LAURA; Monroe, Ian E.; Martínez-Ramos, Miguel; Ackerly, David D. Department of Biological Sciences, Stanford University, Stanford CA 94305; Earth Systems Program, Stanford University, Stanford CA 94305; Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México, Morelia, Michoacán, México. Ap. Post. 27-3, Santa María de Guido, 58090, Morelia Michoacán, México; Department of Biological Sciences, Stanford University, Stanford CA 94305, USA.

We use matrix population models and sociological surveys to assess the potential for sustainable harvesting of mangroves on the NW edge of Lake Maracaibo, Venezuela. Mangroves in this region are illegally harvested for timber for home-building and construction. The most harvested size class of trees was 2-14.9 cm diameter followed by saplings. According to demographic models, 2-14.9 cm diameter trees were the population's most vulnerable size class. Rates of timber extraction were determined by estimating the length of time since remnant stumps were harvested. Local extraction rates ranged from 12 to 100% of 2-14.9 cm trees. Matrix models suggest that most of the observed harvesting was locally unsustainable. We believe the mangroves could be sustainably logged if harvesting was limited to approximately 10% of trees and saplings, or 5% of trees and 20% of saplings. Our sociological surveys were designed to compare the perceptions of old vs. young and rural vs. urban harvesters. The surveys indicated substantial differences in the harvesting practices of the different groups; younger people appear to harvest more intensively than older harvesters, and young urban harvesters are less likely than others to perceive mangroves as becoming scarcer. Almost half of the harvesters identified the high reproductive potential of mangrove populations as a reason for their resilience to harvesting, in contrast to the results of the demographic matrix models. This suggests that harvesting intensities and impacts will only increase over time as urban populations expand, generating more demand for timber and more young people in need of earning money.

500. COMMERCIAL FISHERIES & COMMUNITY-BASED MANAGEMENT OF FLOODPLAIN LAKES: MODELLING THE IMPACTS OF THE CUIABÁ-SANTARÉM HIGHWAY, BR-163. LORENZEN, KAI; Almeida, Oriana T. Division of Biology, Imperial College London, Silwood Park, Ascot SL5 7PY, UK, k.lorenzen@imperial.ac.uk (KL); IPAM, Av. Nazaré, 669, Centro, 66035-170 Belém, PA, Brazil, oriana@ipam.org.br (OA).

The Cuiabá-Santarém Highway (BR-163) is likely to expand the market for fisheries products from the lower Amazon. We use a bio-economic model to predict the impacts of market expansion on fisheries in tyhe Santarem region, and evaluate management measures to address potential negative impacts. Amazonian fisheries are exploited by both commercial and subsistence-oriented fishers, and conflicts between the two sectors are a key driver of management initiatives in the basin. The model is built around a simple general relationship between effort and aggregated multi-species catch, and parameterized for the Santa rem region of the lower Amazon where subsistence-oriented fishing accounts for about 70% of total effort. While the fishery is only moderately exploited biologically, market limitation means that the commercial fishery operates at the open access equilibrium and further expansion is economically impossible unless demand increases substantially. Market expansion due to better transport links with inland areas is likely to lead to a dramatic increase in fishing effort. Access controls to maintain ecologically and economically sustainable levels of effort can be put into effect now with little social costs, and will be highly beneficial to the fishery when market expansion occurs.

501. FALCONIFORMES ASSEMBLAGES IN A FRAGMENTED LANDSCAPE OF THE ATLANTIC FOREST IN SOUTHERN BRAZIL. LOURES-RIBEIRO, ALAN; Anjos, Luiz dos. Programa de Pós-Graduação em Ecologia e Recursos Naturais, Caixa Postal 676, Universidade Federal de São Carlos, São Carlos, SP, 13.565-905, Brazil, brazilraptors@yahoo.com.br (ALR). Departamento de Biologia Animal e Vegetal, Universidade Estadual de Londrina, Londrina, PR, 86051-970, Brazil (LA).

Inserted within the neotropical region, the South America has approximately 84 diurnal birds of prey species. In spite of the great number of diurnal raptors on the continent, the biology of just a few is sufficiently known, so that a precise diagnosis of their current status is almost impossible. An ecological analysis focused on distribution of Falconiformes, comprising abundance data, is provided. Samples were collected in a fragmented landscape within the Atlantic Rainforest, southern Brazil, between August and November 2001. Four main types of habitats were pinpointed among the 30 different sampling sites. Twenty-one Falconiformes species were detected and jackknife estimates for regional richness reached 24.8 ± 2.56 species ($p<0.05$). There were no differences between average number of diurnal birds of prey species in the different habitats under analysis (H-test, $p>0.05$). DCA indicated that species distribution partially explained environmental gradient (eigenvalue = 0.338). Distribution of Falconiformes species throughout the different environments of the region showed a relative trend of affinities throughout a number of habitats, chiefly between riparian corridor and wetlands, followed by forest and grasslands.

502. LOOKING FROM THE 5TH FLOOR WINDOW, A REVIEW OF THE PANTANAL'S PROTECTED AREAS BASED ON COMPREHENSIVENESS, ADEQUACY, REPRESENTATIVENESS AND EFFICIENCY. LOURIVAL, REINALDO; Stewart, Romola; Wilson, Kerrie; Possingham, Hugh; Mourão, Guilherme; Machado, Ricardo; Arcangelo, C.; McCallum, H.; Grigg, G. University of Queensland, School of Life Sciences, The Ecology Center, St. Lucia, Brisbane, QLD, 4072, Australia, r.lourival@sols.uq.edu.au.

This paper evaluates the Pantanal protected areas in Brazil, considering the existing five overlaying levels (Federal, State, Municipal, Private and multilateral initiatives) and how they perform according to the CARE principles of comprehensiveness, adequacy, representativeness and efficiency. The need for a comprehensive evaluation of such layers to avoid redundant financial and political costs is critical (Rodrigues et al. 1999). Results shown that existing protected areas poorly represent (less than 5%) surrogates such as the 16 vegetation classes from (da Silva et al. 2000) the level of comprehensiveness is even worst if the results of the 1998's Cerrado-Pantanal Priority Setting (BRASIL 1999) workshop recommendations are considered, 3 out of 10 subregions of the Pantanal (Da Silva & Abdon 1998) have public protected areas and the sum of all public and private reserves is around 923,995 hectares or less than 7% of the floodplain and just 2.5% of the upper Paraguay river watershed. We use MARXAN software (Possingham et al. 2000) to evaluate the existing protected areas and their potential to better represent regional biodiversity and ecological processes. The Pantanal Biosphere Reserve, created in 2000 but not implemented yet, have great potential for improve and coordinate regional Protected Areas System.

503. MEASURING THE STATE OF BIODIVERSITY - LESSONS FROM THE HEINZ CENTER'S "STATE OF THE NATION'S ECOSYSTEMS" PROJECT. LOVEJOY, THOMAS E. The H. John Heinz III Center for Science, Economics and the Environment, 1001 Pennsylvania Ave., NW, Suite 735 South, Washington, DC 20004, USA (lovejoy@heinzctr.org).

The Heinz Center's "State of the Nation's Ecosystems" report was a ground breaking, stakeholder-based effort to identify a succinct set of indicators of the use and condition of U. S. ecosystems, and may provide useful lessons for addressing the CBD's 2010 goal. One hundred and three indicators describe key ecosystem attributes for coasts/oceans, farmlands, forests, fresh waters, grasslands/shrublands, urban/suburban areas and the nation as a whole. Creation of an indicator framework and acceptance of this framework by diverse political interests were major achievements and illustrate that the process used to identify indicators can be as important as the indicators themselves. Many of the report's indicators are directly relevant to the 2010 goals, including: at-risk species, at-risk plant/animal communities, overall biological community condition, non-native species, chemical contamination, ecosystem goods and services, and others. Data were available to support national reporting for 12 of 31 indicators describing "biological components", and full data were available for only 2. Six indicators required additional technical development. This lack of essential information on biodiversity in an information-rich country like the United States is a surprising-if not alarming-finding, and the lack of scientific agreement on key best metrics poses an important challenge to the ecological community.

504. TESTING INVERTEBRATE SURROGATES FOR CONSERVATION PLANNING AND MANAGEMENT. LOVELL, SASKIE; Hamer, Michelle; Slotow, Rob. School of Biological and Conservation Sciences, University of KwaZulu-Natal, Private Bag X01, Scottsville, Pietermaritzburg, 3209, South Africa (lovells@ukzn.ac.za) (SL; MH). School of Biological and Conservation Sciences, George Campbell Building, University of KwaZulu-Natal, Durban, 4041 South Africa (RS).

The selection of protected areas is a topic of much contention, our knowledge of the distribution of individual biodiversity entities is far from complete. Where distribution data are inadequate conservation planning and management procedures rely on surrogate measures. Conventionally vegetation data are used as a surrogate for biodiversity, including poorly sampled invertebrates. A multi-taxa approach was used to sample invertebrate communities in Mkhuze and Phinda game reserves, South Africa. Vegetation classifications at various spatial scales, woody vegetation communities, and hierarchical taxonomic and cross-taxa congruency were investigated as surrogates for invertebrate community structure. Multivariate analysis (ANOSIM) revealed that vegetation classification does not represent invertebrate communities. Mantel tests were used to test congruency across communities and revealed weak correlation between some invertebrate taxa and woody vegetation demonstrating the scale dependency of invertebrates and vegetation classifications. Weak cross-taxa congruency was identified but correlations were not strong enough to be used as surrogates. Good congruency between higher (genera) and lower taxa (species) was identified. Genus level identification can be used as a surrogate but only in species poor genera. Invertebrates are highly diverse in terms of life history, body size, and ecological role. These findings have shown that a single surrogate will not adequately represent all invertebrate taxa. Conservation planning and management based on vegetation is unlikely to adequately conserve invertebrates, the main component of biodiversity.

505. ECONOMIC VALUE OF CARPENTER BEES TO PASSION-FRUIT PRODUCTION IN MORRETES, PARANÁ, BRAZIL. LÖWENBERG-NETO, PETER; Melo, Gabriel A. R. Departamento de Zoologia, Setor de Ciências Biológicas, Universidade Federal do Paraná, Curitiba, Paraná, Caixa Postal 19020, CEP 81531-990, Brasil, lowenberg_p@yahoo.com.br.

Passion fruit (*Passiflora edulis*) is an economically important crop to small farmers in Morretes, eastern Paraná. Passion flowers are self-incompatible and require the pollination services of large bees, such as *Xylocopa* spp., to set fruits. This study aims at estimating the economic contribution of carpenter bees (*Xylocopa* spp.) to the income from passion fruit production in Morretes. The market prices and values, in US$, were obtained from field interviews and agricultural agencies; additional information was taken from the literature. Locally, the plants bloom during 210-240 days a year. Previous studies indicate that 5 workers manually pollinated one hectare in 2 hours. The price of a worker-day in Morretes is about $6.50, therefore one person would cost $8.00/day/ha doing the bees' work. The mean fruit productivity in Morretes is approximately 600 boxes/year/ha and the mean fruit price is about $6.30 per box. The gross income minus the costs from implementation/ maintenance and from hiring workers to carry out the bees'work results in a net profit of only about $480-720/year/ha. The value of pollination services, provided by carpenter bees, corresponds to about 50% of the total income from passion fruit production in Morretes and contributes

approximately US$ 120,960-138,240/year to the region. (Funding: PROBIO-MMA/CNPq/GEF/BIRD)

506. AREA EFFECT ON TRAP-NESTING WASPS AND BEES IN AN URBAN FOREST FRAGMENT. LOYOLA, RAFAEL D.; Martins, Rogério P. Laboratório de Ecologia e Comportamento de Insetos, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, 30.161-970, Belo Horizonte, MG, Brazil, avispa@gmail.com (RDL, RPM).

The temporal variation in the occurrence of trap-nesting wasps and bees was evaluated in an urban forest fragment at Belo Horizonte, MG, Brazil. The predictions of the following hypotheses were tested: (1) larger areas present higher species richness of wasps and (2) bees when compared to smaller ones, (3) Hymenoptera occupy more nests in larger areas than in smaller ones and (4) rare species occupy more nests in smaller areas, and common species nest more frequently in larger areas. Wasps and bees were sampled by using trap nests placed in three areas sizes (25, 100 and 400 m^2). In 2004, 137 trap nests were occupied by eight species of wasp and bees. The first hypothesis was partially corroborated - larger area presented higher species number, but the intermediate $100m^2$ area size was less rich than the $25m^2$ one. The second hypothesis was refuted and the third one was partially corroborated - the number of occupied nests was higher in the largerarea, but it was not the lowest at the smallest one. The hypothesis four was fully corroborated - area effects are species specific. Knowledge about area effects on predatory wasps and pollinating bees is essential for reserves design and ecological processes conservation.

507. THE EFFECTS OF SPATIAL AND FEEDING ECOLOGY OF PAMPAS CARNIVORES ON THEIR CAPACITY OF ADAPTATION TO HABITAT MODIFICATIONS. LUCHERINI, MAURO; Manfredi, Claudia; Luengos Vidal, Estela; Castello, Diego; Savini, Simona; Casanave, Emma. GECM, Cát. Fisiología Animal, Departamento de Biología, Bioquímica y Farmacia, Universidad Nacional del Sur, Bahía Blanca, 8000, Argentina, luengos@criba.edu.ar.

Despite the Pampas being one of the largest and most strongly modified eco-regions of Argentina, almost nothing is known about its carnivores and the effects on them of habitat alterations. Here we present the first radiotelemetry and fecal analysis data on the Pampas fox, *Pseudalopex gymnocercus*, Geoffroy's cat, *Oncifelis geoffroyi*, lesser grison, *Galictis cuja*, and common hog-nosed skunk, *Conepatus chinga*, collected in a protected area of the southern Pampas, and use them to understand the variations in carnivore guild composition (estimated through live-trapping frequency) between three areas with different degree of human impact. *P. gymnocercus*, which is abundant in all areas, has omnivorous and opportunistic feeding habits, its home range is comparatively small and uses all types of habitats. *O. geoffroyi*, which no longer occurs in the most modified area and is rare in the other ones, has a relatively reduced food niche, large home ranges and shows a preference for habitats with dense vegetation. The cases of *G. cuja* and *C. chinga* would be intermediate. These results suggest that habitat, space and food requirements affect the capacity of adaptation of carnivores to human modifications in the Pampas grasslands and provide guidelines for their conservation/management in this eco-region.

508. RECOVERY FROM DISTURBANCE IN ESTUARIES: IMPACTS OF SEAGRASS ON RECOLONISATION DYNAMICS. LUNDQUIST, CAROLYN J.; Pilditch, Conrad A.; Thrush, Simon F.; Hewitt, Judi E.; Cummings, Vonda J. National Institute of Water and Atmospheric Research (NIWA), PO Box 11-115, Hamilton, New Zealand, c.lundquist@niwa.co.nz (CL, ST, JH, VC). Department of Biological Sciences, University of Waikato, Private Bag 3105, Hamilton, New Zealand (CP).

New Zealand estuaries are subject to natural and human disturbances that negatively impact flora and fauna, and result in both short-term and long-term degradative changes to benthic habitats. In particular, seagrass habitats are extremely sensitive to land-based disturbances such as increased sediment loading and suspended sediment concentrations that reduce light penetration. To manage future impacts and to guide restoration of disturbed areas, it is important to understand how organism transport varies between habitat types, thus influencing rates of recolonisation. Vegetation such as seagrass and mangroves can modify flow conditions, changing the likelihood of colonisation of these habitats compared to unvegetated habitats. We investigate the pool of available colonists in vegetated and unvegetated estuarine habitats to determine if rates of recovery are different in habitats that vary in hydrodynamic conditions and ambient communities. Field experiments show reduced flows within seagrass beds are associated with lower rates of resuspension of sediments and reduced abundance of post-settlement dispersing fauna (juveniles and adults) in the colonist pool. Our results imply that seagrass communities are both highly sensitive to disturbance, and potentially subject to reduced transport and recolonisation by benthic organisms, furthering decreasing their ability to respond to and recover from increasing rates of disturbance.

509. NEW ACOUSTIC CENSUS TECHNIQUE TO IMPROVE SURVEYS OF TROPICAL FOREST BIRDS. LUTHER, DAVID. University of North Carolina-Chapel Hill, Curriculum of Ecology, 217 Miller Hall, CB#3275, UNC-Chapel Hill, Chapel Hill, NC 27599-3275, USA, (dluther@unc.edu).

Tropical rainforest destruction is occurring at an alarming rate, endangering the species that live in these threatened ecosystems. Conservation efforts to protect species and their threatened habitats depend upon reliable estimates of species diversity. To improve estimates of tropical avian species diversity, I have developed an avian census method designed for the tropics that combines audio tape recordings with traditional standardized point counts. The tape recordings provide permanent records that allow researchers to repeatedly listen to each sample to confirm detections. Using data collected at the Rio Cristalino Private Reserve in the southern Amazon Basin, I created saturation curves to determine the optimal amount of time per morning and number of visits per site necessary to efficiently maximize the number of species detected. The point censuses were also replicated at short intervals of distance (100 meters) and time (2 days) to provide estimates of temporal and spatial variation in avian communities. This method will provide reliable census data that will aid scientists and conservationists as they develop and improve tropical forest conservation strategies.

510. CERRADO DEFORESTATION AND EFFECTS ON BIODIVERSITY CONSERVATION. MACHADO, RICARDO B.; Ramos Neto, Mário B.; Silva, José Maria C. Conservation In-

ternational, SAUS quadra 3 lote C Ed. Business Point sala 722. 70070-934 - Brasília-DF - Brazil; r.machado@conservation.org.br (RBM, MBRN, JMCS).

Current deforestation rates for the Brazilian Cerrado indicates that the entire ecosystem can disappear by the year 2030. We used MODIS imagery from 2002 to estimate the remaining natural areas of Cerrado vegetation. We estimate that areal loss has been two million hectares annually for the last fifteen years. A conservative estimate is that average deforestation rate was 1.1% per year although rates could be as high as 3% for some areas. Expansion of agribusiness, particularly grain production, is the most recent threat to Cerrado's natural vegetation. Large portions of suitable areas for plantations (flat areas with well drained soil) are rapidly occupied, whereas rocky and sloppy areas are left for 'conservation'. As a consequence of this unplanned model, important centers of endemism such as the Araguaia region and other areas with high number of species are disappearing. The current Cerrado's protected areas covers less than 5% of the original 2 million km 2. Due to its international importance for conservation as a recognized hotspot, we argue that only a systematic planning at the same scale of the environmental impacts can promote the necessary conservation actions for the Cerrado biome.

511. COMISSION TYPE ERROR AND THE USE OF BIODIVERSITY SURROGATES FOR THE DEFINITION OF CONSERVATION SCENARIOS FOR THE BRAZILIAN CERRADO. Machado, Ricardo B.; Scaramuzza, Carlos A. M.; Ramos Neto, Mário B.; RODRIGUES, SIDNEY T.; Ferreira, Anamaria A. Conservation International, SAUS quadra 3 lote C Ed. Business Point sala 722. 70070-934 - Brasília, DF, Brazil; r.machado@conservation.org.br (RBM, MBRN). WWF-Brasil, SHIS EQ QL 6/8, conjunto E, 2º andar 71620-430, Brasília-DF (CAMS, STR). Instituto de Ciências Biológicas, Campus Samambaia, Universidade Federal de Goiás, 74001-970, Goiânia, Goiás, Brazil (AMAF).

The Brazilian Cerrado is considered a priority region for both conservationists and 'developers'. The conservationist classifies the biome as a hotspot and the developers classify it as a key area for grain production, particularly soybean. One possible way to make compatible both interests in a plausible scenario for the Cerrado conservation is the use of decision-supported tools. However, the data quality for species distribution is one of the main constrain for the design of good conservation plan. The use of biodiversity surrogates can be applied to bypass this problem, but this approach can generate a commission type error (when a species is considered present in an area where it is absent). We use two tools (C-Plan and Marxan) in order to test if the use of biodiversity surrogates is capable comprehend the localities of threatened species (birds and mammals). The results show that 91% of 46 species are comprehended by the priority areas defined with the biodiversity surrogates. Only four species are missed and a site-specific protection could be applied for them. Although the use of biodiversity surrogates is not ideal, the results show that this approach is valid when the primary data on species distribution are poor and biased.

512. GENETIC EVALUATION OF A REINTRODUCED POPULATION OF BLACK-FOOTED FERRETS. MADDOX, CYNTHIA K.; Swanson, Bradley J. Department of Biology, Central Michigan University, Mt. Pleasant, Michigan, 48859, USA, maddo1ck@cmich.edu.

The only self-sustaining wild population of black-footed ferrets (*Mustela nigripes)* is located in the Buffalo Gap National Grasslands (BGNG), South Dakota. The ferret captive breeding program was designed to minimize the loss of genetic variation, but inbreeding, mating system and limited dispersal all work to remove genetic variation in the reintroduced population. A population's genetic variation is proportional to its probability of persistence and, in this case, provides genetically sound individuals for future reintroduction sites. DNA extracted from hair and saliva samples from wild born kits (n=265) in the BGNG population (2000-2003) was used to determine the loss of genetic variation at 6 microsatellite loci. Heterozygosity of the CBNG population was calculated for each subpopulation, Agate-Sage Creek (AG-SC; N_e=225) and Heck Table (HT; N_e=48), using N_e estimates based on sex ratio and population size from 2000-2003. The loss of heterozygosity, 12% in AG-SC and 14% in HT, was higher than the 1% and 4.2% loss expected respectively. The mating system of the ferrets is unknown, but thought to be polygynous like many mustelids, is likely causing this reduction in H_o. Population management to increase breeding success of additional males in BGNG could help retard the loss of genetic variation.

513. A RECENT REPORT ON *Sotalia fluviatilis* (CETACEA: DELPHINIDAE) MEAT CONSUMPTION IN THE EAST COAST OF MARANHÃO, NORTHEASTERN BRAZIL. MAGALHAES, FAGNER A.; Tosi, Carolina H.; Garri, Rosana G. Ilha do Caju Institute, AV.Presidente Vargas, 235 - Centro 64200-200, Parnaíba/PIAUI, Brazil, fagner_magalhaes@yahoo.com.br (FAM, CHT, RGG).

The tucuxi (*Sotalia fluviatilis*) is one of the less-studied delphinids. It is listed as "insufficiently known" despite its continuous distribution along the eastern South and Central American coasts. The accidental capture represents the most serious threat to this specie in Brazil, which can be explained by the tucuxi´s preference for coastal and estuarine brackish waters. The present study was held in Carnaubeiras city, Delta of Parnaiba River, in the east coast of Maranhão. The main objective of this work was to obtain informations about interactions between dolphins and fisheries. Interviews were done with local communities from September to November 2004, using standard forms of collecting data and photos for specie identification. According to a fisherman report, in 2002 one specimen of *S. fluviatilis* was accidentally captured in a gillnet and then killed, having been its meat consumed. According to national law 7.643/87, it's valid to emphasize the prohibition of fishing cetaceans in Brazilian waters. Despite of many preservation and searches projects, it remains clearly the necessity of more ethnoecology studies on fishermen communities and its relation with dolphins, as well as on biology and conservation.

514. WAY OUT FOR THE PROPOSED WILDLIFE SANCTUARY TRAPPED BETWEEN RAPIDLY URBANIZING SURROUNDINGS IN THE NORTHERN WESTERN GHATS, INDIA. MAHABALESHWARKAR, MUKUL; Dahanukar, Neelesh; Raut, Rupesh; Patwardhan, Ankur; Sahasrabuddhe, Kapil; Ghate, Utkarsh; Paingankar, Mandar. RANWA, C 26 / 1, Ketan Heights, Kothrud, Pune - 411 038, India.

The Western Ghats are one of the 25 biodiversity hotspots recognized globally. Tamhini (18.5N, 73.5E), a village in proposed wildlife sanctuary adjoins Khandala, a biodiversity hotspot crossing Mumbai - Pune urbanization belt. Most of the villages are surrounded by privately owned lands with few pockets of disturbed or restoring forests amidst shifting cultivation since long. The villages also have Reserved Forest surroundings. Large variety of

natural and man-modified ecosystems in this area indicates presence of large species diversity. Our partial checklists over the past few years indicate admirable species richness - trees, 474; birds, 374; butterflies, 62; fish, 32; frogs, 16; mammals, 73; ants, 25; reptiles, 74; and aquatic invertebrates 15 (families). A large proportion of biodiversity here exists under pressure of rampant urbanization. Rapid Rural Appraisal conducted in this area prioritized the use of natural resources in the people's livelihood but it also reflected that the transfer of traditional knowledge from one generation to other is lacking. Declaration of Protected Areas and Eco-sensitive areas has played vital roles at policy level but seems to have given rise to People - Wildlife conflict. Recently passed Biodiversity Act may play an important role in the constitution of Biodiversity Management Committees at Village level for sustainable management of the natural resources.

515. URINARY STEROID AND GENITAL SWELLING DURING THE OVARIAN CYCLE OF THE CAPTIVED JAVAN GIBBON (*Hylobates moloch*). MAHESHWARI, HERA; Toelihere, Mozes R; Widjajakusuma, Reviany; Sajuthi, Dondin; Alikodra, Hadi S; Purwantara, Bambang; Sjahfirdi, Luthfiralda; Astuti, Pudji; Hodges, Keith; Heistermann, Michael. Faculty of Veterinary Medicine, Bogor Agricultural University, Indonesia, hera_maheshwari@yahoo.com (HM, MRT, RW, BP). Center for Primatological Study, Bogor Agricultural University, Indonesia (DS). Faculty of Forestry, Bogor Agricultural University, Indonesia (HSA). Department of Biology, Faculty of Mathematic and Natural Sciences, University of Indonesia (LS). Faculty of Veterinary Medicine, Gadjah Mada University (PA). Department of Reproductive Biology, German Primate Centre, Gottingen (KH, MH).

This study was aimed to supply information regarding the endocrinological characteristic during the ovarian cycle of this critically endangered species, Javan Gibbon (*Hylobates moloch*) and a reliable method for monitoring its cycle. Estrone conjugates (E1C) and pregnanediol glucuronide (PdG) that indexed by creatinine (Cr) were determined along with records of daily genital swelling throughout 3-6 months from three females. During the ovarian cycle, only one of those females showed changing in genital swelling. Urinary E1C concentrations seemed to be uninformative in reflecting cyclic ovarian function because of its highly variable. In contrast, PdG profile seemed to be a reliable indicator of ovarian cyclicity, particularly for the one cyclic female, and gave the length of follicular phase of 11-18 days and luteal phase of 8-12 days, resulting in the cycle lengths of 23-26 days. The other two females showed a longer follicular phase (36 days) but the same length of luteal phase (12 days), resulting in the cycle lengths of 48 days. This presented data indicate the potential of urinary steroid conjugate analysis as a practical and realible method for non-invasive monitoring the reproductive status of Javan Gibbon and offer new opportunities for supporting breeding management of this species.

516. LIGHT AND TEMPERATURE EFFECTS OVER AGAVE GERMINATION, AS A MEAN TO DEVELOP A THECNIQUE FOR AN INTEGRAL PROPAGATION AND CONSERVATION. Maiti, Ratikanta; RAMÍREZ-BRAVO, O. ERIC; Wesche- Ebeling, Pedro; Sanchez-Arreola, Eugenio. Departamento de Química y Biología, Universidad de las Américas- Puebla, Santa Catarina Martir, Cholula, C.P. 72 820, Puebla, México, ermex02@yahoo.com.

Agave plants have been used by mexican cultures for centuries for a wide range of uses. Despite the importance of the genera, urbanization and illegal extraction had pose many especies as rare or endangered. As seedling establishment is rare in nature, populations are mainly composed by clonal subjects. By combining different temperature ranges and light quality it is intended to generate an easy germination technique for community implementation. Nine species were analyzed for cummulative germination and its speed to do it. Results indicated that each species has a special combination of factors; however it was showed that for most species a dark treatment and a low range temperature was optimal. Just to mention, *A. victoria reginae* proved to have a great temperature range in contrast to *A. stricta* that showed an erratic pattern. As for light the first taxa proved to increase its seedling production by applying a nominal dark treatment. In the other hand, species from group Salmianae show clear interaction between both factors, but a lack of common patterns among taxa. Data from this study will help to establish propagation projects in base to seedling production to increase genetic diversity and recovery of diminished populations.

517. MARINE CONSERVATION CAPACITY BUILDING IN PERU: FIRST STEPS AND CONTRIBUTIONS. MAJLUF, PATRICIA. Conservation Biology Unit, Universidad Peruana Cayetano Heredia, Armendariz 445, Lima 18, Peru. pmajluf@spondylus.org.

With anchoveta (*Engraulis ringens*) annual captures for fishmeal production exceeding 8 million MT, politicians and fisheries managers in Peru are generally unwilling to accept any limits to the use of this or any other marine resource. This and other unsustainable fishing policies are already resulting in significantly reduced captures for the small-scale fisheries for human consumption and, apparently, also in a reduced resilience to severe El Niño events in most anchoveta predators, probably including important commercial species of fish. The Conservation Biology Unit of the Cayetano Heredia University in Lima, Peru, was created to strengthen conservation capacities providing sound science-based advice to decision makers and training young Peruvians in Conservation Science. With an initial emphasis in marine conservation, the CBU has systematized the available long-term information, demonstrating the various impacts of the anchoveta fishery and is actively suppor ting efforts to improve sustainability for this fishery. Also, it is leading the development of sustainable marine area use zoning proposals, and a proposal for the establishment of the first Peruvian network of marine reserves. Political turmoil may yet delay implementation of these initiatives, but taking the first steps now will facilitate achievement when the right time arrives

518. HABITAT AND REPRODUCTIVE SUCCESS OF THE LAST SELF-SUSTAINING POPULATION OF HIHI: AN ENDANGERED ENDEMIC BIRD. MAKAN, TROY; Castro, Isabel; Robertson, Alastair W. Ecology Institute of Natural Resources Te Kura Mātauranga o ngā Taonga ā Papatuanuku, Massey University, Private Bag 11222, Palmerston North, web site: http://nzbirds.massey.ac.nz, Ph. 06 356 9099, New Zealand.

The Hihi is a cavity nesting forest dwelling passerine that once occurred throughout the North Island of New Zealand. Following European colonization the introduction of predators, habitat loss, and other factors reduced their distribution to a single offshore island (Little Barrier) where they have persisted to the present day. Efforts to recover the Hihi have involved many translocations to several other islands, none of which have established a self-sustaining population. On Kapiti and Tiritiri Matangi Islands

hihi persist with the aid of management (supplementation of food and nest boxes). In order to improve the chances of establishing self-sustaining populations this study focused on comparing the reproductive success of Hihi in two habitat types on LBI, the modified habitats on Kapiti Island, and the completely managed populations on Tiritiri and Mokoia Islands. We found a significant difference between the mean numbers of chicks fledged per nest in two habitat types o n Little Barrier Island. Fledging success was significantly lower on Little Barrier compared to the other managed islands where an unlimited supply of carbohydrate food is provided. We discuss these results in relation to the selection of habitats for future translocations and the implications for management at current sites.

519. GENETIC CONFIRMATION FOR THE NEED OF URGENT CONSERVATION ACTION OF HAIRY WOOD ANT *Formica lugubris* IN IRELAND. MÄKI-PETÄYS, HANNALEENA; Breen, John. Department of Biology, University of Oulu, P.O.Box 3000, Oulu, FIN-90014, Finland, hannaleena.maki-petays@oulu.fi (HM). Department of Life Sciences, University of Limerick, Limerick, Ireland (JB).

Formica ants form a substantial component in coniferous forest ecosystems in the northern hemisphere. These locally dominant red wood ant species are included in the global red list of IUCN as a result of habitat loss and degradation. In Ireland, the distribution and population size of *Formica lugubris* has declined fast in the last decades. Only two small isolated populations remain and the number of known nests is 49. For conservation purposes, information about the species status is needed. We use genetic methods, microsatellites and SSCP, to examine sociality, genetic variability and structure of the populations. We also use sequencing to clarify whether *F. lugubris* is native to Ireland. The genetic variation is incredibly low, but there exists only little inbreeding depression measured as the proportion of diploid males. Both populations are mainly monogynous having only one or two queens per nest, making the effective population size very low. Irish *F. lugubris* populations also have a unique mtDNA haplotype, indicating that the species is native to Ireland. We conclude that *F. lugubris* needs urgent conservation and should be protected in Ireland. Supplementation of Irish *F. lugubris* populations from English populations is not acceptable because of genetic differences and different social structure.

520. POPULATION STATUS, DISTRIBUTION, BEHAVIOUR AND HABITAT PREFERENCE OF THE GREY-CRESTED HELMET-SHRIKE, *Prionops poliolophus* IN NAIVASHA, KENYA. MALAKI, PHILISTA; Muchane, Muchai; Balakrishnan, M. National Museums, Kenya, Ornithology Department, P. O Box 40658, GPO 00100 Nairobi-Kenya; Email: kbirds@africaonline.co.ke; phillista@yahoo.com (PM, MM); Addis Ababa University, Dept. of Biology, P.O. Box 31226, Addis Ababa, Ethiopia (MB).

The Grey-crested Helmet-shrike, *P. poliolophus* is an East African endemic bird species, inhabiting the Mara-Serengeti woodland of northern Tanzania and Southern Kenya. It is listed as globally threatened and vulnerable in the IUCN Red-data list. The population, behaviour and habitat preference of *P. poliolophus* were studied and its distribution mapped in Naivasha, during July 2003 - March 2004. The vegetation was assessed and compared in different sites. Vegetation cover and density, dbh and height of trees assessed. Eleven family groups with population size ranging from 5 to 17 birds, with an average of 9.6±4.4 (n=11), were located. Mean bird density was 0.15±0.03/ha in the *Tarconanthus camphoratus* bush land (730ha) and 0.04± 0.01/ha in the *Acacia xanthophloea* woodland (461ha) . They are territorial, live in social groups and breed cooperatively. Territory sizes ranged from 0.02ha to 0.98 ha. *P. poliolophus* have a low nesting success (33.3%) due to nest predation. Areas of dense vegetation within *A. xanthophloea* woodland and *T. camphoratus* bushland were mostly preferred by the bird species. Questionnaire study showed high rate of decline in the extent of preferred habitat, due to conversion of woodlands to agriculture and urban development. Predation and habitat destruction were the major factors limiting the population of this bird species. Measures to stop habitat destruction and promote conservation are required for the survival of *P. poliolophus*. Results of this investigation provide baseline information on which conservation and monitoring strategies of the species and their habitat can be developed.

521. RECENT MORTALITY AND OTHER HEALTH CONDITIONS OF THE SEA FAN GORGONIA VENTALINA IN SANTA MARTA, COLOMBIAN CARIBBEAN, 15 YEARS AFTER A MASS MORTALITY EV. MANRIQUE-RODRIGUEZ, NELSON; Bejarano, Sonia; Garzón-Ferreira, Jaime. Instituto de Investigaciones Marinas y Costeras Jose Benito Vives de Andreis INVEMAR, Cerro de Punta Betín, Sociedad Portuaria de Santa Marta, Santa Marta, Magdalena, Colombia, gorgonia@invemar.org.co - jgarzon@invemar.org.co.

Coral reef degradation has taken place worldwide increasingly during last decades, apparently along with growing human impacts on coastal regions. Together with anthropogenic stresses, natural phenomenon -also disordered by global climate change- have lead coastal ecosystems to an extensive decline even causing complete decimation of populations over wide spatial scales. The Caribbean gorgonian sea fan *Gorgonia ventalina*, conspicuous dweller of shallow reefs is a clear example of such massive events which precise causes remain merely hypothesized. Although it is well known that important epidemic diseases as *Aspergillosis* and other sources of mortality continue threatening current sea fan populations, no other broad-coverage health assessment has been reported since the one carried regionally by CARICOMP members on 1995-1996. Moreover, few authors have recognized that epizoism, fouling, predation and other interactions may cause tissue loss and even fewer have made quantitative evaluations of their incidence. In response to this critical lack of information, by means of this study, 120 belt transects (30 x 2m) at 20 shallow localities where surveyed during march-december 2003 at the Tayrona Natural Park. Incidence of mortality, diseases and other health indicators was determined on remaining sea fan populations, one of the most important Colombian coral reef areas.

522. A GIS-BASED MODEL OF RIVER ECOLOGICAL INTEGRITY FOR CONSERVATION PLANNING. MAO, ANGUA A.; Rouget, Mathieu; Balmford, Andrew; Nel, Jeanne L.; Kleynhans, Neels. Percy FitzPatrick Institute of African Ornithol-

ogy, University of Cape Town, 7701 Rondebosch, South Africa, mao@botzoo.uct.ac.za (AAM, AB). South African National Biodiversity Institute, Private Bag X7 Claremont 7735, Cape Town, South Africa (AAM, MR). Department of Botany, University of Cape Town, 7701 Rondebosch, South Africa (MR). Department of Zoology, University of Cambridge, Downing Street, Cambridge, CB2EJ, UK (AB). Council for Scientific and Industrial Research, P.O. Box 320, Stellenbosch 7599, South Africa (JLN).Institute for Water Quality Studies, Private Bag X313, Pretoria 0001, South Africa (NK).

Freshwater ecosystems are highly imperiled the world over, yet conservation planning is mainly focused on terrestrial and marine ecosystems. Few criteria exist to assess the ecological integrity of rivers for conservation planning. We built a GIS-based model that uses broad landuse variables for predicting the ecological integrity of rivers (subdivided into riparian and instream integrity). We also tested the importance of the spatial scale of land use variables in predicting ecological integrity in order to identify the optimum scale at which the model should be built. Results showed that the riparian integrity of river systems could be predicted with an accuracy of up to 80% using four land use variables. However, instream integr ity could not be accurately predicted based on land use. The total area under natural cover is the most important variable for assessing riparian integrity. Riparian integrity is most influenced by land use activities at the catchment level rather than activities nearby the rivers. This GIS-based model provides a fine-filter approach to supplement landscape-level conservation plans of river systems. The model represents a significant contribution towards the monitoring component of the River Health Program (RHP), which reports on the state of rivers in South Africa.

523. RESPONSE OF SMALL MAMMALS SPECIES TO INTRODUCTION OF EXOTIC TREES OVER ANDEAN NATIVE FORESTS. Maradiegue, Edmundo I.;Vargas, Renzo R.; Moya, Karina; Alfaro, Fernando; AGUIRRE, LUIS F. Centro de Biodiversidad y Genética, Universidad Mayor de San Simón, PO BOX 538, Cochabamba, Bolivia, laguirre@fcyt.umss.edu.bo (LFA).

Few studies addressed the consequences over species assemblages by introduction of exotic plants species in native Tropical Andes forests. We evaluated changes in small mammal assemblage in the Tunari National Park located in the Bolivian tropical Andes. Here, we analyzed and compared diversity and similarity between native-remnant *Polylepis besseri* forest, introduced *Pinus radiata* and *Eucalyptus globulus* forests, as well as mixed forests (*Polylepis-Pinus* and *Polylepis-Eucaliptus*). After 800 traps/night/habitat we collected 245 individuals belonging to 7 species (six rodents and one marsupial). The rodents *Andynomis edax* and *Bolomys lactens* were found only in native *Polylepis* forests (n=2, n=1 respectively). *Oligoryzomys flavescens* was the only species absent from native *Poylepis* and found only in *Pinus* and mixed *Polylepis-Eucaliptus* forests. The marsupial *Thylamys elegans* was found mostly in *Pinus* forests (n=15) and none in *Eucaliptus* forests. When comparing species assemblages, most of the analyzed habitats are very similar between them, being the most similar native *Poylepis* and introduced *Eucalyptus* forests. All communities followed a pattern of a geometric series representing species-poor communities due to harsh environment regimen and historical human disruption of native habitats. There are some effects over small mammals species assemblages when their original habitats are modified by introducing exotic plants.

524. PROJETO TAMAR-IBAMA: 25 YEARS PROTECTING SEA TURTLES IN BRAZIL. MARCOVALDI, MARIA ÂNGELA; Lima, Eduardo; Bellini, Cláudio; da Silva, César; Thomé, Joca; Baptistotte, Cecília; Gallo, Berenice; Lima, Eron; Lopez, Gustave. Projeto Tamar Ibama Caixa Postal 2219, Rio Vermelho CEP 40223-970 Salvador-BA Brazil.

Created in 1980, Tamar is an example of a successful long-term alliance, between the government, an NGO, the private sector, and local communities, to promote the wise use and protection of Brazilian marine resources. With 21 permanent field stations set up near the major sea turtle nesting, feeding and bycatch areas over 1,100 km of the mainland coast and oceanic islands, Tamar operates a comprehensive long-term research program including routine collection of information on various aspects of sea turtle biology and conservation, providing important demographic information on the status and trends of sea turtle stocks. Today 150 conservation trainees along with local fishermen assure protection to 14,000 nests, 70% of which remain*in situ*. For the last 25 years Tamar has strived to incorporate h uman and social issues into all its conservation initiatives, facilitating and providing viable socio-economic alternatives for these communities, employing more than 1,200 people, 85% of whom are local community's members, in its activities that include: Visitor Centers, handicrafts groups, ecotourism guides, and cottage industries. This generates local income, improves both health and education standards, and promotes a sense of self-esteem for the communities as well as ensuring the long-term protection of sea turtles and their habitats.

525. INBREEDING AVOIDANCE IN GUPPY, *Poecilia reticulata*: DO MALES CARE? MARIETTE, MYLENE; Macías Garcia, Constantino; Magurran, Anne E. Departamento de Ecología Evolutiva, Instituto de Ecología, Universidad National Autonoma de México, A.P. 70-275, C. P. 04510, Coyoacán, D. F. México mmariette7@hotmail.com (MM, CMG). Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB Scotland, UK (AEM).

Both captive and wild populations of many threatened species are genetically impoverished and may thus experience a decline in individual fitness known as inbreeding depression. To avoid inbreeding, individuals should not mate with (i) inbred individuals, nor (ii) genetically similar individuals, both leading to low offspring genetic diversity. We tested whether male guppy (*Poecilia reticulata*) show mate preference based on inbreeding avoidance. A male was presented with either (i) an outbred and an inbred female, or (ii) a female from his own population and a heterogametic female. In both cases, he had access to first visual cues alone, and then to visual and chemical cues. When only visual cues were available, males spent less time with inbred than with outbred females, whereas they did not show any preference for a heterogametic over homogametic female. No preference was observed with visual + chemical cues. It is still to determine which visual cues (colour, behaviour or other) make inbred females less attractive. Our work demonstrates that males can and do discriminate against inbred mates, but only when chemical information are not taken into account. Considering mate discrimation against inbred individuals may help improving the success of captive breeding programs.

526. HOW MANY BIRDS ARE THREATENED IN BRAZIL? Marini, Miguel Â.; GARCIA, FREDERICO I. Departamento de Zoologia, Instituto de Biologia, Universidade de Brasília, Brasília, DF, 70.919-900, Brazil, marini@unb.br.

Brazilian birds have been classified with respect to threat category by IUCN (2004) in an analysis of globally threatened species and by the Brazilian Environmental Institute (IBAMA 2003) in an analysis of nationally threatened birds. IUCN lists 124 species, whereas IBAMA lists 160 bird taxa. A merging of these two lists has a total of 193 bird taxa. These lists, however, have only 91 (47%) species in common, 69 taxa (25 species and 44 subspecies) listed only by IBAMA and 33 species listed only by IUCN. Disagreements between these lists include the consideration of subspecies by IBAMA and disagreement in the existence of some species in Brazil. Differences between the threatened categories among the species listed by both sources have a disagreement of only 16%. The most important disagreements between lists involve 21 species that are listed by only one source and classified either as endangered or critically endangered. Other disagreement is in the definition of extinct: four species are considered extinct in the wild by IBAMA and only one by IUCN. Special efforts should be made by ornithologists to reevaluate their criteria and reach a consensus about the list and the threat categories of threatened birds in Brazil.

527. BUILDING MANAGEMENT CAPACITY FOR TECATE CYPRESS (*Cupressus forbesii*) USING RISK ASSESSMENT. MARKOVCHICK-NICHOLLS, LISA; Regan, Helen; Zedler, Paul H; Deutschman, Douglas. Quantitative Conservation Ecology Lab, San Diego State University, Biology Department, 5500 Campanile Dr., San Diego, CA 92182, USA, markovchick@cox.net, Telephone: 619-594-1200 (LMN, HMR, DD). Nelson Institute for Environmental Studies and Arboretum, University of Wisconsin - Madison, 550 N. Park St, Madison, WI 53706 USA, phzedler@wisc.edu (PHZ).

Fire regimes play an important part in the survival, ecology, and evolution of many plant species. Recruitment in such species is frequently linked to fire. However, threatened species that occur in fire-prone habitats may be particularly at risk from adverse fire regimes because of their restricted habitats in combination with other threats. Tecate cypress is a long-lived, highly fragmented plant species endemic to southern and Baja California. Tecate cypress plants are killed by fire which, in turn, promotes the release of seeds from canopy-stored cones. The principle threatening processes affecting Tecate cypress are habitat destruction and adverse fire regimes. The long-term effects of an altered and variable fire regime on remaining populations are unknown. Even currently stable populations could become extirpated due to a single short fire interval. We construct a stochastic stage-based model to investigate the risk of decline and/or extinction of southern Californian populations. We investigate a range of management options including fire suppression and partial patch burning to create multi-aged cohorts. Impacts of variation and uncertainty in life history and environmental variables are examined. This case study illustrates how risk assessment can build the capacity of conservation efforts by maximizing research and management resources.

528. INTEGRATING STAKEHOLDER PARTICIPATION INTO RECREATION PLANNING FOR ABACO NATIONAL PARK, BAHAMAS. MARKS, LISA; Jacobson, Susan K.; Stein, Taylor V.; Gape, Lynn; Sweeting, Monique. Department of Wildlife Ecology and Conservation, University of Florida, PO Box 110430, Gainesville, Florida, 32611-0430, USA, limarks@ufl.edu (LM, SKJ, TVS). Bahamas National Trust, Nassau, Bahamas (LG, MS).

This study engaged key stakeholders in the initial planning of a recreation management plan for Abaco National Park. Data were collected using two methods - a stakeholder analysis and individual interviews. For the stakeholder analysis, we conducted meetings with six stakeholder groups. Each meeting collectively identified a vision statement for the park and involved group members in participatory mapping to spatially identify current and desired future uses of the park. Subsequently, we conducted interviews with a key stakeholder group, hunters, to incorporate contextual data on current uses of the park, hunting satisfactions, and attitudes about future management. Results show that a diversity of activities occur in the park, each with a distinct spatial distribution. Each stakeholder group varied in its priorities for conservation, re creation and development of the park, however all groups were willing to allocate park area for uses other than their primary one. We found that the stakeholder analysis and individual interviews provided complementary information and both are valuable to park planning.

529. THE ECOLOGY AND POPULATION BIOLOGY OF SEVERAL THREATENED *Delosperma* SPECIES IN GAUTENG PROVINCE, SOUTH AFRICA. MAROM, DALIT; Witkowski, E. T. F.; Pfab, Michele. Restoration and Conservation Biology Research Groups, Department of Animal, Plant and Environmental Sciences, University of the Witwatersrand, P.O. Wits 2050, Johannesburg, South Africa, dmarom@dantex.co.za (DM, EW). Gauteng Department of Agriculture, Conservation. Environment and Land Affairs, Johannesburg, South Africa (MP).

Gauteng is the smallest province in South Africa, yet has the highest human density, and also contains high levels of biodiversity. The ecology and population biology of all known subpopulations of threatened Gauteng endemics, *Delosperma macellum, D. purpureum, D. gautengense* and *D. davyi*, and South African endemic *D. leendertziae*, were studied. *D. herbeum*, a common *Delosperma* species was also investigated for comparison. *D. davyi* and *D. herbeum* were the most vigorous species with the highest capsule and seed production and fastest growth rates. Seed mass and seed germination was not significantly different between the species and subpopulations, with germination of 91-100%. Germination success was generally positively related to parent plant size and percentage germination was positively related to seed mass. *Delosperma* is predominantly self-fertilizing and at least short-term persistent seed banks exist for all the species. *D. macellum, D. purpureum* and *D. gautengense* allocated more to the shoot than *D. davyi* and *D. herbeum.* Reproductive structure allocation was highest in *D. herbeum, D. davyi* and *D. leendertziae*. Urbanisation and in turn habitat loss is the main factor threatening all these species, and protection from urbanisation is the key to preserving these species.

530. MANAGING RESISTANCE AND RESILIENCE FOR CONSERVATION OF SEMI-NATURAL ECOSYSTEMS. MARRS, ROB; Cox, Emma; Ghorbani, J; Pakeman, R.J.; Le Duc, Mike. Professor Rob Marrs Applied Vegetation Dynamics Laboratory School of Biological Sciences Liverpool L69 7ZB, UK.

We carried out an experiment over a 10 year period on moorland infested with *Pteridium aquilinum*, where we applied a range of bracken control and moorland restoration treatments. We have analysed the data with a combination of univariate anova with repeated measures, multivariate analysis of variance using constrained ordinations and the use of bivariate SD-ellipses to chart treatments in species ordinations space. The study has highlighted

the most suitable treatments for restoring moorland, but it has also provided an insight into the resilience and resistance of the different communities over this period. The implications of these results for restoration ecology will be discussed.

531. CONSERVATION OF UNDERSTORY BIRDS IN THE SE ATLANTIC RAIN FOREST, BRAZIL: CORRIDOR AND FRAGMENT SIZE EFFECTS. MARTENSEN, ALEXANDRE CAMARGO; Metzger, Jean Paul; Pimentel, Rafael. Department of Ecology, Bioscience Institute - University of São Paulo, São Paulo, SP, 05508-900, Brazil. martensen@terra.com.br.

We investigated the effects of fragment size and corridor on the understory bird community in an Atlantic Forest region, one of the richest and most threatened forests worldwide. We studied two landscapes with 10,000 ha each: a fragmented (FL) and a forested one (CL). Seventeen fragments with different sizes (1 to 125ha) and connectivity (with/without corridors) and 4 areas in the CL were sampled with mist-nets in a total effort of ca.11,300 hours/net (ca.540 hours/net/site). Seventy-one species were captured (46CL and 64FL), seven only in the CL whereas 25 only in FL, most of these were edge species. Richness varies according to fragment size ($F_{3,10}$=4.12, p=0.03) and connectivity ($F_{1,5}$=20.29, p=0.006) when considering small fragments (<5ha). Corridor effects were not statistically significant for medium fragments ($F_{1,4}$=0.02, p=0.88). Species richness and composition were significantly different in fragments with <50ha when compared to control areas, while large fragments (>50ha) were similar (richness, U=0.0973, p=0.4613). Thus, size and connectivity were important factors affecting bird community. Despite the effects of fragmentation, patches <50ha could harbor a large amount of species and might play an important role in species maintenance in fragmented landscapes, and corridors can be used as a tool to improve connectivity between fragments.

532. PARKSWATCH: TOWARDS MAKING PARKS WORK. Martinez, Martha; GATTI, GUSTAVO. ParksWatch, Center for Tropical Conservation, Duke University, P.O. Box 90381, Durham, North Carolina 27708-0381, USA, (mmartinez@Parkswatch.org).

The announcement of a new national park signals a potential success story in conservation. However, parks all over the world are under threat from diverse pressures including logging, fire, habitat fragmentation and the invasion of alien species, among them our own. Alleviating these pressures is often an uphill struggle, especially in the absence of strong institutional support and adequate financial resources. The mission of ParksWatch (www·parkswatch·org) is to alleviate such pressures by generating up-to-date information on the threats faced by parks and disseminating the information to management agencies, donors and the public. In addition, we suggest short and long-term strategies to improve the management of each protected area we assess. Currently, ParksWatch operates in nine South American countries and each country/regional office is staffed with highly motivated local conservationists. Here, I will provide an overview of ParksWatch and the methodology we use for evaluating the status of protected areas. Then, I will outline our vision for the future and the types of collaboration we seek to strengthen our role in conservation.

533. MANAGEMENT TECHNIQUES APPLIED FOR BLACK LION TAMARINS: POTENTIALS AND PITFALLS. MARTINS, CRISTIANA S.; Valladares-Padua, Claudio. IPÊ - Instituto de Pesquisas Ecológicas, Caixa Postal 47, Nazaré Paulista, SP, 12960-000, Brazil, ipecristi@uol.com.br.

Since 1985 the black lion tamarin, has been studied into their historic range in the Atlantic Forest, Brazil. Our first studies gave us the diagnostic of its endangered status, and has lead to the establishment of an integrated conservation program, focusing the species and its habitat. The program uses the concept of metapopulation in their broad spectrum of management techniques. This paper describes and discuss the management techniques that were developed (translocation, mixed reintroduction, managed dispersal); and that are being used for recovery of this species. From 1995 to 2000 we carried out two translocations, two mixed reintroductions and one managed dispersal. Data on behavioral ecology were collected in order to evaluate them. Each one of these techniques has potentials and pitfalls, and we emphasize the importance of sound science in supporting evaluation. As a general result we concluded that the translocation is the most successful management technique for wild groups. The mixed reintroduction and managed dispersal are techniques that can be applied but need further research and monitoring. Additionally, there is a need of long term research not only on fauna and flora, but on the human-being reality and presence, to promote a scenario of landscape conservation.

534. POLLINATION FOR SURVIVAL - POLLINATION ECOLOGY OF A CRITICALLY ENDANGERED SPECIES - THE AFRICAN VIOLET, *Saintpaulia teitensis* (GESNERIACEAE). MARTINS, DINO J.; Powys, Anne. Dino J. Martins, P. O. BOX 72461 Nairobi 00200, Kenya (dinom@elci.org); Anne Powys, P. O. Box 5 Sarit Centre, Nairobi, Kenya.

The African Violet, *Saintpaulia teitensis* (Gesneriaceae), is an Eastern Arc Global Biodiversity Hotspot endemic. Forest fragments on the Taita Hills in South-eastern Kenya hold the last remaining wild populations of this plant. Only one population (Mbololo Hill) remains ecologically viable in terms of habitat security, flowering, pollination, seed-set and seed dispersal. The pollination ecology of *S. teitensis* was investigated. Pollinators of this endangered plant species were found to be primarily wild bee species (Suborder: Aprocrita) of the genus *Amegilla* (Family: Apidae). Observations of bee floral visitors showed floral manipulation ("buzz" pollination) for release of pollen. *Amegilla* spp. also feed from many different forest-floor flowers (Acanthaceae and Labiateae). *S. teitensis* relies on pollinators for adequate outcrossing and production of viable seed-pods. Few or no pods were observed in degraded or small forest fragments. *Amegilla* spp. forage in forest edge mosaics and cultivated areas on certain crop flowers. Future conservation and management of this endangered plant needs to take into account the needs and biology of its pollinators. Recommendations for conserving pollination services in fragmented habitats include: protection of forest floor plant diversity through limiting removal of trees and saplings and careful monitoring of forest-edge for effects of overgrazing and degradation.

535. FIELD KEY IDENTIFICATION OF THE BRAZILIAN CANIDS SPECIES THROUGH THEIR GUARD HAIRS FOUND IN THEIR FAECES. MARTINS, IRIS A.; Alberts, Carlos C.; Frei, Fernando. Departamento de Ciências Biológicas, Universidade Estadual Paulista, Assis, SP, 19.806-173, Brazil, martins_profauna@yahoo.com.br (IAM, CCA, FF).

The Canidae Family includes six extant species in Brazil: *Atelocinus microtis*, *Cerdocyon thous*, *Chrysocyon brachyurus*, *Pseudalopex gymnoscercus*, *Pseudalopex vetulus* and *Speothos venaticus*. These canids are top food chain species and their importance is relevant and indispensable for the homeostatic maintenance of the ecosystem. This Family is under threat due to anthropogenic actions: habitat loss and hunting for obtain furs. The study of canid ecology in the field, generally, requires high financial costs that include radio telemetry equipment and specialized professionals. The biological study of these animals, based in their traces, is a cheaper alternative, and its application in the field is easy and probably efficient. Analyzing the patterns of dispersal of faeces and morphological patterns of the hairs found in faeces (due to self-grooming behavior), bring about important information, such as species, population size and territory size. The aim of this study was a field key elaboration for guard hair identification of the six Brazilian canids. This key is based on cuticular and medular patterns of the guard hairs and on their coloration and bands. Their use in the field was tested and the results was satisfactory for the inter specific identification, excluding the use of the genetic for these purpose.

536. CONSERVATION STATUS OF BRAZILIAN LANCEHEADS *Bothrops* spp. MARTINS, MARCIO. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, 05508-090, São Paulo SP, Brazil, jararaca@ib.usp.br.

Twenty six species of lanceheads (*Bothrops* spp.) occur in Brazil, with 12 endemics. Here the conservation status of Brazilian lanceheads is assessed for the first time, based on recent studies on their ecology. About half of the species are generalists and opportunistic in several aspects of their ecology: they occur in several types of habitats, consume virtually all kinds of vertebrates they can find, and are widely distributed. Most of these species seem to tolerate habitat disturbance, and are not of concern in the present. A second group of species, although having wide distributions, are specialized in some of their habits and are candidates to be endangered in the near future, in case their habitats continue to be disturbed. Finally, seven Brazilian lanceheads occur in restricted areas (less than 20.000 km^2) and are of high concern for conservation, since their habitats are still being destroyed. Three of these species are listed as endangered in Brazilian and IUCN red lists. Field studies on the population biology of two of them are presently being conducted. Although a few species are still very poorly known, results herein indicate that habitat disturbance is by far the most important cause of concern for Brazilian lanceheads.

537. FIRST SIGHTING OF CRESTED CAPUCHIN MONKEY (*Cebus robustus*) IN A PROTECTED AREA IN MINAS GERAIS, BRAZIL. MARTINS, WALDNEY P.; Peixoto, Esperança L.; Rylands, Anthony B. Programa de Pós-graduação em Ecologia, Conservação e Manejo de Vida Silvestre, Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Av. Antônio Carlos 6627, 30270-901, Belo Horizonte, Minas Gerais, Brasil, wpmonkey@yahoo.com.br. Center for Applied Biodiversity Science, Conservation International, 1919 M Street NW Suite 600, 20036, Washington, D.C., USA.

The Crested capuchin monkey (*Cebus robustus*) is threatened and categorized as "Vulnerable" according to the Brazilian and IUCN *Red List of Threatened Animals*. Within its range, which is limited by the Jequitinhonha river in the north and the Doce and Piracicaba rivers in the south, *C. robustus* is known to occur in only 10 federal, state and private protected areas in the state of Espírito Santo and Bahia, and as far as it was known, it has not been reported in any of the 3 state reserves in Minas Gerais. On the July 21 st 2004, in one of the "Projeto Robustus" expedition at the "Estação Ecológica Estadual de Acauã", a *C. robustus* group (n = 3) was seen, during a census using playback equipment. This was the first sighting registered for the specie in a protected area within the state and though the "Estação Ecológica Estadual de Acauã" is more than 5,000 ha in size, it may not be enough to protect this specie in Minas Gerais. Due to rapid habitat destruction and intense hunting pressure, it is urgent that more protected areas within the geographic limits of the Crested capuchin monkey are created.

538. CHALLENGES AND OPPORTUNITIES OF CONSERVATION AND LIVELIHOOD IN THE EAST USAMBARA MOUNTAIN FORESTS. MASHAURI M., SHEDRACK. Eastern Arc Mountains Conservation Endowment Fund, Ministry of Natural Resources and Tourism; P.O. Box 6053, Morogoro, Tanzania. mashauri@lycos.com.

This paper examines the socio-economic aspects of conservation in the East Usambara Mountains, a small part of the Eastern Arc Mountains of Tanzania and Kenya. Specifically it focuses on the growing importance of the relationships among conservation efforts, values of nature and local livelihoods. It delves into the importance of each of these three dimensions and looks into the possibility of making conservation an enriching process rather than a poverty causing or enhancing one. Both the Total Economic Value of the resources and Sustainable Livelihood models are presented. This paper looks into the relationship between the authorities mandated with conservation and the local communities' livelihoods and the potential benefits of conservation. Trends in conservation show that the management of ANR has make considerable efforts towards both conservation and involvement of local communities, and are looking into sharing of benefits and costs of conservation. Moreover, the type of community participation remains far from the ideal; it is still strongly passive. Although local communities have yet to develop a strong sense of ownership, current efforts are making some headway to develop a partnership that addresses local livelihood concerns.

539. A MULTI-CRITERIA APPROACH TO PROTECTED AREA ZONATION IN NYUNGWE NATIONAL PARK, RWANDA. Masozera, Michel; FORREST, JESSICA; Munanura, Ian; Blondel, Nicholas; Rugerinyange, Louis. Wildlife Conservation Society - Rwanda Country Program, Building le PRESTIGE near Station Discentre, Kicukiro - Kigali, Rwanda (M.M.); Living Landscapes Program, International Program, Wildlife Conservation Society, 2300 Southern Blvd., Bronx, NY 10460, USA, jforrest@wcs.org (J.F.); Wildlife Conservation Society - Parc National de Nyungwe, P.O Box 163, Cyangugu, Rwanda (I.M., N.B.); l'Office Rwandais du Tourisme des Parcs Naturels (ORTPN) - Parc National de Nyungwe, P.O Box 163, Cyangugu, Rwanda (L.R.).

Nyungwe National Park in Rwanda is an ecosystem of global importance, supporting a vast species diversity, including 13 species of primates, over 275 species of birds, and more than 1200 species of plants, many of which are found only in the Albertine rift. Together with neighboring Kibira National Park, this ecosystem forms the largest block of remaining tropical montane forest in east Africa between 1500 and 2300 m. We report on a recent effort to zone the national park and surrounding human landscape

for park management purposes using a geographic information system to incorporate information on the biological, geological, and human landscapes. We first mapped the biological landscape by assigning ranks to sensitive species and habitats, species richness, irreplaceability of Albertine rift endemic species, landscape heterogeneity, and degraded areas. Human landscape features and threats data were overlain on the biological basemap to recommend 8 major zones within the park for different management strategies ranging from strict protection, to potential tourism, to restoration. Districts adjacent to the park comprise the ninth management zone, and were ranked according to their level of conflict with the protected area. As a conclusion we suggest that there are certain critical methodological differences and data indicators necessary for conservation planning at the regional and local levels.

540. BRAZILIAN TAPACULOS CONSERVATION: A MOLECULAR APPROACH IN *Scytalopus*. MATA, HELENA; Maurício, Giovanni N.; Bornschein, Marcos R.; Fontana, Carla S.; Bonatto, Sandro L. Centro de Biologia Genômica e Molecular, Faculdade de Biociências, Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS). Porto Alegre, RS, 90619-900, Brazil, helenamata@pucrs.br (HM, SB). Museu de Ciências e Tecnologia, PUCRS, Porto Alegre, RS, 90619-900, Brazil (CSF, GNM). Comitê Brasileiro de Registros Ornitológicos and Liga Ambiental, R. Olga de Araújo Espíndola 1400, conj. res. Paiquerê II, bl. N, ap. 31, Curitiba, PR, 81050-280, Brazil (MRB).

Traditional taxonomy can fail in capture the phylogenetic relationships within a group and there are cases of extinction of species due to taxonomic problems. The genus *Scytalopus* is characterized by presenting morphologically very similar species with restricted distributions in the Neotropical Region. At this moment it includes five species in Brazil. Two of them are globally threatened (*S. iraiensis* and *S. psychopompus*), one has been classified as near threatened (*S. novacapitallis*), and one has regional problems of conservation (*S. indigoticus*). We used molecular (mitochondrial ND2 gene) plus morphological and vocal data to access the taxonomic status of different populations. *Scytalopus speluncae* is actually represented by at least five distinct clades. Two of them are being described as new species, the third correspond to a haplotype of an endemic population of southern Bahia; and the fourth and fifth represented the *S. speluncae* type population found in the north and a southern population. Furthermore, *S. psychopompus*, whose validity has been questioned by recent authors, is a true species, differing from *S. indigoticus* consistently (e. g. 8.4% mtDNA sequence divergence). Due to its restricted range, habitat loss and low population density, we propose that *S. psychopompus* be included in the Brazilian red list.

541. USING VIRTUAL POPULATION ANALYSIS TO ASSESS THE CONSERVATION STATE OF THE STOCK OF BARRED SORUBIM (*Pseudoplatystoma fasciatum*) IN THE NORTHERN PANTANAL, BRAZIL. MATEUS, LÚCIA A. F.; Penha, Jerry M. F. Laboratório de Ecologia e Manejo de Recursos Pesqueiros, Instituto de Biociências, Universidade Federal de Mato Grosso, Cuiabá, MT, 78060-900, Brazil.

Fishery may affect structure and dynamics of target stocks. We used Virtual Population Analysis to investigate the effect of fishery on the stock of Barred Sorubim, a large predatory catfish, in the Cuiabá River basin, northern Pantanal. Data of caught (kg) and fork length (cm) were obtained at the "Antônio Moysés Nadaf" Market in the Cuiabá city, Mato Grosso state, Brazil. These data were utilized to estimate the number, biomass, yield, and fishery mortality for each age classes. These later were used with input to Thompson and Bell model in order to assess the stock state. The procedure was repeated to three different scenarios of natural mortality. The results show that exploitation state of the stock is critical. The variation in the fishery mortality among age classes is large (coefficient of variation = 77%). The classes with larger fishing pressure are those of intermediate sizes. The simulation obtained with Thompson and Bell model indicated that an increase in the fishing effort doesn't result in increase of the yield per recruit. So, it is necessary a reduction in the fishing pressure to avoid stock overfishing.

542. DELINEATING KEY BIODIVERSITY AREAS, STRENGTHENING CAPACITY AND BUILDING INSTITUTIONAL LINKS: THE KENYAN EXPERIENCE. Matiku, Paul; MUGO, ROBINSON; Knox, David. Nature Kenya, P. O. Box 44486, 00100, Nairobi, Kenya. e-mail: director_naturekenya@mitsuminet.com (PM, RM); Center for Applied Biodiversity Science Conservation International, 1919 M St NW, Suite 600, Washington DC 20036, USA (DK).

This paper identifies key conservation targets for the Eastern Arc Mountains and Coastal Forests of Kenya and Tanzania Biodiversity Hotspot. Key Biodiversity Areas were defined using information on globally threatened species in *The 2002 Red List of Threatened Species* that are found in the Kenya and Tanzania sections of the biodiversity hotspot. Data were compiled for each species on its degree of threat status and known distribution. Key Biodiversity Areas were determined by identifying all sites that are important for each globally threatened species. The analysis identified 333 globally threatened species in the Hotspot, with 105 species being represented in Kenya and 307 in Tanzania all distributed over a total of 160 sites. Of the 333 globally threatened species in the Hotspot, 241 are Vulnerable, 68 are Endangered, and 24 are Critically Endangered. A further analysis indicated that 51 of the 160 sites are Important Bird Areas (IBAs) with 23 of the 25 sites holding the most threatened species being IBAs suggesting that IBAs succeed in capturing the sites critical for conserving most threatened species.

543. DNA BARCODING AND ILLEGAL TRAFFIC OF AVIAN EGGS. MATSUMOTO, TANIA E.; Oliveira-Marques, Adriana Ribeiro; Miyaki, Cristina Y. Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, 277, 05508-090, São Paulo, SP, Brazil, taniaem@yahoo.com.

In 2003, 58 eggs from unknown parrot species were apprehended. We sequenced a portion of the mitochondrial 16S ribosomal DNA (213bp) in order to compare them with previously sequenced samples from a wide range of parrot species, in an effort to assess its usefulness for identifying the species. We obtained 5 groups of identical sequences. BLAST searches in GenBank showed that one group was identical to a previously sequenced *Ara ararauna*, another one was identical to an *Amazona xanthops* sequence, 2 groups were 99% identical to *A. xanthops*, and the other, 99% similar to the *Amazona aestiva* / *ochrocephala* complex. One sample did not show any high probability matches with any sequence deposited in GenBank and could not be identified. Phylogenetic analyses (distance) were also performed and the results confirmed that the putative *A. ararauna* sequences clustered with *Ara ararauna* and not with any other species of the genus *Ara* and the putative *Amazona* sp. samples clustered with the corresponding species. Unfortunately, not enough data is available regarding

geographically-linked markers to allow for identification of possible areas of origin of the poached samples. (Financial support: FAPESP. CAPES, CNPq).

544. REDISCOVERING ATLANTIC FOREST - TEACHER TRAINING FOR CONSERVATION OF THE ATLANTIC FOREST AND GOLDEN LION TAMARIN IN BRAZIL. MATSUO, PATRICIA MIE; Boucinha, Vanessa; Toledo, Paulo; Di Beneditto, Ana Paula M. Associação Mico-Leão-Dourado, Caixa Postal 109.968, Casimiro de Abreu - RJ, 28.860-970, Brazil, (miematsuo@yahoo.com) (PMM, VB, PT); Universidade Estadual Norte Fluminense. Laboratório de Ciências Ambientais. Pósgraduação em Ecologia e Recursos Naturais (PMM, APMDB).

The Golden Lion Tamarin Association (AMLD) coordinates a program to conserve a viable population of golden lion tamarin *Leonthopithecus rosalia* in their habitat - Atlantic Forest of Rio de Janeiro State. Community support is crucial for the success of efforts to conserve endangered species and ecosystems. AMLD provides long-term training for teachers in the municipality of Silva Jardim on Atlantic Forest conservation. The training has presentations by researchers that study in the area on flora, fauna, water, threats and conservation actions, and field activities in local forests. Each teacher plans his/her own project to integrate these concepts and community conservation actions into his/her curriculum. During subsequent workshops the teachers present the activities they carried out in their schools and the results they obtained. AMLD conducted ten two-days workshops with the same group of teachers. They planned and carried out 80 education projects at schools. The training program provided an opportunity for the teachers to identify and try new ideas and methodologies, to evaluate the results, and to share their experiences thus developing a mutual support system as activities progressed. The long-term teacher training has shown good results and is absolutely necessary to achieve sustained public support for Atlantic Forest conservation.

545. INCENTIVES FOR HABITAT CONSERVATION ON NON-INDUSTRIAL PRIVATE FORESTS (NIPF) OF FLORIDA - AN ECOLOGICAL ECONOMIC ANALYSIS. MATTA, JAGANNADHA; Alavalapati, Janaki; Gruby, Rebecca. University of Florida, 208 Newins-Ziegler Hall P.O. Box 110410, Gainesville, Florida, 32611, U.S.A, raojm@ufl.edu.

Growing concerns about environmental protection and sustainable forest management have led to the development of several policies and programs to protect fragile ecosystems around the world. In particular, private forestland owners are asked to integrate forestry with protection of habitat for wildlife. There is however, insufficient understanding on which forest practices are compatible with habitat conservation, and how landowners would respond to the adoption of such practices. This study investigates the management of non-industrial private forests(NIPF) of Florida to address these two issues employing focus group and contingency valuation methods to elicit landowners' willingness to adopt identified conservation compatible forest practices (CCFPs) under certain incentives. Preliminary results suggest that landowners' forest management objectives significantly influence their willingness to adopt forest practices. While not all policy incentives stimulate landowners' interest towards the adoption of CCFPs, they play a critical role in advancing habitat for conservation on private lands. Other factors influencing landowners' interest in conservation include resource characteristics, results of past management practices, technical assistance, and income. The study also examined the role of uncertainty and neighborhood characteristics on landowners' decision to accept conservation incentives and developed an ecological economic model to predict NIPF landowner behavior towards adoption of CCFPs.

546. PREDICTING SPECIES GEOGRAPHIC DISTRIBUTIONS BASED ON ECOLOGICAL NICHE MODELING FOR SPIX'S MACAW (*Cyanopsitta spixii*) IN BRAZIL. MATTOS, JULIANA C. F.; Carvalho Jr., Osmar A.; Guimarães, Renato F.; Machado, Ricardo B.; Barros, Yara M. Universidade de Brasília, Departamento de Geografia, Laboratório de Sistemas de Informações Espaciais, Campus Darcy Ribeiro, Asa Norte. Brasília, D.F., Brasil 70910-900, frotamat@hotmail.com (JCFM, OACJ, RFG). Conservação Internacional do Brasil, Brasília, D.F., Brazil (RBM). Coordenação Geral de Fauna, Diretoria de Fauna e Recursos Pesqueiros, IBAMA, Brasília, D.F., Brazil 70.818-900 (YMB).

The most recent method used to predict species geographic distributions is the use of Ecological Niche Models. The program DesktopGarp (Peterson, 2001), is a program that links distributional information with information on land use and protection to identify priorities of conservation action. The result analysis may indicate either areas that have a higher chance of eventually finding remaining groups or populations of the species, as well as indicate the specific area with the highest probability of finding the proper habitat conditions of the species. We used this method in order to determine the potential occurrence area of the Spix's Macaw (*Cyanopsitta spixii*). This bird is one of the most threatened species in the world, and is now classified as extinct in nature according to the official Brazilian list of endangered species. According to IBAMA, a captivity breeding program is the only option available to be able to recover this species from going extinct. The individuals that are bred in captivity will eventually be reintroduced into its natural habitat. The resulting map models of the analysis correspond to the best estimate of the potential occurrence areas of the species with the most proper habitat conditions for the reintroduction of Spix's Macaws.

547. FIBROPAPILLOMAS IN GREEN SEA TURTLES: HISTOLOGICAL, IMMUNOHISTOCHEMMICAL AND ULTRA-STRUCUTURAL ASPECTS. MATUSHIMA, ELIANA R.; Mehnert, Dolores U.; Borella, Maria I.; Monezi, Telma; Batlouni, Sérgio; Müller, Natascha; Candeias, J.; Baptistotte, Cecília. Departamento de Patologia, Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo, SP/SP. 05508-900, Brazil, ermatush@usp.br.

Juvenile green sea turtles, *Chelonia mydas*, from the seaside of the state of São Paulo, presenting multiple papillomatous cutaneous lesions, were examinde and submitted to the colection of simples for hematological, histopathological, immunohistochemmical, ultra-structural exams and diagn osis using the polymerase using the polymerase chain reaction (PCR). In the hematological results, MCH, uric acid, alkaline phosphatase, AST and ALT were observed to be statistically significant both in normal animals and those presenting fibropapillomatosis. Histologically, papillomas exhibited estromal hyperplasic proliferation and epidermal proliferation and epidermal proliferation. Epithelial cells presented nuclear alterations suggestive of viral infection and severe nuclear pelomorphism. A large nuclear halo was present in the epithelial proliferation cases. In these cells, nuclear characteristics were frequently discariotic and intra-nuclear inclusions were occasionally observed. All fibropapillomas examined were negative for group-

specific antigens against *Herpesvirus*. Ultra-structural evaluation was negative for viral particles. Although *Herpesvirus* detection by PCR in ocular secretion and blood suggests the participation of this agent, these are still preliminary results.

548. POPULATION SIZE AND STRUCTURE OF THE THREATENED YELLOW-NAPED PARROT *Amazona auropalliata* ON THE NICOYA PENINSULA OF COSTA RICA. MATUZAK, GREG. Amigos de las Aves USA, 22318 Walnut Street, Wildomar, CA 92595, USA; (gmatuzak@hotmail.com).

The Yellow-naped Parrot (*Amazona auropalliata*) is a threatened species and it is declining throughout its range. On the tip of the Nicoya Peninsula in Costa Rica, a population assessment of this species was conducted through implementing evening roost counts 90 minutes before sunset over an entire year. Population counts ranged from 0 to 300 individuals, with daily count averages ranging between 52 during the nesting/dry season (January to June) to 127 during the wet season (July to November). The roosting site, the Tortuga Islands, located off the coast of Curú National Wildlife Refuge, was also documented to be a nesting site for the species. Family groups (groups of 3 - 4 parrots) were documented during counts and ranged from a low of 1 in May to a high of 19 in October. The young to adult ratio in the population during this time period ranged from a low of 2.1% to a high of 14%. The roosting area being connected to other roost sites and changes in seasonal food availability appear to explain seasonal changes in abundance during roost counts. Regional conservation initiatives for the species should include all nearby roosting sites that exist for this species in the area.

549. POTENTIAL AQUATIC COMMUNITY IMPROVEMENT THROUGH A MULTIDISCIPLINARY STORMWATER MANAGEMENT EXPERIMENT. MAYER, AUDREY L.; Roy, Allison H.; Boczek, Laura; Shuster, William D.; Thurston, Hale W.; Clagett, Matthew. US Environmental Protection Agency, Office of Research and Development, NRMRL/STD/SEB, 26 W. Martin Luther King Dr., MS498, Cincinnati, OH, 45268, USA.

Small-scale urban stream restoration efforts often fail to improve ecological structure and function due to the continuous impact of impervious surfaces upstream. Decentralized stormwater management may improve stream ecosystems through improved hydrology, increasing stream baseflows, reducing erosion, and reducing pollutant loads. In a small watershed (~150 ha) in Cincinnati, OH, we have begun a runoff mitigation project involving ecologists, economists, hydrologists, and lawyers. This project will distribute parcel-level Best Management Practices (BMPs) for stormwater mitigation (rain gardens and rain barrels) into a residential area of the watershed based on the outcome of a voluntary e conomic auction among residents. We will test whether the auction will result in enough BMP installation to observe improved hydrological and ecological conditions in downstream sites. We have established six monitoring stations throughout the watershed, at which several years of baseline data is being collected prior to the installation of BMPs. Stream reaches below the residential area support low macroinvertebrate EPT richness, low proportional abundance of diatoms, high conductivity and high concentrations of *E. coli* and fecal coliform bacteria. We expect that sites directly downstream from the BMP installation area will show the greatest improvement of stream ecological condition relative to the other monitoring sites.

550. SCALING UP IN ORDER TO SCALE DOWN: BIOREGIONAL CONSERVATION PROGRAMMES IN SOUTH AFRICAN EFFECTIVELY PUT BIODIVERSITY INTO THE MAINSTREAM. MAZE, KRISTAL; Barnett, Mandy; Sandwith, Trevor; Driver, Amanda; Frazee, Sarah. South African National Biodiversity Institute, Private Bag X101, Pretoria, 0001, South Africa. maze@sanbi.org (KM, MB, TS); Botanical Society of South Africa, Private Bag X10, Claremont 7735, South Africa. driver@sanbi.org; (AD); Conservation International, Southern African Hotspots Programme, Private Bag X7, Claremont, 7735, South Africa frazee@conservation.org (SF).

South Africa has enacted legislation supporting an ecosystem and programmatic approach to the conservation of biodiversity, but which also calls for key social transformation and developmental goals to be met. The legislation requires spatial biodiversity priorities to be identified and action plans to be developed and implemented. Three bioregional conservation programmes, CAPE (Cape Action for People and the Environment), STEP (Subtropical Thicket Ecosystem Programme) & SKEP (Succulent Karoo Ecosystem Programme) used a participatory approach to develop comprehensive strategy and action plans which are currently being implemented at biome and local scales. In each case the programmes incorporate measurable targets for biodiversity conservation, as well as economic development, community involvement and poverty alleviation. They focus targeted conservation intervention in priority areas identified through systematic conservation planning across the landscape as well as through enabling systemic and institutional interventions. Moving beyond the usual sectoral fragmentation of effort and impact, these programmes encourage committed cross-sectoral institutional collaboration. Within this enabling context, they co-ordinate and channel effort for focused on-the-ground impact. This coordinated management model offers a flexible and replicable method of facilitating collective effort at the site level, supported by the agreed high-level vision and strategy. It manifests itself in new partnerships that bridge the gaps between governmental and non-governmental organizations, and between conservation and social development agencies and the private sector, and assists in securing and focusing financial and institutional effort on priorities. This paper looks at the outcomes of the programmes and assesses the extent these can be considered to be examples of mainstreaming biodiversity into development processes.

551. FLOWER PRODUCTION AND FEMALE REPRODUCTIVE SUCCESS OF *Rapatea ulei*: A COMPARISON OF INTACT FOREST AND FOREST CORRIDORS IN AMAZONIAN PASTURES. MCCAIN, CHRISTINA D. Department of Biology, University of Miami, P.O. Box 249118, Coral Gables, Florida, 33124-0421, USA, cmccain@bio.miami.edu.

The perennial herb *Rapatea ulei* (Poales: Rapateaceae) is a year-round floral resource in alluvial forest communities along small streams in Central Amazonian terra firme forest. Populations of *R. ulei* in intact forest were compared with those of streams in forest corridors in pasturelands near Manaus, Brazil. Phenology, rates of inflorescence production, plant density, and female reproductive success were compared among six populations in intact forest and deforested areas. Reproductive plants were 3.5 times more abundant in deforested sites than in intact forests, reaching densities of over 800 flowering plants/150 meter plot, compared to the lowest density of 91 flowering plants in an intact forest site. Though density differed drastically, individual plants in deforested versus intact sites showed no significant difference in flower production per

plant, and reproductive success per plant was significantly lower in deforested sites than intact sites in the same year. The two intact forest plots with the lowest densities of flowering plants had the highest successful seed production per plant. In those plots, greater than 20% of ovules resulted in mature seeds, compared to 1% - 5% success in higher density, deforested sites. These results demonstrate that dense flowering populations were not indicators of reproductive success.

552. LAND USE CHANGE AND IMPACTS ON AQUATIC SYSTEMS IN THE ANDEAN HEADWATERS OF THE AMAZON. MCCLAIN, MICHAEL; Blanco, Andrea; Celi, Jorge; Gann, Daniel; Mena, Carlos; Waggoner, Lindsey. Department of Environmental Studies, Florida International University, Miami Florida 33199, USA, michael.mcclain@fiu.edu.

The Amazon's Andean headwaters harbor a rich assemblage of species and habitats critical to the aquatic biodiversity of the larger Amazon system. This region is also home to some of the highest human population densities and most widespread land conversion in the Amazon; at least 40% of the region has been either converted to human uses or fragmented by these uses. Over the past 5 years we have investigated land use patterns and change and associated impacts on aquatic ecosystems in the Andean Amazon portions of Ecuador and Peru. Increased rates of land cover conversion are most associated with increased population density and proximity to roads and rivers. Changes in land-use configuration vary mainly as a function of biophysical factors; no significant differences are observed between indigenous and colonist communities inhabiting the same basin. Water and habitat quality in rivers vary as a function of adjoining and upriver land uses. Rivers flowing through agricultural and ranching areas carry increased sediment loads, have elevated temperatures, pH and PO_4 concentrations, and lower oxygen. Macroinvertebrate communities vary according to land use and are most severely impacted downstream on towns. Aquatic biodiversity preservation in the region requires increased attention by managers.

553. STUDY ABROAD PROGRAMS AND TEACHING CONSERVATION: THE OTS SEMESTER IN KRUGER NATIONAL PARK, SOUTH AFRICA. MCCLEARN, DEEDRA; Biggs, Harry; Robertson, William I. V.; Rogers, Kevin. Organization for Tropical Studies, Apdo. 676, San Jose, Costa Rica, deedra@sloth.ots.ac.cr (DM). Scientific Services, Kruger National Park, Skukuza 1350, South Africa, biggs@sanparks.org (HR). The Andrew W. Mellon Foundation, 140 East 62nd Street 10021, USA, wr@mellon.org (WR). Centre for Water in the Environment, University of the Witwatersrand, Private Bag 3, Wits, 2050, South Africa, kevinr@gecko.biol.wits.ac.za (KR).

A cooperative venture among several partners implemented a semester-long undergraduate ecology and conservation program in Kruger National Park, South Africa (SA) in 2004. The Organization for Tropical Studies (OTS), Andrew W. Mellon Foundation, Kruger National Park (KNP), University of the Witwatersrand, and University of Cape Town are the key members. In addition to the core teaching staff, over 40 academic and scientific resource people participated on the inaugural semester. Students are upper-division undergraduates from the US and 4th year Honours students from SA. The advantages of field-based study are enhanced by the KNP's uniquely strong integration of management and scientific goals. Students overwhelmingly reported that the best feature of the program was the opportunity to conduct original research with leading scientists. Long term success of the program will depend on integration of student research with KNP (and SANParks) objectives, continued support from academic partners in SA, establishment of scholarships for low income US and SA students, and passage of program graduates into higher degree programs.

554. COMMUNICATING SCIENTIFIC KNOWLEDGE TO NATURAL RESOURCE MANAGERS: A STEP TOWARD CHANGING FIRE MANAGEMENT POLICY. MCCLOSKEY, JON; Loftin, Cynthia. USGS-BRD Maine Cooperative Fish and Wildlife Research Unit, University of Maine, Orono, ME, USA, 04469-5755.

Initiating institutional change that results in adaptive ecosystem management, requires that three aspects of social structure reinforce each other: 1) paradigms that frame actions, 2) rules that organize actions, and 3) resource allocation that facilitates action. With questionnaires, we identified how these aspects guide fire management within Okefenokee National Wildlife Refuge (ONWR). Responses suggest that assumptions of fire behavior and frequency models are not recognized, and conventional fire management paradigms are entrenched. For example, fire management activities throughout the United States are based on the assumption that with fire suppression, the probability of fire increases with time due to accumulating fuels. We tested this assumption and found it invalid for ONWR, suggesting a need for revised fire management policy. Ambiguous and complex scientific knowledge, misguided economic incentives, and cultural history can perpetuate convention, thereby creating barriers to planning, consensus, and change. In ONWR, these barriers compromised the simplest standards of experimental design (e. g., development of models to identify amphibian-habitat associations). A step towards institutional change is to more efficiently integrate scientific knowledge into the planning process. We offer simple, non-mathematical solutions that integrate traditional science, business management tools, and emerging ecological frameworks such as complex adaptive systems a nd adaptive management.

555. EXPLORING CORRELATIONS BETWEEN POPULATION TRENDS OF SOUTHERN RESIDENT KILLER WHALES AND PACIFIC SALMON OFF WASHINGTON STATE (USA) AND BRITISH COLUMBIA. MCCLUSKEY, SHANNON M.; VanBlaricom, Glenn R.; Conquest, Loveday L. Washington Cooperative Fish and Wildlife Research Unit, School of Aquatic and Fishery Sciences, University of Washington, Box 355020, Seattle, WA 98195-5020 USA, ShanMcC@u.washington.edu (SMM, GRVB). Northwest Fisheries Science Center, NMFS, NOAA, Seattle, WA 98112 (SMM). School of Aquatic and Fishery Sciences, University of Washington, Box 355020, Seattle, WA 98195-5020 USA (LLC).

Prey limitation has been proposed to be an important potential factor in the most recent period of population decline of the southern resident community of killer whales (SRs) (*Orcinus orca)*. Limited evidence suggests that the SRs forage nearly exclusively on Pacific salmon (*Oncorhynchus* spp.). Annual adult population data for the five species of Pacific salmon were obtained from the Washington Department of Fish and Wildlife and Fisheries and Oceans Canada for river systems in Washington and British Columbia. Annual census data for the SRs were obtained from the Center for Whale Research. Simple t-tests were calculated for various correlation coefficients involving the SRs, individual family pods within the SR community, individual species of salmon, and total salmon from various river systems. Results indicate that

the strength of the correlation between SRs and salmon is pod and species specific, and fluctuations in salmon and SR population trends are linked. The SRs have been proposed for listing as threatened under the US Endangered Species Act (ESA), and listed as endangered by the Canadian government. Many salmon stocks in the region have also been listed under the ESA, making it critical to improve our understanding of the relationships between SRs and salmon stocks.

556. AMAZON TRANSFORMATIONS: CHANGING CONCEPTIONS OF THE AMAZON RAINFOREST AND ITS DEVELOPMENT POTENTIAL. MCGRATH, DAVID; Moutinho, Paulo; Nepstad, Daniel. NAEA, Universidade Federal do Pará, Belém, PA 66.075-900, dmcgrath@amazon.com.br (DM); Instituto de Pesquisa Ambiental da Amazônia, SCLN 210, Bl C, 211, Brasília, DF, 70.862, Brazil, moutinho@ipam.org.br (PM); Woods Hole Research Center, Falmouth, MA 02540, USA, dnepstad@whrc.org (DN).

Conceptions of Amazon forest ecology and development potential have undergone a number of transformations over the last two centuries. Early 19th century scientist explorers, struck by the exuberance of the vegetation, emphasized the great fertility of the soils and region's great development potential. By the mid 20th century this view had been replaced by one that emphasized the low fertility of the soils and the region's limited potential for development. In this view, forests were almost closed systems in which nutrient and water budgets were largely independent of the soil. The high diversity of tropical forests was the result of the functional specialization of each species, adaptations that increased the efficiency of nutrient cycling. By the end of the century all three elements of this model were being questioned. Hydrological studies showed that forests consumed water and nutrients from up to 20m of soil, while studies of successional processes indicated that there is considerable redundancy in niche specialization. Finally, the expansion of mechanized soybean production into the Amazon forest challenges the idea that Amazon soils are incapable of sustaining intensive agricultural. This new conception of Amazon ecology and development potential requires a comparable transformation in approaches to Amazon conservation.

557. IDENTIFYING KEY INDIVIDUALS FOR CONSERVATION USING THE SAMPLE INFLUENCE FUNCTION. MCGRAW, JAMES; Furedi, Mary Ann. Department of Biology, P. O. Box 6057, West Virginia University, Morgantown, WV, USA, jmcgraw@wvu.edu.

In a world of limited resources, identifying the most critical targets for conservation within a species of concern will ensure the greatest efficiency of conservation effort. Classically, sensitivity and elasticity analyses have been used to identify life history stages critical to population growth rate in order to guide management of rare or endangered species. Unfortunately, these analytical approaches have inherent mathematical assumptions that limit their utility as guides for conservation. A complementary method, the sample influence function, uses a contextual, experimental approach to identifying key individuals for population growth. Using our extensive demographic database on *Panax quinquefolius* L. (American ginseng), we demonstrate the differences between classical sensitivity/elasticity and the sample influence function. The sample influence function places a relativized stage-specific conservation value on each individual in the population proportional to its influence on population growth. The sample influence function showed the importance to ginseng population growth of transitioning from small to large size classes, reproducing early, and surviving within large classes. By contrast sensitivity/elasticity emphasized only survival of large individuals. In the case of ginseng conservation, the oversimplification resulting from elasticity analysis could misdirect conservation efforts. The sample influence function analysis is more relevant for conservation decision-making.

558. THE DECLINING AMPHIBIAN POPULATIONS TASK FORCE (DAPTF): ACHIEVEMENTS AND FUTURE DIRECTIONS. MCKAY, JEANNE; Halliday, Tim. The Declining amphibian Populations Task Force (DAPTF), Department of Biological Sciences, The Open University, Walton Hall, Milton Keynes, UK daptf@open.ac.uk.

Since the first World Congress of Herpetology in 1989, it was clear that amphibians were threatened worldwide and that many of the environmental threats transcended national boundaries, notably climate change and infectious disease. To address these problems, a truly global organisation was required and in 1991, the Declining Amphibian Task Force (DAPTF) was established by the Species Survival Commission (SSC) of the World Conservation Union (IUCN). The DAPTF operates through a global network of issue-based Working Groups focused on specific topics including: disease and pathology, monitoring techniques, chemical contaminants, climatic and atmospheric change and captive breeding. We also support Regional Working Groups representing over 90 different regions to collect data on amphibian declines and their causes. To continue building a truly global assessment of the amphibian decline phenomenon, we would like to expand our work in Africa, Asia and the Far East and make our various funding initiatives available to more people around the world. Since 1989, we have developed a more complete picture of the global pattern of decline resulting in the IUCN's Global Amphibian Assessment and our own Declining Amphibian Database. These enable us to identify specific regions and amphibian taxa that most urgently require our attention.

559. STATUS AND AVAILABILITY OF GRADUATE PROGRAMS IN CONSERVATION IN MEXICO. MEDELLÍN, RODRIGO A.; Equihua, Miguel; Villegas, Rafael; Bynum, Nora. Instituto de Ecología, Universidad Nacional Autónoma de México, México, D. F., 04510, México (RAM). Instituto de Ecología A. C., Xalapa, Veracruz, México (ME, RV). Center for Biodiversity and Conservation, American Museum of Natural History, New York, NY. 10024. USA.

The availability of human resources has been cited as a major hurdle to effective nature conservation, and universities around the world have established graduate programs that include an emphasis or specialization closely connected to conservation biology. Mexico provides an interesting example to assess the characteristics of these graduate programs. Mexico's Secretary of Education and the National Council of Science and Technology (CONACyT) have certified at least nine graduate programs with a focus on topics relevant to conservation biology. Most programs are based in northern or central Mexico, while courses and available programs are severely limited for southern Mexico. Participation of faculty members in the programs is uneven; some Universities offer programs where only 2 or 3 professors state interest in biodiversity conservation, whereas other institutions mention over 20 faculty members working in related fields. In 1991, there were only 79 registered graduate students in Ecology, and 264 in 2000. Although this increase is heartening, the environmental challenges

faced by Mexico indicate the need to strengthen existing programs and continue to promote the creation of more conservation biology-focused graduate programs in under-served areas.

560. CONSERVATION AND DEVELOPMENT WITH LOCAL PARTICIPATION: THE CASE OF LLANGANATES NATIONAL PARK IN THE CONDOR BIORESERVE, ECUADOR. MEDINA, GALO; Camacho, Jaime; Campaña, Jorge. EcoCiencia, Francisco Salazar E 14-34 y Coruña. Quito, Ecuador.

Llanganates National Park is one of the 33 Ecuadorian officially protected areas. It has an outstanding biodiversity and a very important cultural and mythical value. However, since its creation in 1996, the Ecuadorian government has not paid the attention needed to adequately manage the area and there are only four people controlling its 220,000 hectares as part of the State-paid staff. Since 2004 we are implementing a community park wardens program, the objectives of which are the involvement of the surrounding communities in the management of the protected area. Now the park has ten park wardens from five communities working in three critical areas of the park. The idea is that these individuals should not be a police force but work with their communities in sustainable development activities such as ecotourism, handicrafts, reforestation, community development, and environmental education, among others. The incorporation of local communities in the administration and management of protected areas in a small though megadiverse country, which shows high demographic density, high population growth rates, and a rather high percentage of its territory under official protection, is basic in order to achieve an effective link between the conservation of biodiversity and a sustainable development model.

561. BREEDING IN A BOTTLENECK: REDUCED EFFECTIVE POPULATION SIZE IN A REINTRODUCED POPULATION OF THE ENDANGERED CALIFORNIA CONDOR. MEE, ALLAN. CRES, Zoological Society of San Diego, 15600 San Pasqual Valley Road, Escondido CA 92027-7000, USA.

The California condor *Gymnogyps californianus* is one of world's most endangered birds. Beginning in 1992, reintroductions have sought to re-establish wild populations and recent breeding efforts have allowed the opportunity for intensive study of breeding behavior. Given the length of condor pair bonds and the extensive nature of male parental care we predicted that male quality would be important in mate choice decisions. We studied mating behavior through to egg laying when most courtship ceased. A significant proportion of courtship displays were directed at females other than the male's social mate. Most extra-pair events (75%) involved a single male, the highest ranked in the population. Thus, social rank appears to strongly influence a male 's attractiveness. Since 2001, breeding populations have been slow to expand (2-3 breeding pairs in 4 years). Further, by 2004 50% of all adults were unpaired non-breeders. We propose a number of hypotheses to explain reduced effective population size in condors: mate incompatibility, female biased sex ratio and social rank effects. Based on predicted population growth over the next 5-10 years we suggest that mate incompatibility and more especially, social rank will continue to interact to depress population growth.

562. MULTI-SCALE ANALYSES OF INUNDATION AND WETLAND VEGETATION IN THE FLOODPLAINS OF THE AMAZON BASIN. MELACK, JOHN; Hess, Laura; Mertes, Leal; Novo, Evlyn; Costa, Maycira; Forsberg, Bruce. Institute for Computational Earth System Science, University of California, Santa Barbara, CA USA, melack@lifesci.ucsb.edu; INPE, Sao Jose dos Campos, SP, Brazil; INPA, Manaus, AM, Brazil.

Active and passive microwave remote sensing analyses were applied to define an Amazon wetlands mask and to identify inundation/vegetation states in the lowland basin. Hydrologic subregions, similar with respect to inundation periodicity, were delineated using long-term stage and precipitation datasets and radar mosaics. Multi-temporal analyses focus on the Cabaliana, Mamiraua, and Curuai reaches of the main stem floodplain and the upper Negro floodplain and adjacent interfluvial wetlands. Remote sensing results were validated with high-resolution digital videography and field surveys, and compared to classifications derived from optical remote sensingg. The inundation and vegetation patterns were incorporatd into regional investigations of fish communities, biogeochemical processes and macrophyte productivity.

563. DIET CHARACTERIZATION OF INTRODUCED GOATS IN MONA ISLAND RESERVE, PUERTO RICO. MELÉNDEZ-ACKERMAN, ELVIA; Cortés, Carla; Sustache, Jose; Aragón, Susan; Fernández, Denny. CREST Center for Applied Tropical Ecology and Conservation and Institute for Tropical Ecosystem Studies, University of Puerto Rico-Río Piedras PO Box 21910 San Juan PR 00931-1910 USA, elmelend@upracd.upr.clu.edu (EM-A, CC, SA DF). Department of Natural Resources and the Environment, Fish and Wildlife Office, P.O. Box 9066600 San Juan Puerto Rico 00906-6600 (JS, MG), Department of Biology, University of Puerto Rico - Humacao, CUH Station, Humacao, Puerto Rico 00791 (DF).

Feral goats, are one of the most common and impending threats to the biodiversity of island biotas around the world and are listed among the 100 most damaging introduced species in the world. Introduction of these animals to Mona Island, a dry forest island reserve occurred 500 years ago by Spanish settlers. Current management of populations of these animals include a four month hunting season coordinated by the Department of Natural Resources and the Environment (DNRE) of Puerto Rico. We used this management strategy as an opportunity to directly characterize the diet of these herbivores. Such information can be important in the development of further management strategies of this important natural reserve. A total of 87 stomach contents were collected and analyzed. Of the 431 plant species in Mona Island, 92 were found in stomach contents. Diet composition was no related to the sex and stage of maturity of goats. We did find an association between relative plant habit composition (tree, shrub, vine, herb) inside stomachs and the month the stomach was collected suggesting temporal changes in plant consumption. Therefore, long-term studies may be required to accurately assess the full scale of the diet these exotic ungulates in Mona Island.

564. SMALL MAMMAL COMMUNITIES IN A DISTURBED TROPICAL LANDSCAPE AT POZUZO, PERU. MENA, JOSÉ L. Departamento de Biologia, Universidad Nacional Agraria La Molina, Av. La Molina s/n, Lima, Peru. Apartado Postal 07-0145, Lima 7, Peru, jlmena@viabcp.com.

Between 1996 and 1997 I assessed small mammal communities in a disturbed tropical landscape including forests remnants and cattle pastures at Pozuzo (1000 m), formerly a pre-montane tropical forest in central Peru. Habitat structure of a small patch (6 ha) and a large patch (> 80 ha) were measured to assess their relationship with the occurrence of small mammals. Fourteen native species were recorded, 11 were restricted to forest habitat and three occurred in both forest remnants and cattle pastures. The presence of *Marmosops noctivagus* was positively associated with the abundance of small trees. The abundance of larger trees was associated with the presence of the arboreal *Rhipidomys* sp., and the terrestrial *Neacomys spinosus* with herbaceous cover. The abundance of *M. noctivagus* was greater in the small patch, while the abundance of other species were similar in both forests. No significant differences were found in richness and species abundance between the forest remnants. My results suggest that a few species use cattle pasture. However, the forest remnants could have a high conservation value to maintain small mammal diversity in these human-dominated lands.

565. THE ROAD TO THE PACIFIC: THE MADRE-DE-DIOS, ACRE, PANDO (MAP) REGIONAL PLANNING PROCESS. MENDOZA, ELSA R. H; Brown, Foster; Nepstad, Daniel; Muñante, Armando; Nacarato, Paola. Instituto de Pesquisa Ambiental da Amazônia, Av. Nazaré 669 Nazare, 66035-170 Belém - PA, Brasil, elsa_mendoza@uol.com.br (ERHM, DCN). Setor de uso da Terra e Mudanças Globais, Parque Zoobotanico, Universidade Federal do Acre, Rio Branco, AC, 69.915-900, Brazil (ERHM, FB), Woods Hole Research Center P. G. Box 296, Woods Hole, MA-USA (FIB, DCN), SENASA, Av. Tres de octubro 324 Puerto Maldonado, MD, Peru (AM). Ministerio de Transportes, Av. 28 de Julio No 800 Lima 1, Peru.(PN).

The rapid and recent paving of highways in the Madre de Dios, Peru - Acre, Brazil - Pando, Bolivia or MAP Region (300,000 km^2 and 700,000 population) has resulted in accelerating land use change in one of the most biologically and culturally diverse areas of the planet. The MAP Initiative began as a means to find solutions to adverse impacts associated with rapid infrastructure expansion and to maximize the benefits for regional society of such investments. Research with local communities is a key step in this initiative. We visited 13 municipalities (6 Brazilian, 7 Peruvian; >350 persons) along the highway in eastern Acre and eastern Madre de Dios to learn the perceptions and expectations of local societies to contribute to regional planning. Results include: 1) Helping five Brazilian municipalities organize geographic inf ormation of citizens' aspirations for a regional development plan; 2) Atlas of perceptions of land use in 13 municipalities now available; 3) Generation of secondary road maps, using motorcycles and GPS; 4) Discovering significant municipal boundary discrepancies between official sources; 5) Incorporation of the methods used into the second phase of Acre State Zoning; 6) Effective collaboration between a Brazilian NGO and Peruvian government agencies.

566. WORKING TOWARDS COMMON GOALS: THE CREATION OF THE OTISHI NATIONAL PARK AND THE COMMUNAL RESERVES OF ASHÁNINKA AND MATZIGUENGA. Meneses, Erick; TORRES DE PEREZ, ISABEL. Conservation International - Peru / Lima (CI) Malecón de la Reserva 281 Miraflores Lima 18 Peru.

This case study in Peru is in the mountain range of Vilcabamba (Cusco and Junin). The project was executed by, between 2001 and the 2003, with funds of the GEF/WB, and that concluded successful with the categorization of the National Park Otishi and the Communal Reserves Machiguenga and Ashaninka, as its main objective. One of the resulting initiatives with the communities was the development of a crafts association in the Communal Reserve Ashaninka This experience was very valuable for the communities and concluded with the design of 4 communal businesses associated and linked with conservation, organizing for more than 90 mothers of the linguistic family Arawak.

567. HUNTING AS A FACTOR AFFECTING THE CONSERVATION OF THE ENDANGERED ANDEAN CAT IN ARGENTINA. MERINO, MARÍA J.; Lucherini, Mauro; Luengos Vidal, Estela; Savini, Simona; Huaranca, Juan C.; Tavera, Gabriela; Birochio, Diego. GECM, Cát. Fisiología Animal, Departamento de Biología, Bioquímica y Farmacia, Universidad Nacional del Sur, Bahía Blanca, 8000, Argentina, luengos@criba.edu.ar (MJM, ML, ELV, SS, DB). Universidad Mayor de San Simón, Cochabamba, Bolivia (JCH, GT).

The Andean cat (*Oreailurus jacobita*) is one of the most endangered felids in the world, but the factors affecting its conservation status are still little understood. Since 2001, during 5 expeditions to the Andes of Argentina, we carried out interviews to adults of 29 villages and young students of 14 rural schools to understand the perception and attitude of local villagers towards this felid. Despite most interviewees did not show a negative perception of the two small cats occurring in the high Andes, hunting of these species is relatively widespread and can be seriously affecting its survival in Argentina. Therefore, in the same villages, we also carried 5 community meetings and formal and no-formal conservation education activities, aiming to start reverting this situation. A final evaluation proved that school kids not only largely enjoyed and learnt from our activities, but also that their attitude was positively affected. The degree of adult participation to our meetings was estimated as low to medium, but we always found interest in economic incentives associated to the sustainable use of their cultural, natural and historic heritage, which can prove a tool to obtain greater community involvement.

568. THE GENETIC RECOVERY OF AMPHIBIAN POPULATIONS TO HABITAT FRAGMENTATION. MEYER, SHAVONNE; Green, David M. Redpath Museum, Department of Biology, McGill University, 859 Sherbrooke St. West, Montreal, Quebec, Canada, shavonne.meyer@mail.mcgill.ca (SM, DMG).

Forest fragments are often deforested and then allowed to recover in order for future deforestation events to occur. There is a need to know how the populations within these forests are able to resist or recover from these events. We sampled populations of two amphibian species of different dispersal tendencies: the wood frog (*Rana sylvatica*), and the redbacked salamander (*Plethodon cinereus*), from sites in three localities of different fragmentation histories in Monteregie, Quebec. Tissue samples were taken for DNA analysis using 6 microsatellite loci to detect fine-scale genetic differentiation between sites for each species, with respect to the distances between sites, and for each locality. We found that fine-scale genetic differentiation is apparent at the spatial scales tested and the magnitude of these differences is greater for the poorer disperser, the greater distances between sites, and the locality that is presently most fragmented. We also found that the genetic differences observed at each locality indicate that after the forests have had some time to re-grow, amphibian populations were able to recover genetically from some of the differentiation

that occurred during times of fragmentation, although this is less evident for *P. cinereus*, the poorer disperser.

569. SYNERGISTIC EFFECTS OF HABITAT DISTURBANCE AND FRAGMENTATION ON AMAZONIAN FOREST VERTEBRATES. MICHALSKI, FERNANDA; Peres, Carlos A. Centre for Ecology, Evolution & Conservation, University of East Anglia, Norwich, NR4 7TJ, England, f.michalski@uea.ac.uk (FM, CP). Instituto Pró-Carnívoros, C.P. 10, Atibaia, SP, 12940-970, Brazil (FM).

Habitat fragmentation has been shown to influence the abundance, movements and persistence of many tropical forest species. Here we examine the effects of forest patch and landscape metrics, and levels of forest disturbance on the species diversity, and guild structure of midsized to large-bodied vertebrates in 23 forest patches in a highly fragmented forest landscape of southern Brazilian Amazonia. Line-transect census, armadillo burrow census, camera-trapping, and habitat sampling were carried out during 14 months (2003-2004) in the Alta Floresta region, Mato Grosso, Brazil. Forest patch area was the strongest predictor of vertebrate occurrence and abundance. Landscape metrics (e. g. distance from source areas) were also important determinants of the persistence of forest vertebrate species. Anthropogenic disturbance including surface wildfires, timber extraction and hunting had detrimental effects on the persistence and abundance of some species over and above those of fragment size. Different species ranged in their responses from highly sensitive to highly tolerant to forest fragmentation. A threshold area of approximately 100 ha appears to be the minimum patch size required to sustain 52.4% to 76.2% of vertebrate species, whereas patches of around 1,000 ha showed full assemblages of large vertebrates, including white-lipped peccaries and large predators.

570. BREEDING SITE PREFERENCES IN TRANSLOCATED BIRD POPULATIONS OF NEW ZEALAND SADDLEBACKS AND ROBINS. MICHEL, PASCALE; Dickinson, Katherine; Jamieson, Ian. Department of Zoology (PM, IJ) and Department of Botany (KD), University of Otago, PO BOX 56, Dunedin, New Zealand, micpa606@student.otago.ac.nz.

The outcome of a nest is critical for the survival and genetic variability of endangered bird populations. Successful nests may depend on the quality of their surrounding physical environment, which should provide protection from predators, suitable microclimate and nest material for appropriate incubation conditions and food sources for chick rearing. Therefore recovery programs of endangered species need to consider habitat requirement for maximizing breeding success of translocated populations. We therefore investigated nest site selection in newly established, translocated populations of two forest passerines: South Island Saddlebacks (*Philesturnus carunculatus*) and Robins (*Petroica australis*) on Ulva Island, New Zealand. We specifically measured nest site selection in term of vegetation structure, physical nest characteristics and nearby food availability. We identified key components of habitat characteristics that were driving nest location, and developed a model for predicting nest establishment in those two species. Plant species cover from 30 cm to 5 m, density of small tree ferns, abundance of invertebrate larvae and cockroaches, and cavity characteristics were the determining factors in breeding site selection by Saddlebacks and Robins on Ulva Island. This research approach to nest-site selection, including the specific model, should be applied to a different landscape to fully validate its strength and applicability in wildlife management.

571. UTILIZING MULTI-DATE SATELLITE IMAGERY TO DELINEATE TRANS-BOUNDARY WETLAND-CROPLAND MOSAICS AT LAGUNA MERIN - URUGUAY-BRAZIL. MICKELSON, JOHN; Steinke, Valdir. CIESIN-Columbia University, 61 Rt 9W, Palisades, NY, USA, john.mickelson@ciesin.org; CSR/IBAMA, Av. L, Ed Sede, Brasilia, Brazil, valdir.steinke@ibama.gov.br.

Our project focuses on the utilization of multi-date satellite imagery to improve baseline land cover data for ecological assessments across transnational boundaries. The work supports efforts to improve the effectiveness of multilateral environmental agreements (MEAs) in a region at the southern-most border of Brazil with Uruguay; the Laguna Merin. The region's important wetlands complexes have been recognized both by the Ramsar Convention as well as the UNESCO Biosphere program, and are also listed as a Birdlife International Endemic Bird Area. Composed of intricate matrices of expanding crop and pasture land interspersed with wetlands and riparian corridors, the area is considered to be of prime concern for both resident and migratory populations of waterfowl and shorebirds. Our project has a) Identified and mapped locations of and changes within natural wetland areas, agricultural and natural habitat features, b) developed geospatial data sources that help inform equitable and sustainable agriculture practices across the national boundaries, and c) fostered transnational research, conservation and cooperation efforts that help develop long-term integrated protection plans for the area.

572. BAT COUNT PHILIPPINES: A CONSERVATION SYNERGISM BETWEEN LOCAL CAPACITY BUILDING AND ENDANGERED SPECIES MONITORING. MILDENSTEIN, TAMMY; Cariño, Apolinario; Stier, Samuel. University of Montana, Ecosystem & Conservation Sciences Department, Missoula, Montana 59812, USA, tammy.mildenstein@umontana.edu (TM). Silliman University, CENTROP, 6200 Dumaguete City, Philippines (AC). University of Montana, College of Forestry and Conservation, Missoula, Montana 59812, USA (SS).

In the Philippines, where over 90% of the original forest has been removed and government institutions that protect the environment remain weak, populations of many species including large flying-foxes (Pteropodidae) are assumed to be declining towards inevitable extinction. However, the number and sizes, and even locations, of remaining large flying-fox roosts have never been ascertained, obscuring conservation needs. Our project initiated an awareness and capacity building campaign to empower local communities with the knowledge and survey techniques necessary to monitor the flying-fox colonies roosting in their neighboring forests. Through field training of local stakeholders, media coverage to increase awareness, and a national workshop for conservation managers throughout the country, we initiated a nationwide monitoring campaign that resulted in the first map of known flying-fox roosts in the country (including 30 previously undocumented roosts), a network of over 200 trained individuals committed to regular flying-fox monitoring, and a nationally-coordinated action plan for flying-fox conservation management. Consciously including community members in population surveys generated new information vital to planning conservation efforts for threatened species. Simultaneously, this approach helped build the local capacity necessary to affect sustained conservation in difficult environmental and institutional settings increasingly common to biodiversity rich areas.

573. CHARACTERIZING THE INFLUENCE OF CANOPY GAPS ON THE ARBOREAL INVERTEBRATE AND MACROLICHEN COMMUNITY IN THE ACADIAN SPRUCE/FIR FOREST. MILLER, KATHRYN M.; Woods, Stephen A.; Selva, Steven B. Department of Biological Sciences, 5722 Deering Hall, University of Maine, Orono, Maine, 04469, USA, Kathryn.Miller@umit.maine.edu (KMM, SAW). Department of Biology and Environmental Sciences, University of Maine at Fort Kent, 23 University Drive, Fort Kent, Maine, 04743, USA (SBS).

Practicing sustainable forest management requires a comprehensive knowledge of the forest community, its inhabitants, and impacts of management. To date, scant attention has been paid by conservationists to arboreal invertebrate communities in northern temperate forests, despite their roles in virtually all forest processes. Consequently, little is known about their habitat requirements and sensitivity to forest management. The aim of this research was to explore arboreal invertebrate and lichen associations and the influence of harvested canopy gaps on these taxa. Study sites were located in the Penobscot Experimental Forest in Bradley, Maine, USA. Invertebrate and lichen assemblages were compared between 40 trees in continuous forest and 40 residual trees located in harvested canopy gaps. Invertebrate collections and estimation of lichen percent cover occurred along the bole of each tree at three vertical intervals (0-2m, 2-4m, and 4-6m). The most abundant invertebrate orders included Acari (mites), Collembola (springtails), Diptera (flies), Psocoptera (bark lice), and Araneae (spiders), respectively. Counts of invertebrate orders varied significantly with lichen species composition and height. Additionally, Collembola and Araneae counts were greater in continuous forest, and Psocoptera counts generally increased with diameter of tree. Future efforts will focus on invertebrate associations at the family-level.

574. ANALYSIS OF THE APPLICATION OF THE IUCN RED LIST CRITERIA AT THE NATIONAL LEVEL. MILLER, REBECCA; Rodríguez, Jon Paul; Bambaradeniya, Channa; Boles, Ruben; Eaton, Mark; Fowler, Theresa; Gärdenfors, Ulf; Keller, Verena; Molur, Sanjay; Walker, Sally. National Red List Advisory Group, c/o Centro de Ecología, Instituto Venezolano de Investigaciones Científicas, Apartado 21827, Caracas 1020-A, Venezuela, rmiller@ivic.ve, (RM, JPR). IUCN- The World Conservation Union, Sri Lanka Country Office, No. 53, Horton Place, Colombo 07, Sri Lanka (CB). COSEWIC Secretariat, c/o Canadian Wildlife Service, Ottawa, ON K1A 0H3, Canada (RB). Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL, United Kingdom (ME). Species at Risk Branch, Canadian Wildlife Service, Environment Canada, Ottawa, ON K1A 0H3, Canada (TF). ArtDatabanken, Swedish Species Information Centre, Box 7007, S-750 07 Uppsala, Sweden (UG). Schweizerische Vogelwarte / Swiss Ornithological Institute, CH-6204 Sempach, Switzerland (VK). Zoo Outreach Organisation, 29-1 Bharathi Colony, First Cross, Peelamedu, PB 1683, Coimbatore, Tamil Nadu 641004, India (SM, SW).

As countries worldwide become increasingly interested in monitoring and conserving biodiversity, the development of national red lists of threatened species gains greater importance and these lists become more influential in determining conservation priorities. The World Conservation Union (IUCN) categories and criteria for evaluating extinction risk, although originally intended for use at the global level, have been used nationally ever since their development. The IUCN recently published guidelines adapting the criteria for regional use, which we evaluated at an international workshop. We also sent a survey investigating the extent to which IUCN criteria have been utilized in national listing efforts and the ways in which they have been incorporated into national conservation policies to the 180 CBD focal points. Of the 22% that responded, 75% have already developed a national threatened species list, 83% used the IUCN criteria and 90% incorporated the criteria or the lists into national conservation policies. We recommend quantifying the thresholds in the Regional Guidelines in order to increase their repeatability. Additionally, increased communication and information exchange between countries and between regional and global assessors, potentially through an interactive website, will facilitate the development of national red lists and improve their value both within and between countries.

575. STRONG GENETIC DIFFERENTIATION IN POPULATIONS OF *Berchemiella wilsonii* VAR. *pubipetiolata* AS REVEALED BY MATERNAL AND BIPARENTAL DNA MARKERS. MING, KANG; Fenghua, Xu; Hongwen, Huang. Wuhan Botanic Garden, Chinese Academy of Sciences, Wuhan, Hubei 430074, China. mingk@rose.whiob.ac.cn.

Berchemiella wilsonii var. *pubipetiolata* is an endangered tree in eastern China. AFLP and cpDNA markers (cpRFLP and cpSSR) were used to characterize the genetic diversity within and between populations of *B. wilsonii* var. *pubipetiolata* and its two congeners. By combining cp-RFLP and cpSSR analyses, six haplotypes was detected in *B. wilsonii* var. *pubipetiolata*, and one each was detected in *B. wilsonii* var. *wilsonii* and *B. berchemiaefolia*, respectively. For *B. wilsonii* var. *pubipetiolata*, the overall level of nuclear and chloroplastic genetic diversity (H_{Tb}=0.202 and H_{Tc}=0.700, respectively) were similar to other outcrossing, long-lived, woody species. The analysis of molecular variance (AOMVA) for both markers revealed high differentiation between two geographical groups. The results indicated: 1) *B. wilsonii* var. *pubipetiolata* is genetically distinct from *B. wilsonii* var. *wilsonii* and *B. berchemiaefolia*; 2) the historically spatial isolation separated two geographical groups of *B. wilsonii* var. *pubipetiolata* into different gene pools; 3) at regional level, low haplotypic diversity and high inter-population differentiation suggests a founder effect occurred and reflects impacts of anthropogenic activities on extant population structure.

576. LONG-TERM ECOLOGICAL RESEARCH ON FIRE ECOLOGY: LESSONS LEARNED FOR CERRADO CONSERVATION. MIRANDA, HELOISA S.; Sato, Margarete N.; Andrade, Saulo M.A.; Arakawa, Henrique B. Departamento de Ecologia, Universidade de Brasília, Brasília, DF, 70.910-900, Brazil, hmiranda@unb.br.

Fire is a common feature in the Cerrado ecosystem. Changes in the vegetation structure caused by a high frequency fire regime (2 years interval) in the middle of the dry season were investigated for cerrado *sensu stricto* (C) (a savanna woodland) and for campo sujo (CS) (an open savanna) vegetation at the Reserva Ecológica do IBGE, Brasília, Brazil. In 1992, when the project started, the vegetation of both areas was protected from fire for 18 years. In 2004, in both areas, 63% of the woody individuals (diameter > 5 cm at 30 cm height) had suffered top kill or died, resulting in a loss of aboveground biomass of 8.0 t/ha in the C area and 0.8 t/ha in the CS. No change was observed in the biomass of the herbaceous layer after the six prescribed fires. Considering that the biomass of the herbaceous layer is fully recovered 2 years after a fire and that the mortality rates at the C area (55.6%) and at the CS area (33.6%)

indicate that the time needed for recovery of the vegetation structure and the carbon lost by the woody layer will be greater in the C area than in the CS.

577. CONSERVATION OF THREATENED SPECIES AND EVOLUTIONARY HISTORY IN THE HOTSPOTS OF BIODIVERSITY. Mittermeier, Russell A.; HOFFMANN, MICHAEL; Pilgrim, John D.; Brooks, Thomas; Mittermeier, Cristina G.; Lamoreux, John; Fonseca, Gustavo. Conservation International, 1919 M Street NW, Suite 600, Washington, DC 20036 USA (RAM; CGM). Center for Applied Biodiversity Science, Conservation International, 1919 M Street NW, Suite 600, Washington, DC 20036 USA, m.hoffmann@conservation.org (MH; JDP; TMB; GF). Department of Environmental Sciences, University of Virginia, Charlottesville, VA 22903, USA (JL).

Life on earth faces a crisis of historical proportions, with nearly 16,000 species currently at risk of extinction. Conservationists can only achieve a significant reduction in global biodiversity loss, by allocating our time and resources more effectively to those regions urgently in need. The biodiversity hotspots, characterized by having both exceptional numbers of endemic species and exceptional levels of threat, are widely used to inform global conservation strategy. Here, we report on the results of a new and expanded analysis of the biodiversity hotspots to show that hotspots hold, as endemics, higher proportions of species globally threatened with extinction and of higher taxa (genera and families) than would be expected given their number of endemic species. Islands like Madagascar host large numbers of th reatened endemic species, and also hold particularly large numbers of higher taxa as endemics, even given their large numbers of endemic species. Given that the overwhelming majority of recent terrestrial vertebrate extinctions have occurred in the hotspots, and that sites representing places of imminent species extinctions are also concentrated in hotspots, we argue that urgent conservation action in the hotspots is crucial if the current rate of extinction is to be slowed.

578. CONSERVATION GENETICS OF NEOTROPICAL PARROTS. MIYAKI, CRISTINA Y. Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão 277, 05508-900, São Paulo, SP, Brazil, cymiyaki@ib.usp.br.

Parrots are one of the avian groups with the highest number of endangered species and for over 13 years we have been applying molecular markers to aid in the conservation of neotropical taxa. Emphasis has been given to more endangered species, such as the extinct in the wild *Cyanopsitta spixii* and the vulnerable *Anodorhynchus hyacinthinus*. Data on genetic variability, parentage, sex identification, and population structure have been gathered and used in *ex situ* and *in situ* conservation programs. These results have been applied in: 1) the establishment of reproductive pairs in captive breeding programs (preferably pairing genetically less similar individuals), and 2) to better understand the biology of the species, including the analyses of sex ratio and genetic similarity of chicks sampled in the nest, the identification of a wild hybrid between two species, and the study of the population structure. The collaborations established with governmental and non-governmental institutions have shown that the conservation of parrots is a long term task and poses many challenges. (Financial support: FAPESP, CNPq, CAPES).

579. THE EFFECTS OF DENSITY DEPENDENCE AND HABITAT FRAGMENTATION ON BLUE CRAB POPULATIONS. MIZEREK, TONI; Regan, Helen; Hovel, Kevin. San Diego State University, Department of Biology, 5500 Campanile Dr., San Diego, CA 92182-4614 USA. tmizerek@mail.sdsu.edu.

Within Chesapeake Bay, eelgrass is the major habitat for blue crabs because it provides resources and protection from predators. The distribution of eelgrass in the area is at an historic low and has become severely fragmented due to anthropogenic effects such as nutrient loading and propeller scarring. Populations of blue crabs are also at critically low levels primarily due to harvesting pressure. Furthermore, density dependence has been shown to have different effects on juvenile blue crabs at different levels of fragmentation. This is because juvenile blue crabs are susceptible to higher levels of predation by cannibalistic adults and other predators in larger, rather than smaller, habitat fragments. Hence, in fragmented landscapes there is a trade-off between adult and juvenile mortality that can have important population-level consequences. In this poster, we present a stochastic stage-based model that incorporates density dependence, habitat fragmentation and harvesting to explore habitat restoration options for the seagrass which in turn, will benefit blue crab populations. We show that it is important to consider density dependence in the context of habitat fragmentation for prioritizing management actions that benefit such ecologically and economically significant species.

580. RESEARCH AND MANAGEMENT OF CANADA LYNX IN MINNESOTA. Moen, Ronald A.; Burdett, Christopher L.; NIEMI, GERALD J.; Mech, L. David; Lindquist, Edward L. Natural Resources Research Institute, University of Minnesota, 5013 Miller Trunk Hwy, Duluth, MN 55811-1442, USA, gniemi@d.umn.edu (RAM, CLB, GJN). U.S. Geological Survey, Biological Resources Division, Northern Prairie Wildlife Research Center, 8711 37th St SE, Jamestown, ND, 58401-73171, USA (LDM). USDA Forest Service - Superior National Forest, 8901 Grand Ave Pl, Duluth MN 55808-1102, USA (EL).

The Canada lynx (*Lynx canadensis*) is a threatened species in the U. S. outside of Alaska. Knowledge about distribution, habitat requirements, abundance, and long-term persistence is required for the conservation of Canada lynx in the Great Lakes region. These questions are being addressed in a cooperative project supported by government agencies and NGOs. In a population that some biologists had thought was extirpated we have radiocollared 10 males and 9 females. GPS collars have been deployed on 9 of these animals with other animals wearing VHF collars. Over 3,000 GPS locations document habitat use of both males and females in the first year of GPS collar deployment, supplemented by over 500 VHF locations. Long-distance movements by several males have been documented. Adult females have remained in smaller areas while raising kittens. Kittens in all 3 litters we located have survived 9 months. Abundance is being determined by following up on sightings reports and collecting scats and hairs for DNA analysis. To date over 50 Canada lynx have been uniquely identified. Persistence will be addressed through long- term monitoring and genetic analyses. Project results will allow management and recovery efforts for Canada lynx to be based on region-specific demographic and habitat use data.

581. TRENDS IN BREEDING BIRD POPULATIONS ON AN URBANIZING LANDSCAPE. MOLNAR, JENNIFER L. The

Nature Conservancy, 217 Pine Street, Suite 1100, Seattle, WA, 98101, USA, jmolnar@tnc.org.

The spread of urbanization in the northeast US has accelerated in recent decades and has resulted in rapidly and widely changing patterns of land use. To evaluate the consequences of these changes on breeding bird populations, I analyzed spatial and temporal patterns of county-level trends in population data from the North American Breeding Bird Survey and land use data from the Natural Resource Conservation Service's National Resources Inventory between 1982 and 1997. I compared the responses of birds from different guilds to identify life history attributes that make species more or less resilient to land use change. Five out of the eight guilds increased in abundance across the study area despite ongoing urbanization. Guilds that declined were Neotropical migrants and those that breed in grassland and, to a lesser extent, successional-scrub habitats. The trends of the latter two guilds varied with land use change more than the trends of Neotropical migrants, indicating that species breeding in grassland and successional-scrub habitats were more sensitive to changing land uses.

582. GENETIC EVIDENCES OF MONARCH BUTTERFLY'S OVERWINTERING AREAS PERTURBATION: FORMATION OF SINK LOCAL MEXICAN POPULATIONS. MONTESINOS-PATIÑO, ENEIDA; Nuñez-Farfán, Juan; Hernández-Gutiérrez, Salomón. Conservation Biology Graduate Program, University of Minnesota, St. Paul, 55108, MN, USA, mont0322@umn.edu (EMP). Departamento de Ecología Evolutiva, Instituto de Ecología, UNAM, Apdo. Postal 70-275, Ciudad Universitaria, México D.F., 04510, México (JNF). Departamento de Biología Molecular, Universidad Panamericana, México D.F, 03920, México (SHG).

The monarch butterfly's migratory phenomenon is threatened by forest fragmentation in the overwintering areas in Mexico. Monarchs that overwinter in fragmented forests lose more energetic resources, resulting in decreased lipids. At the end of overwintering season these monarchs are likely to be unable to complete the migratory trip back to the USA. This may result in high levels of genetic flow between the migratory population and local populations of monarchs in Mexico. We performed allozyme electrophoresis of 8 loci to determine the genetic structure of three migratory and three local Mexican populations of monarchs. Our central aim was to investigate the variability, differentiation levels, and genetic flow between migratory and local populations of monarchs. There is no genetic differentiation between migratory and local populations (F_{ST} = 0.002). The genetic identity between these populations is high (I > 97%) as a result of high genetic flow between them (Nm = 9.68). This study, suggests that fragmentation could have important effects on migratory monarchs. If butterflies with decreased lipid supplies are less likely to remigrate, local populations could act as sink populations and the migratory population as their source. The high level of gene flow between these populations documented here supports this interpretation.

583. BUILDING CAPACITY IN PLANT CONSERVATION: MISSOURI BOTANICAL GARDEN'S TRAINING AND CONSERVATION PROGRAMS IN TROPICAL COUNTRIES. MONTIEL, OLGA MARTHA; Arango-Caro, Sandra; Milder, Gail. Center for Conservation and Sustainable Development, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO, 63166, USA, OlgaMartha.Montiel@mobot.org.

Tropical countries contain the largest number of plant species, have the greatest potential for finding new species, and are the most at risk for loss of biodiversity. The Center for Conservation and Sustainable Development of the Missouri Botanical Garden is contributing actively to expanding capacity in the understanding of plants and their conservation in tropical countries through analysis of plant information, training of local botanists, conservationists, and other citizens, and development of community-based programs. Over the last two decades, the Garden and its Center for Conservation and Sustainable Development have trained some 400 students, professionals (botanists, conservationists, agronomists, foresters, doctors), park guards, and schoolchildren from tropical countries - especially from Bolivia, China, Ecuador, Madagascar, Peru, Tanzania, and Vietnam - in conservation and botany. The Center for Conservation and Sustainable Development is also working with rural, indigenous communities in Madagascar, Ecuador (Shuar and Awá), and Peru (Yanesha) to help them build their capacity to manage their richly diverse but severely threatened ecosystems and to understand and use native plant species for their own benefit. The Center for Conservation and Sustainable Development has staff and offices in seven countries, where it has formed partnerships with local communities and institutions to pursue this conservation work.

584. RECENT EXPERIENCES IN BUILDING CAPACITY FOR TRAINING IN CONSERVATION AT THE UNIVERSITY AND PROFESSIONAL LEVEL IN BOLIVIA. MORAES R., MÓNICA; Herrera, Patricia; Bomblat, Christian; Centurión, Teresa; Aguilera, Gladys; Inchausti, Víctor Hugo. Instituto de Ecología, Carrera de Biología, Universidad Mayor de San Andrés, Casilla 10077 - Correo Central, La Paz, Bolivia, monicamoraes@acelerate.com (MM). Museo de Historia Natural Noel Kempff Mercado, Facultad de Ciencias Agrícolas, Universidad Autónoma Gabriel René Moreno, Casilla 2489, Santa Cruz, Bolivia (PH). Carrera de Biología, Universidad Autónoma Gabriel René Moreno, Casilla 702, Santa Cruz, Bolivia (TC, GA). Conservation Internacional-Bolivia, Casilla 13593, La Paz, Bolivia (VHI).

Over the past fifteen years, the megadiverse country of Bolivia, has made efforts to improve scientific knowledge and educational tools in the area of biodiversity conservation. Improvements have been introduced within the formal and non-formal educational systems, and have targeted both universities and professionals working in the field. New tools have been adapted or developed (field guides & parlant maps, management plans for conservation, participative workshops, educational modules, etc.) that link the university and professional levels in field. Universities are also sharing their academic knowledge and reaching to a wider audience, by serving as advisors to different sectors of the Bolivian society, either alone or under cooperation with other institutions. In higher education, however, in spite of a large, well-established, and active university system there is no professional track in biodiversity conservation, and less than 8% of universities have programs that directly address issues of conservation. Among those universities, environmental sciences studies are offered at the undergraduate (60%) and graduate (40%) level. But a lack of teaching resources in Spanish remains a significant obstacle to teaching about biodiversity conservation.

585. COMPARING POTENTIAL ECONOMIC BENEFITS FROM SUSTAINABLE AND UNSUSTAINABLE USE OF IMATACA TROPICAL FORESTS IN THE VENEZUELAN GUIANA. MORALES, GONZALO; Hernández-Valencia, Ismael. Instituto de Zoología Tropical, Facultad de Ciencias, Universidad Central de Venezuela. Apartado 47058, Caracas 1041-A, Venezuela, lmorales@ciens.ucv.ve.

The Imataca Forest Reserve (IFR) harbors over 3 million Ha of nearly pristine and biologically diverse tropical forests (e. g., over 740 terrestrial vertebrate species and 2300 vascular plants are reported). In law, IFR is devoted to sustainable forestry, but legal and illegal gold mining have long been there. This industry jeopardizes indigenous culture and health, but its socio-economic benefits are thought to exceed those from timber production. We addressed this issue by comparing probable gross revenues from sustainable forestry (SF), tourism, non-timber forest products (NTFP), environmental services (ES), wild meat (WM) and Carbon fixation (CF) versus legal gold mining (LGM). Benefits from genetic resources could not be quantified. Prices of goods and services refer to the 1994-2003 decade. All figures are in US $ millions per year (for short, MM) and they refer to 3.011 million Ha of tropical forests. Our estimations are SF 97.6 MM; combined NTFP and ES 3000-22000 MM; CF 45-90 MM; WM 0.06 - 0.12 MM; tourism 0.9 - 2.3 MM, and LGM 53 MM. Environmental restoration costs were not drawn from LGM revenues. We conclude that benefits from sustainable use of Imataca forests may largely exceed those from legal gold mining, while preserving indigenous culture and health.

586. VARIATION IN WOODY SPECIES AMONG DIFFERENT VEGETATION FORMS IN A CONTIGUOUS AREA IN THE TRIÂNGULO MINEIRO REGION OF BRAZIL. MORENO, MARIA I. C.; Haridasan, Mundayatan. Departamento de Ensino, Centro Universitário do Triângulo, Uberlândia, MG, 38400-000, Brazil, inmoreno@click21.com.br (MICM); Departamento de Ecologia, Instituto de Biologia, Universidade de Brasília, Brasília, DF, 70.919-970, Brazil (MH).

The presence of different vegetation forms in the cerrado landscape depends on edaphic gradients determined by topography and parent material. The present study was conducted along a gradient of different forms of the cerrado and forest vegetation forms on well drained dystrophic and mesotrophic soils at the Panga Ecological Station in Uberlândia in the Triângulo Mineiro region of Brazil. The main objective was to determine the similarity in floristic composition of woody species among the different physiognomic forms of open and closed woodlands and forests in a contiguous area. A total of 183 species belonging to 58 families were registered among 9909 individuals in 127 plots of 10 x 20 m in all the seven physiognomies. Forty species were restricted to mesotrophic soils rich in Ca of which 31 were unique to the semideciduous forest and 9 were unique to the mesotrophic "cerradão". Seventy three species were unique to open and closed vegetation forms on dystrophic soils. The remaining 110 species occurred both on dystrophic and mesotrophic soils but not with the same density. Thus to conserve woody species in a "cerrado" landscape it is important to protect all the different physiognomic forms along a natural gradient.

587. UTILIZATION AND STATUS OF LARGE MAMMALS IN BAKOSSILAND, SOUTHWESTERN CAMEROON. MORGAN, BETHAN; Dixson, Alan. Conservation and Research of Endangered Species (CRES), Zoological Society of San Diego, 15600 San Pasqual Valley Road, Escondido, CA 92027-7000, USA.

We present one aspect of our project in Cameroon: the nature of wildlife utilization and status of large mammals in Bakossiland, an area of outstanding biodiversity currently under gazettement as a National Park and associated protected areas. The stimulus for this study was to determine 'baseline' offtake levels of wild-caught meat (through conducting detailed market surveys) and establish local perceptions of mammal dynamics (through hunter interviews) before commencing active management of the Protected Areas. Rodents constituted the majority of meat sold in bushmeat markets, although primates and ungulates contributed substantial biomass. Detailed hunter interviews in 15 remote villages suggested a decline in most hunted species. However, populations of some 'flagship' species such as drills appear to be recovering in some areas thanks to a traditional hunting ban imposed by the paramount chief in 1994. Other key species, such as the yellow-backed duiker, may be close to extinction throughout Bakossiland. Economic incentives for bushmeat over domestically-reared meat are discussed, in addition to the weakening of traditional taboos, and lack of government-led enforcement. One local solution for Bakossiland, however, is the encouragement of the traditional chieftaincy structure, which may offer an effective local solution to the bushmeat crisis, particularly for charismatic species.

588. THE IMPACT OF DEER ON RARE PLANTS: *Calypso bulbosa* (ORCHIDACEAE) ON ANTICOSTI ISLAND, QUÉBEC, CANADA. MORISSETTE, ÈVE-MARIE; Lavoie, Claude; Huot, Jean. Centre d'études nordiques, Université Laval. Québec, Québec (Canada), G1K 7P4 eve-marie.morissette.1@ulaval.ca. (EMM, CL, JH).

The vegetation structure of Anticosti Island has been greatly modified since the introduction of white-tailed deer in 1896. The exceptional deer density (16 individuals km^{-2}) on the island is highly problematical; deer over-browsing has strong effects on balsam fir stands, which are gradually disappearing. These forest stands harbour several rare plant species. We hypothesized that a rare orchid, *Calypso bulbosa*, is actually at risk on Anticosti Island because of the indirect effects of deer browsing. A survey was carried out in 2004 to localize *C. bulbosa* colonies and to describe its habitat. Herbarium data were also gathered to determine the importance of Anticosti Island as a refuge for the species in northeastern North America. More than 55% of colonies were located in fir stands. Detrended correspondence analyses clearly showed that colonies were mainly located in open, old-growth fir stands. Herbarium specimens strongly suggest that Anticosti Island is the main refuge for the specie in northeastern North America. Considering that old-growth fir forests are becoming rare on Anticosti Island, it is likely that *C. bulbosa* populations are at risk. Forest management activities should be undertaken to protect existing balsam fir stands and ensure the regeneration of new forest stands.

589. AN OVERVIEW AND EVALUATION OF THE MAJOR INITIATIVES FOR SHARING CONSERVATION INFORMATION. MORITZ, THOMAS D. American Museum of Natural History, 79 th Street at Central Park West, New York, NY 10024 USA, tmoritz@amnh.org.

The signature of the Biodiversity Convention in 1992 formalized the need for a framework for sharing biological and conservation information. Since then there has been a convergence between

initiatives that seek to free all types of information, including software, scientific data, artistic products, under the Creative Commons. IUCN set up in 2004 the Conservation Commons, bringing together existing projects managing species, protected areas, and legislation. Drawing on more than 10 years' experience at the international level in working to build collaborations with respect to sharing biodiversity information, this presentation will review current and past experiences, analyzing "common pool resource" (CPR) systems as proposed by Elinor Ostrom (Governing the Commons), and argue that the Ostrom CPR models are applicable at the global scale to digital information systems resources.

590. DISTRIBUTION, ABUNDANCE AND CONSERVATION STATUS OF THE FIJIAN GROUND FROG. MORLEY, CRAIG; Kuruyawa, Joape; Thomas, Nunia; Osborne, Tamara; Morrison, Clare. Address: Department of Biology, the School of Pure and Applied Sciences, The University of the South Pacific, P.O. Box 1168, Suva, Fiji Islands. morley_c@usp.ac.fj.

The Fijian ground frog *Platymantis vitianus* has been extirpated from much of its historical range due to predation by mongoose *Herpestes javanicus* and human activities. Our main objectives were to gather baseline data on the distribution and abundance of the frog from the last four known mongoose-free islands and to publicise the plight of the frog in Fiji. Standardised visual encounter surveys were used by a team of 8 members for 2 hours each night in a range of locations on each island. The location, substrate, and body measurements of all frogs were recorded. Gau Island had the highest frog encounter rate while Ovalau had the lowest. Gau is also the only island not to have the marine toads *Bufo marinus*. Of the frogs encountered, 40% were adults. The frogs were rarely present where human activity occurred and most frogs were seen in forested areas with clear undergrowth. They were often found near water bodies but never in the water. For these populations to persist we recommend stopping further mongoose and marine toad incursions, preventing the frog's habitat from deteriorating further and increasing the locals' knowledge and awareness of the frog.

591. WORLD'S INTACT LARGE MAMMAL ASSEMBLAGES. MORRISON, JOHN; Sechrest, Wes; Wilcove, David S.; Dinerstein, Eric. World Wildlife Fund, 1250 24th St. NW, Washington, DC, USA, john.morrison@wwfus.org (JM, ED). IUCN/SSC-CI/CABS Biodiversity Assessment Unit, c/o Center for Applied Biodiversity Science, Conservation International, 1919 M Street NW, Suite 600, Washington, DC, USA, 20036 (WS). Woodrow Wilson School, Princeton University, Princeton, NJ 08544, USA (DW).

Large mammals are of particular interest to ecologists because they play critical ecological roles within ecosystems yet are highly susceptible to extirpation due to human activities. Large carnivores affect both the numbers and distribution of their prey as well as species abundance at lower trophic levels. Large herbivores engineer major changes to vegetation structure and species composition. However, humans have extirpated large mammal species across much of their ranges. We attempted to determine the locations and proportion of the world's continental land area that presently retain the full assemblage of large mammals (>40kg) occurring in 1500 AD. The extirpation of a single species (e. g. Sumatran rhinoceros, lion) was sufficient to remove large areas from further consideration. The results were dominated by areas of boreal forest and tundra in Russia and Canada, and tropical moist forest, particularly in Amazonia and the Congo Basin. There were also surprising restricted locations, including isolated mountain ranges, and the vicinity of particular protected areas (e. g. Kruger). These locations provide another ecologically-based measurement of the "human footprint." Some locations are among earth's least disturbed ecosystems remaining; others receive intense conservation activity; yet others may warrant special attention from conservationists.

592. THE EFFECTS OF RECREATIONAL DISTURBANCE ON BEACH NESTERS: A CASE STUDY OF THE BLACK OYSTERCATCHER IN ALASKA. MORSE, JULIE A.; Powell, Abby N.; Tetreau, Michael D. USGS Alaska Cooperative Fish and Wildlife Research Unit, University of Alaska, Fairbanks, 209 Irving Bldg 1, Fairbanks, AK 99775 USA, julie.morse@uaf.edu (JAM, ANP). Kenai Fjords National Park, PO Box 1727, Seward, AK 99664 USA (MDT).

In the United States, National Parks are generally assumed to provide high-quality undisturbed wildlife habitats. However, these parks also attract recreational users, whose presence may in turn reduce the suitability of key habitats for nesting shorebirds. In Kenai Fjords National Park, popular campsites are often also nesting habitats of the Black Oystercatcher (*Haematopus bachmani*). In response to increasing recreational activity in coastal Alaska, we studied the nesting ecology of Black Oystercatchers on 33 to 39 breeding territories annually from 2001-2004. Most recreational disturbance on nesting territories was from kayak campers and occurred after the peak hatch of first clutches. Annual fledging success (24%) was low but our best models suggest daily survival rates of nests and chicks did not differ between disturbed and undisturbed territories. Most (96%) of the color banded oystercatchers returned to their breeding territory in the subsequent year irregardless of level of disturbance. Our data suggest Black Oystercatchers are resilient to recreational disturbance at the low levels observed; a threshold may exist below which productivity is not affected or effects are not detectable. Due to the high levels of depredation observed, we suggest conservation efforts must focus on examining the influence of recreational disturbance on predator movements.

593. SOCIAL CONTEXT OF ENVIRONMENTAL SERVICE PAYMENTS (ESP) IN THE SAN JUAN - LA SELVA PORTION OF THE MESOAMERICAN BIOLOGICAL CORRIDOR (MBC) IN COSTA RICA. MORSE, WAYDE C. University of Idaho College of Natural Resources Department of Conservation Social Sciences Moscow, Idaho 83844 USA e-mail: mors7758@uidaho.edu and Center for Tropical Agriculture and Higher Learning (CATIE) Escuela de Postgrado CATIE 7170, Turrialba Costa Rica.

The MBC is a multinational project designed to integrate biodiversity conservation with sustainable social and economic development. Corridors are shaped by human activities forming a matrix of agriculture and forest areas with multiple owners. Matrix areas are key conservation targets influencing the effectiveness of reserves, landscape connectivity, and themselves for maintaining biodiversity. In 1996, Costa Rica began an innovative market based ESP program compensating farmers for carbon fixation, hydrological services, biodiversity protection, and aesthetic values. Successful program administration depends on understanding the social context in which farmers choose to participate. A mixed methods qualitative-quantitative research design was used and included in-depth interviews with regional non-governmental organizations, extensions agents, and local farmers, and a survey

administered to 210 randomly selected farmers. ESP participants and non-participants were surveyed allowing for comparison. Results show the socioeconomic context driving land use changes over time and by geographic location. Global market forces driving export agriculture products have complemented demographic trends influenced by colonization projects and immigration from Nicaragua; while historic land tenure policies, low labor needs, and a cultural affinity for cattle maintain an influential cattle industry. Specific regional analyses shed light on important factors that can enhance or inhibit future ESP programs.

594. IMPLEMENTING CONSERVATION AND DEVELOPMENT PROJECTS WITH AMERINDIAN COMMUNITIES. MORSELLO, CARLA. Programa de Pós-graduação em Ciência Ambiental, University of São Paulo, Rua do Anfiteatro, 181 - Colméia Favo 14, Cidade Universitária, SP,05508-900, Brazil, morsello@uol.com.br.

This paper examines the implementation of integrated conservation and development projects with Amerindians, and highlights the nature of the challenges within the context of the Brazilian Amazon. Integrated conservation and development projects (ICDPs) aim to link biodiversity conservation and development of local communities. Absorbing a considerable proportion of funds available for conservation, ICDPs emerged in response to the recognition that approaches insensible to local people's needs are largely inefficient in development countries. ICDPs employ a set of to ols, among which economic instruments based on providing income-orientated incentives to local populations, by implementing handicrafts trade, ecotourism and marketing of non-timber forest products. The conservation importance of indigenous territories in the Amazon is resulting in the growing implementation of ICDPs, particularly by conservation organisations. However, besides the fact that a number of assessments have concluded that many ICDPs have not achieved their objectives, evidences suggest there are numerous challenges in the context of Amazonian societies when markets are developed. Although ICDPs may represent an important approach, their implementation has to consider several aspects such as the linkage between conservation threat and proposed activity, the collective nature of Amerindians work, and the cultural impacts of disrupting traditional systems of common property resource use.

595. CHANGES OVER THE LANDSCAPE: FISH COLONIZATION PROCESS AFFECTED BY MODIFICATIONS ON MICROHABITAT INTEGRITY. MORTATI, AMANDA; Zuanon, Jansen; Venticinque, Eduardo M. Instituto Nacional de Pesquisas da Amazônia, CP 478, Manaus, AM, Brazil, amortati@inpa.gov.br (AM, JZ) WCS - Wildlife Conservation Society (EMV).

The Ichthyofauna of terra firme forest streams, in Central Amazonia, is closely linked to riparian vegetation depending structurally and energenetically on the input of organic material from the forest. For this reason, we evaluated streams physical characteristics and alterations to surrounding riparian vegetation that may interfere with the litter banks availability and consequently change fish colonization dynamics. We developed a colonization experiment with eight litter bags per microhabitat (pools and runs), in 22 streams distributed throughout areas with different primary forest percentage, canopy openness and understory density, located 80 km north of Manaus, Brazil. We also collected data on depth, width, discharge, stream substrate, and leaf fragmentation. Pools litter banks showed a slower leaf fragmentation rate and were more frequently colonized than rapid currents. Discharge was interpreted as inverse of litter banks retention time and was directly related to stream depths. Then, microhabitat and discharge were important factors showing that fish colonization is related to qualitative characteristics of the litter banks. Riparian vegetation conditions were important to evaluate primary forest alteration magnitude and were related to fish colonization probability. Therefore, primary forest preservation areas along streams are fundamental to aquatic fauna, besides the increase connectivity of habitat over the landscape.

596. QUANTIFYING LAND COVER CHANGE IN CERRADO AND TRANSITION FOREST ECOSYSTEMS WITH MODIS SATELLITE IMAGE TIME SERIES. MORTON, DOUGLAS C.; DeFries, Ruth. Department of Geography, 2181 LeFrak Hall, University of Maryland, College Park, MD, 20742, USA. morton@geog.umd.edu (DCM, RD).

Rapid land cover conversion in the Brazilian Cerrado and transition forest zones for cattle ranching and grain production continues to fragment large tracts of these biomes. The pattern, spatial extent, and nature of these land cover transitions have important ramifications for conservation of biodiversity and ecosystem function. Using phenological information from time series of MODIS satellite imagery, we classified land cover to quantify specific land cover transitions for the state of Mato Grosso between 2000-2004. Clearing Cerrado and forest for cattle pasture is the dominant land cover transition in Mato Grosso during this period. However, the number and size of new clearings for cropland increased between 2000-2004. New cropland areas are twice the size, on average, of clearings for pasture, and by 2003, 30% of all forest conversion in Mato Grosso went directly to cropland. Mapping the spatial extent of agricultural expansion and classifying transitions from Cerrado and transition forest to planted pasture and cropland are critical first steps for evaluating tradeoffs between land use and conservation. These classification and change maps can now be used to set conservation priorities based on landscape connectivity and the location of frontier zones.

597. GEOGRAPHICAL ECOLOGY OF AMPHISBAENIA AND CONSERVATION IN THE CERRADO OF BRAZIL. MOTT, TAMÍ; Monahan, William B. Museum of Vertebrate Zoology, University of California, Berkeley, 3101 Valley Life Sciences Building, Berkeley, CA, 94720-3160, USA, tamimott@berkeley.edu, monahan@berkeley.edu.

Of the estimated 80 species of the family Amphisbaenidae (fossorial squamate reptiles) native to South America, 16 are endemic to the cerrado of Brazil. Brazilian cerrado is a highly climate-dependent neotropical savanna subject in recent times to pronounced levels of human disturbance. Both climate and landuse changes potentially affect amphisbaenians through their effects on soils. Here we combine new amphisbaenian distribution and abundance data with existing museum records to quantify distributional patterns in the cerrado and to model how the biome will respond to anthropogenically mediated climate change. Areas in and around six newly forming hydroelectric powerplants were surveyed for amphisbaenians. We found in all sites high numbers of sym patric species of amphisbaenians (up to eight species) and identical species assemblages between Guapore and Campo Novo dos Parecis as well as between Manso and Serra da Mesa. These results suggest that levels of sympatry are much higher than previously thought and confirm the uniqueness of amphisbaenian communities in the cerrado proper. Results from climate models pro-

jected for c. 2050 further suggest that the cerrado biome will contract in response to climate warming. These findings identify the southern Brazilian cerrado as critical for long-term conservation planning.

598. DROUGHT, FIRE FEEDBACKS, AND SAVANNIZATION IN BRAZILIAN AMAZONIA. MOUTINHO, PAULO; Nepstad, Daniel; Alencar, Ane. Instituto de Pesquisa Ambiental da Amazônia, IPAM, Av. Nazaré 669, Av. Nazare 669, 66035-170 Belém, PA, Brazil (PM, DN, AA), moutinho@ipam.org.br. The Woods Hole Research Center, WHRC P.O. Box 296, Woods Hole, MA 02543-0296, USA (DN), and Universidade Federal do Pará, UFPa, Campus Guamá, Belém, PA, Brazil (DN).

Intense droughts in Amazonia may increase in the future through stronger El Ninõ episodes, global warming, and rainfall inhibition by deforestation, increasing fire frequency and intensity in the region. In 1998, for example, ca. 40,000 km^2 of standing forest burned in the Amazon. In addition, three positive fire feedbacks can be identified that could intensify droughts in Amazonia: (1) fire releasing smoke into the atmosphere resulting in rainfall reduction, (2) fire increasing the susceptibility of forest to recurrent fires and (3) fire use to prepare cattle pasture burn accidentally productive agrosystem and forests systems around, discourage the land owners to invest in fire prevention. As a consequence of drought intensification and high frequency of fire occurrence in Amazonia, we are proposing that a significant part of Amazon forest would be susceptible to savannization process. Forests under high frequency of burn regime and located where the sources of grass seed are abundant (along the border of cattle pasture) could be more susceptible to savannization. Within this context of continuous intense droughts in Amazonia, and consequent savannization, the preservation of Amazon forest and its high species diversity would be under risk claiming for a redefinition of biological conservation strategic for the region.

599. TRADE-OFFS BETWEEN REPRODUCTION AND SURVIVAL: BIRD RESPONSES TO GRAZING AND FIRE REGIMES IN SOUTH AFRICAN MONTANE GRASSLANDS. Muchai, Muchane S.; DU PLESSIS, MORNÉ. Centre of Excellence at the Percy FitzPatrick Institute, University of Cape Town, Rondebosch 7701, South Africa, morne@botzoo.uct.ac.za (MM, MADUP). Department of Ornithology, National Museums of Kenya, Nairobi, Kenya, mmuchai@yahoo.com (MM).

Hand management practices have been implicated as a cause of decline of many ground-nesting species in the northern hemisphere. However, given the major differences in life histories between hemispheres, this is not known for southern temperate species. We set out to study this relationship in three closely-related bird species occupying montane grassland habitat in South Africa over three breeding seasons. We used an experimental setup representing varying grazing and burning regimes. Grazing pressure and fire frequency both negatively affected breeding success and nest predation rather than food availability was responsible for such declines. Vegetation features around successful and unsuccessful nests supported the idea that habitat choice is a key selective force in nesting success. Nest success was higher in preferred than non-preferred habitat suggesting an adaptive response. Parental activity was greater during the nestling period than during incubation, but nest predation did not track this difference. However, once nest-site effects were accounted for, nest predation showed a positive increase with parental activity during the nestling stage within and across species. We propose that montane grasslands should be managed so as to achieve the optimal trade-off between the renewal and removal of vegetation material (i. e. burning frequency and grazing pressure respectively).

600. TOWARDS A GLOBAL INTEGRATED TRENDS ANALYSIS NETWORK. MUCHONEY, DOUGLAS. U.S. Geological Survey, 519 National Center, Reston, Virginia, 20192, USA, dmuchoney@usgs.gov.

The concept of an Global Integrated Trends Analysis Network (GITAN) is evolving as a multi-institutional consortium effort to link landscape/land cover, biological, environmental, hydrologic, geologic, socio-economic and management data trends analysis globally using a formal, integrated, nested hierarchical sampling. Land cover change is important to integrating policy and process, it being a powerful intermediate explanatory variable between activity and its consequences. The U. S. Geological Survey's Land Cover Trends Project uses an ecoregion-based sampling approach to characterize the rates, driving forces, using sampling and change analysis techniques and Landsat data for measuring regional land cover change; characterize the types, rates, and temporal variability of change for a 30-year period; and to document regional driving forces and consequences of change. Because of the need to characterize the status and trends of land cover / land use change in support of global environmental and biodiversity assessments, the consortium is developing an interinstitutional collaboration to include not only the existing landscape indicators but also environmental, biological and management indicators. The Global Integrated Trends Analysis Network framework would also support biological assessments, as well as a whole host of other socio-economic, environmental, ecosystem health and other variables and biogeophysical parameters.

601. IMPACTS OF THE RECENT SOYBEAN BOOM ON THE CERRADOS OF BRAZIL'S CENTER-WEST REGION. MUELLER, CHARLES CURT. Departamento de Economia, FACE, Universidade de Brasília. Brasília, DF, Brazil, 70910-900.

The study analyses the spatial impact of the recent soybean boom in the Cerrados of Brazil's Center West - a region encompassing most of the core of Brazil's savannas. Employing annual data on area in crops from IBGE's municipal surveys for the 1990-2003 period, it shows that the region's impressive soybean expansion took place concentrated in space. It occurred predominantly in three clusters of micro regions, of which two were settled for quite some time; but the third - now the Cerrados most important soybean area, located near the region's center-west border - is still a frontier area. It established that the 2003 area in soybeans in the region's Pantanal and Amazon biomes was negligible. For example, the area in soybeans of the Norte Araguaia and Médio Araguaia micro regions totaled 35.9 thousand hectares, only 0.45% of the region's whole area in the crop. But if the direct impact of the soybean frontier on the region's more sensitive portions is not yet substantial, its indirect impacts are. The soybean boom has induced the clearing of land in the Cerrado frontier, not with the immediate purpose of growing soybeans, but for the 'production' of cleared land for future sale, at high prices, to soybean producers.

602. USE OF A MATRIX OF *Eucalyptus* PLANTATION BY LARGE MAMMALS FROM THE CERRADO. MUNARI, DANIEL P.; Pardini, Renata; Pivello, Vânia R. Departamento de

Zoologia, Instituto de Biociências, Universidade de São Paulo. Rua do Matão, travessa 14, número 101, Butantã, São Paulo, SP, CEP 05422-970, Brazil, d.munari@uol.com.br.

The total area covered by exotic *Eucalyptus* plantations in Brazil has drastically increased during the last two decades (>300%). In the State of São Paulo, in particular, most fragments of Cerrado are presently immersed in a matrix of *Eucalyptus* plantations implemented since the 60's. We investigated the use of these plantations by large mammals in relation to the distance to one of the largest Cerrado fragment (1200 ha) in São Paulo. We placed 37 track stations along four transects (1000 m apart from each other) located from the edge of the fragment to 2500 m inside the plantation. Stations were checked every day during a period of 33 days. Among the thirteen species which were recorded using the plantations, two occurred only at the edge, two were more frequent and two less frequent at closer distances from the fragment, while seven did not show any relationship with the distance to the fragment or had too few records to be analyzed. Results suggest that the distance between fragments is an important variable to be considered to improve movement rates of some large mammals, and thus their long term persistence, when planning the spatial configuration of these *Eucalyptus* landscapes.

603. BEHAVIORAL RESPONSES OF THE LARGE TREESHREW, *Tupaia tana*, TO MAST FRUITING AND SELECTIVE LOGGING IN SABAH, MALAYSIA. MUNSHI-SOUTH, JASON; Emmons, Louise H. Department of Biology, University of Maryland, College Park, MD, 20742, USA, south@umd.edu (JM-S); Division of Mammals, Smithsonian Institution, PO Box 37012, National Museum of Natural History, MRC 108, Washington, DC, 20013, USA (LHE).

The ability to predict the behavioral and demographic responses of species to habitat disturbance is an important goal of conservation biology. However, knowledge of responses to natural ecological disturbances are necessary to make realistic predictions. The lowland Dipterocarp rainforests of Borneo are an important reservoir of mammalian diversity, but are also one of the world's leading sources of tropical timber. These forests are characterized by supra-annual masting events during which large amounts of fruit become available to vertebrate frugivore populations. We examined the reproduction and social organization of Large Treeshrew, *Tupaia tana*, populations during a masting year and additional high-fruiting year in primary forest, three years of low fruitfall in primary forest, and two years in a heavily logged forest. Large Treeshrews are small (200g) frugivore-insectivores that live in socially monogamous male-female pairs on large territories that they defend against conspecifics. The *T. tana* population in logged forest exhibited larger body sizes, greater reproductive output, and smaller, more exclusive territories than *T. tana* in primary forest during the three low-fruit years. The *T. tana* population in primary forest during masting and high-fruit years exhibited similar reproductive and behavioral characteristics to the population in logged forest. These results indicate that mast fruiting and the increased fruitfall observed after logging in northern Borneo provide better ecological conditions for treeshrews than primary forest during typical low-fruit years. We argue that factors other than logging, such as regional climate change and conversion of forest to agriculture, may be more serious threats to treeshrews and other frugivorous species.

604. REMNANT DIVERSE HAPLOCHROMINE CICHLID COMMUNITIES IN KENYAN WATERS OF LAKE VICTORIA. MURBI, HARRISON C.; Muchiri, Mucai S.; Liti, David; De Vos, Luc. Department of Fisheries, Moi University, P.O. Box 1125, Eldoret, Kenya (MSM). Department of Zoology, Moi University, P.O. Box 1125, Eldoret, Kenya (DL). Ichthyology Department, National Museums of Kenya, P.O. Box 40658, Nairobi 00100, Kenya (LD, posthumous).

Haplochromine cichlids in Lake Victoria have declined dramatically due to Nile perch (*Lates niloticus*) introduction, eutrophication and overfishing. This study showed that a large number of haplochromines species still exist in sizable numbers and trophic groups at least in the five (Homa Bay, Mbita, Osieko, Litare and Kisumu) sites sampled in 2000. Form features were used to identify trophic groups. Morphometric measurements (analyzed with principal component analysis) were used to delineate species. From a sample of 141 individuals, we identified 36 species in 10 trophic groups. Epilithic algivores were most abundant numerically, but oral mollusc shellers had the highest species number. Surprisingly, the few zooplanktivores (n=15) segregated into 6 species. No piscivores were observed. This large number of species for such a small sample size showed that, even though the haplochromines have declined over time, there is still a considerable species richness at least in the areas investigated. Thus, there remains hope for the preservation of haplochromine diversity after the upsurge of the Nile Perch and the increase in pollution and fishing pressure. The lack of formerly-abundant piscivores is of great concern. Conservation measures are needed urgently to stave off further extinction.

605. COMMUNITY AND SCIENCE WORKING FOR CONSERVATION OF THE INTERNATIONAL RÍO SANTA CRUZ, SONORA, MEXICO. Murrieta-Saldivar, Joaquin; GONZALES, ALFONSO. Sonoran Institute 7650 E. Broadway Suite 205, Tucson, Arizona. USA (joaquin@sonoran.org).

Nearly 80 percent of the land in the state of Sonora, Mexico is in private ownership, the vast majority dedicated to ranching. Cattle production remains one of the most socially influential and often ecologically detrimental activities in Sonora, as exemplified by introducing invasive exotic grasses, use of antiquated grazing management strategies, and little attention to rangeland conservation and riparian restoration practices. The Sonoran Institute's partnership with *Ejido Miguel Hidalgo* in the international *Rio Santa Cruz* watershed provides a model of collaboration with landowners in becoming better stewards. We have worked with the *ejido* to implement a portfolio of riparian and rangeland restoration, environmental education, and ecological monitoring projects that have empowered the local citizenry, improved human health and economic conditions, and restored wildlife habitat and watershed health. The Institute's community and science approach is lead by two convictions: 1) community-based projects can produce tangible, long-term environmental benefits; 2) projects need to involve communities in activities that bring tangible benefits to the community and to the environment. Private landowners will usually not become involved in long-term projects unless the project addresses a critical need. Seven years of working with the Ejido has created tangible results for conservation and community welfare.

606. USING SOCIAL SCIENCE RESEARCH TO BALANCE CONSERVATION AND HUMAN NEEDS ON SANTA CATALINA ISLAND. MUSCAT, ANN M.; Heimlich, Joe. E.; Storksdieck, Martin. Catalina Island Conservancy; P. O. Box

2739; Avalon, California 90704, USA, Phone: 310-510-2595 x105, amuscat@catalinaconservancy.org (AMM).

The Catalina Island Conservancy has protected 88% (42,000 acres) of Catalina Island 's wild lands for the last 32 years. Conservation and restoration efforts were intensified in the early to mid 1990's, causing tensions with both resident and tourist communities. Realizing that its mission of being "a responsible steward of its lands through a balance of conservation, education and recreation" requires an ongoing partnership with the 4,000 year-round residents and more than one million annual visitors alike, the Conservancy is embarking on a concerted effort to more effectively understand and engage with stakeholders and to deepen their understanding of the complex scientific and social issues underlying the Conservancy's conservation decisions. To ensure that this new strategy of community-based conservation is built upon an understanding of the environmental knowledge, awareness, attitudes, interests and behaviors of influential stakeholders, the Conservancy partnered with a non-profit social science research organization (Institute for Learning Innovation) to conduct interviews with the staff, Board of Directors, and major donors. In addition, a comprehensive closed-ended questionnaire was used to sample Island visitors, Island businesses, and all Island residents. Results of the surveys will inform coordinated communication and educational outreach campaigns that support the Conservancy's conservation programs. An initial community "Conservation Council" around an ecological and recreational management plan for four popular beaches on the Island provides early evidence that these data lead to successful strategies to reduce conflict and build trust. The surveys themselves also function as an effective communication tool with the various stakeholders.

607. MAPPING OPPORTUNITY COSTS OF BIODIVERSITY CONSERVATION AT DIFFERENT SCALES. NAIDOO, ROBIN; Adamowicz, Wiktor L.; Ricketts, Taylor H. Conservation Science Program, World Wildlife Fund, 1250 24th St. NW, Washington, DC, 20037, USA, robin.naidoo@wwfus.org (RN, THR). Department of Rural Economy, 515 General Services Building, University of Alberta, Edmonton, Alberta, Canada, T6G 2H1 (WLA).

Conservation scientists recognize the value of incorporating economic costs into conservation planning. Despite this, applications have been few, perhaps because of limited data on land prices. We present methods for estimating opportunity costs of land preservation. Our approach derives from the literature on estimating land values as opportunity costs of alternate land uses, and takes advantage of general availability of necessary data, even in relatively data-poor regions. We provide two illustrations of our methods at two different scales. The first is in a forested landscape undergoing agricultural conversion in Paraguay. Our model of opportunity costs predicts an independent dataset of land values. We use the resulting cost map to estimate the costs of conserving two proposed corridors in the landscape. The second example is a coarse-resolution map of opportunity costs of conservation for the world's terrestrial regions. We use this map to produce rough estimates of the cost of large-scale global conservation priority schemes. These methods have broad application for conservation planning in situations where natural habitat is being converted to human-dominated land-uses (i. e., most of the world). Incorporating economic data into conservation planning can help us to design efficient networks of protec ted areas that represent biodiversity at minimum costs.

608. THE U.N. DECADE OF EDUCATION FOR SUSTAINABLE DEVELOPMENT (2005-2014): WHAT ROLE FOR CONSERVATION EDUCATORS? NAIMAN, TOM. Wildlife Conservation Society, Bronx Zoo, 2300 Southern Blvd., Bronx, New York, 10460, USA, tnaiman@wcs.org.

In November, 2004, more than 100 educators from zoos, aquariums, botanical gardens, and nature centers in the U. S. met at the Bronx Zoo to determine how "living institutions" should respond to the U. N. Decade of Education for Sustainable Development. The participants discussed the similarities and differences between "conservation education" and "education for sustainable development" and created a list of priorities for educators at living institutions. The top priority, a training program for living institution educators, is already underway. This presentation will share the list of priorities developed at the Bronx Zoo conference and will encourage conservation educators in diverse international contexts to use the U. N. Decade as a means to build bridges and collaborative programs.

609. INTERACTION BETWEEN FLOWERS AND HUMMINGBIRDS IN A DISTURBED SEMIDECIDUOUS FOREST: A COMPARATIVE APPROACH OF COMMUNITY STRUCTURE. NARITA, JULIANA; Buzato, Silvana. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, 05508-900, Brazil, junarita@ib.usp.br (JN, SB).

We documented the interactions between flowers and hummingbirds in a semideciduous forest in south-eastern Brazil in order to verify whether human disturbance bring costs for the community organization. We recorded 20 native hummingbird-pollinated plant species, distributed over 10 families and 17 genera. The total number of flowering individuals was 121 and the majority of individuals (69.3%) belongs to the Rubiaceae and Bromeliaceae families. Most hummingbird-pollinated species had low relative abundance in the community, varing from 0.7 to 7%. Resources for hummingbirds were scarce, in addition to that, only a few species and individuals flowered together. Four hummingbird species were recorded visiting flowers: *Thalurania glaucopis*, *Phaethornis eurynome*, *Leucochloris albicollis* and *Colibri serrirrostris* and three morphological-behavioral categories were represented: high-reward trapliners, generalists and territorialists. Rates of flower vis iting by hummingbirds were very low, and some plant species were not visited at any time during the observation period. Compared with other forests, although we realized that the components of the flower-hummingbird community structure (richness, morphological-behavioral categories) were still represented in the studied human disturbed forest, there was paucity of interaction between flowers and hummingbirds as demonstred by the low frequency of visits, indicating risks for the maintenance of the interaction. (FAPESP 01/06089-6).

610. ANALYSIS OF THE RECEIVED FAUNA AT IBAMA/JF AS AN INFERENCE TO THE NATIONAL POLICY AGAINST THE TRAFFIC OF WILD ANIMALS. NASCIMENTO, ANA ELISA RESGALLA; Bisaggio, Eduardo Lage; Bezerra, Ana Raquel Gomes Faria; Borges, Roberto Cabral. Departamento de Zoologia, Instituto de Ciências Biológ-

icas, Universidade Federal de Juiz de Fora, Juiz de Fora, MG, 36036-330, Brazil, aresgalla@hotmail.com (AERN, ELB). Coordenação Geral de Fauna, IBAMA, Brasília, DF, 70818-900, Brazil (ARGFB). Coordenação Geral de Fiscalização, IBAMA, Brasília, DF, 70818-900, Brazil (RCB).

Illegal trade of wild animals represents a serious risk to the biodiversity and can be considered a great factor of pressure over several species. To minimise such pressure, an intense governmental policy would be necessary. Aiming to verify whether the inspection is predominantly passive or active, the origin of all individuals received by IBAMA of Juiz de Fora/MG was analyzed from 2003 to 2004. Four categories have been stipulated: proactive apprehension, reactive apprehension, rescue and spontaneous delivery. The amount of received animals was relatively constant during both years: 1383 in 2003 and 1370 during 2004. During 2003 and 2004, proactive apprehension represented respectively 60.95% and 53.80% of the specimens, the reactive apprehension were 20.75% and 11.46%, the rescue was 9.04% and 28.61% and spontaneous delivery was 9.26% and 6.13%. Furthermore, apprehensions of 20 or more individuals represented only 33.81% of proactive apprehension in 2003 and 18.59% during 2004. It shows that few apprehensions are resultant of investigative and ostensive proceedings aiming the principal traders, illegal transportation or deposits of wild animals. Therefore, despite of the harmfulness of the illegal trade of animals to the biodiversity conservation, an effective governmental policy to fight this kind of activity can not be observed.

611. REPRODUCTIVE ASSESSMENT IN CAPTIVE FEMALES OF AMAZONIAN MANATEES (*Trichechus inunguis*, NATTERER, 1883), BY FECAL STEROID EXTRACTION AND QUANTIFICATION. NASCIMENTO, CLAUDIA C.; Oliveira, Claudio A.; Silva, Vera M. F.; D'Affonseca Neto, Anselmo; Lazzarini, Stella M. Laboratório de Dosagens Hormonais, Departamento de Reprodução Animal, Faculdade de Medicina Veterinária e Zootecnia, Universidade São Paulo, São Paulo, Brazil, claucn@hotmail.com. Laboratório de Mamíferos Aquáticos, Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil. Centro de Preservação e Pesquisas de Mamíferos Aquáticos, Manaus Energia, Manaus, Brazil.

This study has evaluated the reproductive function of six females of the Amazon manatee (*Trichechus inunguis*) kept in captivity at the Aquatic Mammals Laboratory - Instituto Nacional de Pesquisas da Amazônia (n=4) and Centro de Preservação e Pesquisa de Mamíferos Aquáticos-Manaus Energia S/A (n=2) through extraction and quantification of fecal estrogens and progestins. Fecal samples were obtained twice a week for 12 months. Validation of the solid phase radioimmunoassay for progesterone and 17b-estradiol was performed for using on Amazon manatees fecal extracts. To verify if the captive females showed the same seasonal reproductive pattern of wild manatees suggested by Best (1982), the influence of the hydrological cycle of the Amazon River Basin was analyzed. There was no statistical difference on the fecal progestins between phases, but during the flood phase it was verified that the estrogen fecal concentrations were increased, corroborating with Best (1982). These results show that the improvement of the non-invasive techniques for reproductive assessments increase the knowledge of reproductive physiology and is an important tool for scientific research, reproductive management, and species conservation.

612. DRAGONFLY DATA IN THE FRESHWATER HOTSPOT ANALYSIS. NASKRECKI, PIOTR; Spector, Sacha. Conservation International, Harvard University, 26 Oxford St., Cambridge, MA 02138, USA, p.naskrecki@conservation.org.

While freshwater ecosystems cover only 0.8% of the world's surface, they are the habitat for 43% of the total species diversity of fish (2,750 species) and virtually 100% of dragonflies and damselflies (5,600 species.) At the same time freshwater habitats are some of the most threatened ecosystems on the planet, and over 50% of wetlands have been destroyed since the beginning of the 20th century, resulting in an extinction or imperilment of 2,500 species of fishes and yet unknown numbers of invertebrates. In order to develop a strategic plan to prevent further loss of freshwater biodiversity, Conservation International has initiated a global hotspot analysis, based on dragonfly and damselfly as well as aquatic vertebrate data. At the same time a global assessment of the dragonfly and damselfly species will be developed by a network of institutions and specialists to identify the most threatened taxa and habitats for this group of invertebrates.

613. USE OF GIS AND RS TO DEVELOP RESTORATION MODELS FOR NARIVA SWAMP PROTECTED AREA AND RAMSAR SITE. Nathai-Gyan, Nadra; CARBONELL, MONTSERRAT; Browne, Dawn; Kempka, Dick. Wildlife Section, Forestry Division, Farm Road, St. Joseph, Trinidad and Tobago, wildlife@trinidad.net (NNG). Ducks Unlimited, Inc., One Waterfowl Way, Memphis, TN 38120, USA (MC, DB, DK).

The Nariva Swamp Protected Area (7,000ha) is one of the most important protected areas in Trinidad and Tobago and the only Ramsar site in the country. It has a very rich biodiversity due to the varied mosaic of vegetation communities (tropical rain forest, palm swamp forests, mangroves, and grass savanna/marshes). However it was subject to hydrologic changes due to the building (1960's) of a water reservoir upstream and over ten years (1985-1996) of clearing by illegal rice farmers. The Nariva Restoration Initiative aims at achieving the complete restoration of the landscape and ecological characteristics of Nariva Swamp through reforestation, hydrologic (hydrology and hydraulics) rehabilitation, fire management and improved agriculture practices. In January 2005 a baseline inventory and land-cover change analysis, using geographic information systems and remote-sensing technologies, of Nariva from 1942-2003 was completed. The final report of this work includes the reforestation/rehabilitation and hydrologic restoration scenario. A Carbon Sequestration Project is being developed under the Kyoto Protocol and the Convention on Climate Change, which aims at certifying the Carbon credits resulting from the reforestation and this way obtaining some funds for the conservation, management and wise use of the Nariva Swamp Protected Area and Ramsar site.

614. CHALLENGES FOR MANAGEMENT OF WILD UNGULATES IN KHIRTHAR NATIONAL PARK, PAKISTAN. NAWAZ, MUHAMMAD ALI; Mirza, Sarwat N. Department of Ecology and Natural Resource Management, Norwegian University of Life Sciences, As, Norway, ali.nawaz@umb.no (MAN); University of Arid Agriculture, Rawalpindi, Pakistan (SNM).

Khirthar National Park (KNP) is home to diverse species due to convergence of the fauna of three zoogeographical regions i. e.; Paleartic, Ethopian and Oriental. It is listed as a protected Category II area by IUCN, and supports country's largest populations of Sindh ibex (*Capra aegagrus*) and Afghan urial (*Ovis vignei blanfordi*). Strict control on poaching during last three decades

has stabilized the declining populations of wild ungulates. Growing human and livestock populations in the area and their resource requirements has however introduced management to new challenges. We studied state of habitat, ungulate population and major factors in Dumbar range of KNP. Population was estimated at 1007 animals, distributed among three species i. e.; ibex, urial and chinkara as 334,592 and 81 respectively. The study area was classified into three abundance zones, with densities 18.1 as high, 6.4 for medium, and 3.1 per km² for low abundance zone. Sex ratio for adults was at parity (p>0.4). Female to young ratio 1:0.5 vouched for successful breeding. Habitat was assessed for three primary requisites: forage, water and shelter. Forage production was calculated at 1050 tons (DM)/year with significant variation among different range sites. The carrying capacity was estimated at 2600 goat equivalents/year. Ten perennial water sources were recorded within the home range of animals, that were being shared with livestock. The population of ungulates is reproductively active and growing. The habitat condition suggests that the study area can sustain a higher density than occurs at present, if the anthropogenic exploitation is managed. Increase in size and number of settlements, extension in agriculture, chronic grazing, and wood collection are the real threats. Around 5,000 livestock belong to the study area, that primarily graze in valleys but go up into core habitats during drought years. Natural resource extraction and livestock production system need immediate attention to conserve habitats of Khirthar National Park.

615. STARTING SMALL BUT AIMING BIG: CAPACITY BUILDING FROM A TANZANIAN PERSPECTIVE. NDANGALASI, HENRY; Mshana, Luciana; Davion, Edna; Cordeiro, Norbert. Department of Botany, University of Dar es Salaam, P.O. Box 35060, Dar es Salaam, Tanzania (HJN) hjndangalasi@yahoo.com (HJN). East Usambara Biosphere Reserve, PO Box 1449, Tanga, Tanzania (LM). Field Museum of Natural History, 1400 S Lake Shore Drive, Chicago, IL 60605, USA (ED, NC).

Land that was formerly forested and then abandoned due to lower crop productivity, could be restored into forests to reduce species extinctions. However, restoration of tropical forests requires knowledge about more than just what to plant, but how to plant trees and other lifeforms such that successes can be repeated or failures recognized and avoided in future restoration schemes. Because the scientific infrastructure necessary to implement such conservation strategies requires further growth from government to NGOs to local human communities, we developed a small project to addess these issues in Tanzania. Through seed and seedling growth studies, we are producing an online database on vascular plants open to multiple users. We continue to improve established dual-language laminated field guides to aid in identification of seeds and seedlings of vascular forest plants. This guide also identifies traditional uses of plants to facilitate the interests of local human communities. Capacity building has included training in database creation and software application, ecological techniques and theory, and maintaining programme sustainability. Shortly, we plan to experimentally restore forest corridors that will connect isolated forest fragments, using seedlings from our studies and incorporating local communities and graduate students to increase scientific and conservation infrastructure.

616. ASSESSING THE IMPLICATIONS OF DIFFERENT CRITERIA FOR THE SELECTION OF NATURE RESERVES. NEBBIA, ANA J.; Zalba, Sergio M. GEKKO - Grupo de Estudios en Conservación y Manejo - Universidad Nacional del Sur, San Juan 670, (8000) Bahía Blanca, Buenos Aires, Argentina, (ajnebbia@criba.edu.ar) (szalba@criba.edu.ar).

There is a set of criteria usually adopted by scientists and managers for the selection of protected natural areas, in some cases without evaluating their biological meaning under local conditions. We tested some of these criteria using fragments of coastal vegetation in the north of Patagonia (Argentina). We conducted floristic censuses to obtain values of richness, diversity and proportion of native species. These data were used as dependent variables to tests the predictive ability of area, perimeter, degree of internal fragmentation, length of internal roads and area of natural environments in the buffer zone of each fragment. We found area and the shape as being the variables that most condition species richness and diversity. Their influence could be associated with the relevance of edge effect, specially in small areas as those considered in this study. The other variables did not show significant relationships with the selected standards of biological quality. We emphasize the importance of evaluating the validity of the parameters used in processes of selection of nature reserves since some of them, despite being widely spread in scientific literature and in management practices, can be at least neutral for reflecting the biological value of potential areas.

617. WOODY PLANT ALLOMETRY AND GROWTH STRATEGIES IN A SEMI-ARID AFRICAN SAVANNA. NEKE, KIRSTEN S.; Owen-Smith, R. Norman; Witkowski, E. T. F. School of Animal, Plant and Environmental Sciences, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa. kirstensima@yahoo.com.

Much current ecological theory regarding the adaptive significance of inter-specific woody plant architectural variation is based on studies of temperate and tropical forest trees, where light is considered the most important limiting factor. Fire, erratic moisture availability and damage by browsing ungulates or humans are likely to be more influential for savanna woody plants. The growth forms of common savanna woody plant species were examined to identify whether syntopic species show differences that can be interpreted as alternative growth strategies. Several species show a clear shift in growth strategy, from a sapling “small plant” phase characterised by height gain to a “large plant” phase with a reduced height rela tive to stem diameter increment. The height at which this change occurs coincides with the height at which plants become less vulnerable to fire/browsing damage and are generally considered to become reproductive. Yet, other species have a consistent linear relation between height and stem diameter across their entire size range. Saplings of species with a high wood density had a proportionally larger height increment than those species with a lighter wood. We discuss the implications of alternative growth strategies for woody plant persistence and savanna woodland conservation.

618. DEVELOPMENT OF A LANDSCAPE-LEVEL PLANNING TOOL FOR THE SYSTEMATIC CONSERVATION OF RIVER BIODIVERSITY IN THE EASTERN CAPE PROVINCE, SOUTH AFRICA. NEL, JEANNE L.; Dollar, Evan S.J.; Roux, Dirk J.; Maree, Gillian; Moolman, Juanita; Kleynhans, Neels; Reyers, Belinda; Adams, Janine; Smith-Adao, Lind. CSIR Environmentek, PO Box 320, Stellenbosch 7599,

South Africa, jnel@csir.co.za (JLN, DJR, GM, BR, LS); ESJ Dollar Consulting CC, 75 Mountain Breeze Crescent, Pine Acres, Gordon's Bay 7140, South Africa (ESJ); Institute for Water Quality Services, Department of Water Affairs and Forestry, Private Bag X313, Pretoria 0001, South Africa (JM, NK); Botany Department, University of Port Elizabeth, PO Box 1600, Port Elizabeth 6000, South Africa (JA).

This study presents a regional planning framework which provides guidance on how many rivers and estuaries are required to ensure adequate representation and persistence of inland water biodiversity in the region, and which are the most appropriate. A systematic conservation planning approach was used, which included spatial analysis of inland water biodiversity pattern, biodiversity processes and ecological status, in conjunction with explicit conservation targets. Physical "signatures of river heterogeneity", which characterised river reaches according to geomorphological and hydrological descriptors, were used to represent biodiversity pattern of river ecosystems across the landscape. Key landscape-level biodiversity processes were also spatially defined and included in the design of the conservation plan. The ecological status of river ecosystems included an assessment of both riparian and instream integrity. Estuaries were assessed in terms of representation of biodiversity pattern and process, ecological status, protection status and importance in biodiversity processes. Using these spatial data layers of biodiversity pattern, process and integrity in conjunction with explicit targets, different design options for achieving biodiversity representation as well as persistence were considered, taking into account aspects of implementation.

619. THE AMAZON IN AN AGE OF AGRO-INDUSTRIAL EXPLOSION: RISKS AND OPPORTUNITIES FOR LARGE-SCALE CONSERVATION. NEPSTAD, DANIEL. Woods Hole Research Center, PO Box 296, Woods Hole, MA 02543 USA IPAM, Av. Nazare 669, Belém, Pará, 66.035-170, Brazil UFPa/NAEA, Campus do Guama, Belém, Pará, Brazil.

The Amazon Basin has entered a new era of natural resource destruction as the principle industries driving deforestation (cattle ranching and soybean farming) are strengthened by expanding world markets for open-range beef and grain through complex economic "teleconnections". The paving of highways into the heart of the region will facilitate the export of Amazon products to world markets as it creates new corridors for explosive frontier expansion. These mounting threats to the Amazon require large-scale, integrated approaches to conservation that cross traditional disciplinary boundaries. The success of these approaches will depend upon (1) conservation analyses that describe the complex interactions among ecosystems, economies, and climate that will unfold into the future, (2) regional conservation planning processes that diminish the environmental destruction of frontier expansion along emerging highway corridors, and (3) the transformation of grain and beef production industries into proponents of Amazon conservation using a combination of market-based instruments and improved government regulation. These three components of large-scale conservation are emerging in the region.

620. SHOULD THE RELATIONSHIP BETWEEN POPULATION VIABILITY AND HABITAT QUALITY PROMPT A PARADIGM SHIFT IN CARNIVORE CONSERVATION - A CASE STUDY WITH BEARS. NEVIN, OWEN T.; Gilbert, Barrie K. Centre for Animal Conservation, University of Central Lancashire, Penrith, Cumbria CA11 0AH, United Kingdom, onevin@uclan.ac.uk (OTN). Forest Range and Wildlife Sciences, Utah State University, Logan, Utah 84322, USA, bgilbert@cc.usu.edu (BKG).

For many species, reliable evaluation of foraging habitat requires measurement of a multitude of variables. Bears, however, provide a unique opportunity to integrate all these variables into a single measure: salmon consumption. As with Van Horne's measure of habitat quality (Q_j), consumption of salmon affects fecundity, age at first reproduction and survival probability. Our analysis revealed a highly significant (p=0.005) negative relationship between minimum viable population and food availability/habitat quality lending empirical support to the conceptual form of this relationship proposed by Van Horne. Understanding the relationship between habitat quality and minimum viable population has important implications for conservation area desi gn and the dominant paradigm of carnivore conservation, which emphasizes large areas with little or no human access, may in fact be a poor model for conservation efforts. The historic emphasis on the need for large areas has led to the protection of low productivity sites. This study shows that changes in habitat quality have the greatest impact on the viability of populations in poor or marginal habitat. We therefore suggest that pursuit of the current paradigm through the preservation of large, low productivity areas will be insufficient to ensure the long-term viability of populations of large carnivores.

621. ACHIEVING SOCIOECONOMIC RECOVERY AND BIODIVERSITY RESTORATION OBJECTIVES THROUGH GRAY WHALE REINTRODUCTION. Nevin, Owen T.; RAMSEY, ANDREW D. Centre for Animal Conservation, University of Central Lancashire, Penrith, Cumbria CA11 0AH, United Kingdom, onevin@uclan.ac.uk.

This paper presents an ecological and socioeconomic case for the reintroduction of the Gray whale (*Eschrichtius robustus)* to the North Atlantic from the harvestable surplus in the eastern north Pacific. The Gray whale population in the eastern North Atlantic was hunted to extinction in the 17th century. A similar fate almost befell the eastern north Pacific population; however this population has demonstrated a dramatic recovery. European and UK legislation state objectives to 'protect and conserve the ecosystems and the biological diversity of the maritime area, and to restore, where practicable, marine areas which have been adversely affected'. In addition, this reintroduction has broad public support. In a questionnaire based survey 90% of respondents were in favour of Gray whale restoration, compared to only 56% for both grey wolf and brown bear. Successful reestablishment will contribute to the redevelopment of deprived coastal communities through sustainable ecotourism; 81% of respondents would be willing to take a trip to see Gray whales while 53% would add an extra day to their trip. Whilst the proposal appears controversial, there are fewer potential negative impacts of this reintroduction than would be associated with the reintroduction of several terrestrial mammals.

622. LEAST-COST CORRIDORS BASED ON MULTIPLE FOCAL SPECIES ARE ROBUST TOOLS FOR CONSERVATION PLANNING. Newell, Shawn L.; BEIER, PAUL. Center for Environmental Science and Education, Northern Arizona University, Flagstaff, AZ 86011 USA (SLN). School of Forestry, Northern Arizona University, Flagstaff, AZ 86011, paul.beier@nau.edu (PB).

Least Cost Corridor (LCC) Analysis is a GIS-based tool in planning wildland networks. We used sensitivity analysis to determine

(1) how a single-species LCC varied with *weights* for each of 4 factors (vegetation, road density, topographic position, elevation), and *scores* for each class within a factor (e. g., each vegetation class), and (2) how the multiple-species LCC varied with changes in weights and scores, and number of focal species. We conducted analyses for 8 focal species in a 40x100-km potential linkage zone in California USA. For each species, a species expert estimated weights and scores and specified plausible maximum and minimum values for each. LCCs for 6 of the 8 species remained stable (> 90% overlap) as we changed scores and weights within expert-specified maximum and minimum values. But for 2 of the 8 focal species, the LCC based on best estimates overlapped < 20% with some LCCs based on extreme weights and scores. The union of LCCs based on 8 species, however, was robust to uncertainty in single-species LCCs. We conclude that a single-species LCC should not be used to identify parcels for conservation but that a union of LCCs for multiple species provides a sound basis for conservation planning.

623. EFFECT OF ROADS, SELECTED ENVIRONMENTAL VARIABLES AND HUMAN DISTURBANCE ON ASIATIC LEOPARD (*Panthera parcus*) IN KAENGKRACHAN NATIONAL PARK, THAILAND. Ngoprasert, Dusit; Gale, George A.; LYNAM, ANTONY J. 1. School of Bioresources and Technology, Natural Resources Management Division, King Mongkut's University of Technology Thonburi, Thailand, 83 Moo 8 Thakham, Bangkhuntien, Bangkok 10150, Thailand, ndusit@yahoo.com, ggkk1990@yahoo.com 2. P.O. Box 170, Laksi, Bangkok 10210, Thailand.

Roads and human traffic can negatively impact the behavior of a variety of mammals. To determine the effects of roads and human presence on Asiatic leopard behavior and relative abundance in a 104 km^2 section of Kaeng Krachan National Park, Thailand, camera-trapping techniques were used. The density of leopards was 4.78±2.42 individuals per 100 km^2, or a minimum of 4 males and 2 females known alive in the study area. The relative abundance of leopards was 18 ± 1.94 detections/100 trap-nights. The road was not shown to be a barrier for leopards, but they appeared to be affected by human activity along the road that bisected the study area. A logistic regression model suggested the probability of leopards being present was significantly lower near the road ($p < 0.05$). Human activity away from the road also appeared to influence leopard activity patterns, suggesting that leopards were less diurnal in the areas more heavily used by people compared to areas less used (Mann-Whitney U, $p < 0.05$). However, more research is needed to determine the demographic implications of road and human avoidance for such species, and what if any mitigation strategies are required.

624. ENVIRONMENTAL RISK MODEL TO PREDICT VISCERAL LEISHMANIASIS IN THE STATE OF BAHIA, BRAZIL. NIETO, P.; Malone, J.; Bavia, M. Department of Pathobiological Sciences, School of Veterinary Medicine, Louisiana State University. South Stadium Road, Baton Rouge, LA, 70803, (225) 578-9671, USA. pnieto1@lsu.edu; malone@vetmed.lsu.edu (PN, JM); Preventive Medicine Department, Federal University of Bahia. Av. Ademar de Barros, 500 Ondina, Salvador, Bahia, (71)99 781401 Brazil. m_bavia@hotmail.com (MB).

Visceral Leishmaniasis (VL) is a zoonotic parasitic disease caused by the protozoan *Leishmania* and spread by the bite of infected sand flies. More than 90% of the VL cases reported from Latin America are in the northeastern part of Brazil. Bahia state has one of the highest incidences of VL. The parasite infects humans, wild and domestic animals. Climate changes, deforestation and migration cause the dynamics of the disease to change, making the state of Bahia a risk area for several infectious diseases. A GIS ecological risk assessment has been constructed based on satellite data from the Advanced Very High Resolution Radiometer (AVHRR) and the Moderate Resolution Imaging Spectroradiometer (MODIS), from the United States Geological Survey, the National Aeronautics and Space Administration, respectively. The model will be developed using different environmental and climatic variables such as temperature, elevation, normalized difference vegetation index, ecological regions, rainfall, and evapotranspiration. The objective of this study is to establish which environmental parameters best reflect suitability for the disease by associating environmental and climatic variables with the disease prevalence of VL in the state of Bahia, Brazil.

625. PROJECT *Carcharias*: INTEGRATION OF THE FISHING COMMUNITY IN THE PRESERVATION OF THE ELASMOBRANCHS IN THE NORTHERN COAST OF RIO GRANDE DO SUL. NISA-CASTRO-NETO, WALTER; Maria, Luciane; Kober, Marcia V.; Glock, Luiz. Luterana do Brasil - Torres, Rua Universitária, 1900, Parque do Balonismo, Torres, Rio Grande do Sul (RS), Brasil, CEP 95560-000, nisacn@terra.com (WNCN, MVK). Grupo de Pesquisa em Dinâmica de Populações; Faculdade de Biociências; Pontíficia Universidade Católica do Rio Grande do Sul; Prédio 12C - Sala 254, Av. Ipiranga, 6681, Caixa Postal 1249, Porto Alegre, RS, Brazil, CEP 90619-900 (LM, LG).

The population depletions of the elasmobranchs, observed in the south of Brazil, directly affect the fishing communities of Torres and Passo de Torres, who obtain most of their livelihood from the areas. Due to few or inexistent measures and acts of protection, species such as the *Carcharias taurus* are nowadays under risk of extintion, against the official list of IBAMA of 2004: an overexploited species. Like the species become more rare in the captures, the fishing efforts become more intense and the fishermen suffer a substantial wearing out process, both physically and emotionally. All this annihilation process of the marine species makes the fishing community vulnerable to the privations resulting from low incomes. In an effort to support the Community, ULBRA - Torres, with the help of Pró-Squalus, developed the Projeto Carcharias, a communitarian project through which strategies are being developed together with the Fisherman's Colony Z-18, for the understanding of shark biology in the Southern region and offering also social aid measures, education and community health. The project will scope actions and strategies for the development of the specialists, which will be involved in the preservation of elasmobranchs and the betterment of life quality of the local Fishing Community.

626. MICROHABITAT COMPLEXITY IN CLEARCUTS AFFECTS SMALL-SCALE ARTHROPOD DISTRIBUTION. NITTÉRUS, KAROLINA; Gunnarsson, Bengt. Dept. of Applied Environmental Science, Göteborg University, Box 464, SE-405 30, Göteborg, Sweden, karolina.nitterus@miljo.gu.se.

The distribution of ground-dwelling arthropods was investigated in relation to the structural complexity on the ground in a field experiment. Carabid beetles (Coleoptera: Carabidae) and spiders (Araneae) were collected by pitfall trapping in three clearcuts in SW Sweden. The pitfall traps were placed in two types of microhabitats i. e. either where logging residue (slash) had been aggregated on the ground (high microhabitat complexity), or where

slash had been cleared from the ground (low microhabitat complexity). Our slash manipulations revealed that a high microhabitat complexity leads to an aggregation of carabids. For spiders no such effect could be detected. In the control plots, there was also a positive correlation between the structural complexity on the ground (i. e. slash height) and the abundance of carabids. For spiders, no significant correlation was found. We conclude that the small-scale distribution of carabids is affected by microhabitat complexity. Bio-fuel production includes the removal of slash, modifying the structural complexity in clearcuts in a way similar to our open ground experimental manipulations. Therefore an effect on the arthropod fauna might be expected with the rem oval of slash for bio-fuel.

627. THE FUTURE CLIMATE OF AMAZONIA. NOBRE, CARLOS A.; Oyama, Marcos D.; Oliveira, Gilvan; S. Marengo, José A. Centro de Previsão de Tempo e Estudos Climáticos, Instituto Nacional de Pesquisas Espaciais, Cachoeira Paulista, 12630-000, Brazil, nobre@cptec.inpe.br (CAN, GSO, HJAM). Instituto de Aeronáutica e Espaço, Centro Técnico Aeroespacial, São José dos Campos, Brazil (MDO).

The climate of Amazonia is responding to two concurrent perturbations: rapid rates of land-use change, mostly conversion of forest to pasture or cropland, and global warming. The former is liked to increased surface temperatures, decreased evapotranspiration as revealed by observations. It is being hypothesized that biomass burning may lead to a delay in the onset of the rainy season. Modeling studies indicate that basin-wide rainfall would decrease with large-scale deforestation. On the other hand, various scenarios of regional climate change in Amazonia due to global warming point out to a climate warmer by 2° to 5°C by the end of this century. When these scenarios are used as input to CPTEC Potential Biome Model, it projects that large portions of the forest could become impoverished savannas. Scenarios of biome change and redistribution due to climate change must be taken into account for conservation policies of the Amazonian countries.

628. THE FUTURE CLIMATE OF THE CERRADOS. Nobre, Carlos A.; OLIVEIRA, GILVAN; Oyama, Marcos D.; Marengo, José A.; Cardoso, Manoel. Centro de Previsão de Tempo e Estudos Climáticos, Instituto Nacional de Pesquisas Espaciais, Cachoeira Paulista, 12630-000, Brazil, sampaio@cptec.inpe.br (CAN, GSO, JAM, MC). Instituto de Aeronáutica e Espaço, Centro Técnico Aeroespacial, São José dos Campos, Brazil (MDO).

The climate of the Cerrados is responding to two concurrent perturbations: rapid rates of land-use change, mostly conversion to cropland, and global warming. Various scenarios of regional climate change in the Cerrados due to global warming point out to a climate warmer by 2° to 5°C by the end of this century. That could lead to significant species extinctions and redistribution. When these scenarios are used as input to CPTEC Potential Biome Model, it projects that an impoverished savanna would expand to the north occupying areas of forest cover. Scenarios of biome change and redistribution due to climate change must be taken into account for conservation policies of the Cerrados.

629. THE NORTH PORTION OF THE SERRA DO MAR STATE PARK SUPPORTS HUNTING? TEST OF MODELS. NOBRE, RODRIGO A.; Galetti, Mauro. Programa de Pós-Graduação - Ecologia de Agroecossitemas, ESALQ - USP, Piracicaba, SP, 13400-961, Brazil, rocaju@terra.com.br.

The game birds and mammals populations of the some Serra do Mar State Park nucleus supports hunting are being showed for distance sampling method. These data are basic to understand the conservation "status" of many species. The present work has intention to not only make the diagnosis of the game birds and mammals, but also analyze the capacity of these areas tolerate any harvest rate. For this two areas in Serra do Mar State Park had been selected, determined three transects each area, situated in the forest types that had presented better habitat conditions for the game species. The surveys will be made in the daylights and nocturnal, in order to also get the densities, for species preferential hunted. To the data models of sustainability of hunting will be applied: "Exploration" and "Production". Until this moment 268,65 km of diurnal sampling were done, getting 83 registers, as well as 54 of birds and 29 of mammals. Already 15 different species had been found, having the most observed *Tinamus solitarius* and *Odontophorus capoeira*. Until June more 70 days of collection will be carried through of a total of 173, with 8 km covered daily, getting given abundance and/or density data for species.

630. IMPACT OF CONNECTIVITY AND HABITAT HETEROGENEITY ON THE POPULATION PERSISTENCE: AN EXPERIMENTAL DEMONSTRATION. NOEL, FLORENCE; Kirchner, Florian; Couvet, Denis; Moret, Jacques; Machon, Nathalie. Conservatoire Botanique National du Bassin Parisien, Muséum d'Histoire Naturelle de Paris, Paris, F- 75005, France (NF, MJ, MN) Laboratoire UMR5173 Conservation des espèces, Restauration et Suivi des populations, Paris, F- 75005, France (NF, KF, CD, MN).

We analyzed the role of spatial structure of the natural habitat of the rare species *Ranunculus nodiflorus* L. in the maintenance of its metapopulations. This species grows in puddles which are more or less connected by flooded corridors. Since 2002, we have been following five populations of *R. nodiflorus* in the Fontainebleau forest (77, France), for which the presence of corridors among puddles was recorded. Results show that the presence of connections among puddles explains the structure of the populations. It enhances their size in increasing both the number of patches occupied by the species and the number of individuals within patches. However, corridors seem to have no effect on plant fitness. Moreover the species does not appear to have a persistent soil seed bank strategy. More generally, our study shows that population persistence in *R. nodiflorus* is increased by the presence of natural corridors which most likely promote recolonization of empty puddles after local extinctions.

631. IMPACT OF URBAN HABITAT FRAGMENTATION ON RED-BACKED SALAMANDER (*Plethodon cinereus*) POPULATION GENETIC STRUCTURE. NOEL, SARAH; Lapointe, Francois-Joseph. Departement de sciences biologiques, Universite de Montreal, C.P. 6128 Succ. Centre-Ville, Montreal, QC, H3C 3J7, Canada, sarah.noel-boissonneault@umontreal.ca.

Monteregian hills are areas of high biodiversity in Quebec (Canada), where one can find five out of the six amphibian species designated by the provincial government. However, due to increasing urban development, those once natural zones are now more and more fragmented. One of the monteregian hills, the Mont-Royal, probably has the oldest history of urban perturbations in North America. Located in the heart of Montreal City, this green oasis has been altered since 1700 by the construction of roads, cemeteries, water tanks, antennas and buildings. Today, the mountain is highly fragmented and the four remaining

red-backed salamander (*Plethodon cinereus*) populations are isolated. Because of genetic drift, inbreeding and absence of gene flow, we postulated that the genetic structure of the red-backed salamander has been altered by habitat fragmentation. To test this hypothesis, population genetic structure on the Mont-Royal was compared with Mont-Megantic, an undisturbed monteregian hill. Data from six microsatellite loci were analyzed for 100 individuals from each mountain. Allelic frequencies were different in the two mountains and a higher genetic diversity was found in the unfragmented habitat. These results indicate that urbanization of the Mont-Royal has significantly changed the genetic structure of the red-backed salamander.

632. CERRADO SQUAMATE REPTILES: DIVERSITY, DISTRIBUTION PATTERNS AND CONSERVATION. NOGUEIRA, CRISTIANO; Colli, Guarino R. Departamento de Ecologia, Instituto de Biobiências, Universidade de São Paulo, São Paulo, SP, 05508-900, Brazil, crinog@ib.usp.br (CN). Departamento de Zoologia, Instituto de Biologia, Universidade de Brasília, Brasília, DF, 70.919-900, Brazil, grcolli@unb.br (GRC).

Vertebrate diversity is poorly studied in the Cerrado region, a global biodiversity hotspot. This study provides an inventory of squamate reptiles (lizards, snakes and amphisbaenians) of the Cerrado, based on standardized field samplings in ten localities complemented by museum and literature data. We describe taxonomic diversity, local and regional distribution patterns and endemicity levels. We recorded a rich, phylogenetically deeply rooted fauna, including at least 205 described species. Local richness reached 95 species, with community structure influenced by natural habitat mosaics. Faunistic overlap between open and forested habitats was restricted. Thus, most species, including several endemic forms, are habitat specialists in savannas or grasslands, with a smaller portion of the fauna restricted to forested habitats. Habitat heterogeneity connects local and regional distribution patterns and favors sympatry of different squamate species groups, with historically dete rmined habitat requirements. Three major faunistic sub regions were detected. Most of the 62 endemic forms (roughly 1/4 of regional richness) are poorly known, representing potential conservation targets. At a local scale, new protected areas should preserve the typical Cerrado habitat diversity. At a regional scale, a network of protected areas should maximize phylogenetic diversity across the three major biogeographic subdivisions of the Cerrado.

633. ABUNDANCE PATTERNS OF *Maculinea* BUTTERFLIES AT LANDSCAPE SCALE - IMPLICATIONS FOR METAPOPULATION CONSERVATION. Nowicki, Piotr; Pepkowska, Aleksandra; KUDLEK, JOANNA; Skórka, Piotr; Witek, Magdalena; Woyciechowski, Michal. Institute of Environmental Sciences, Jagiellonian University, Gronostajowa 7, 30-387 Krakow, Poland; ycaktiw@yahoo.co.uk.

The *Maculinea* butterflies (Lycaenidea) require specific foodplants and host ants to accomplish their life cycles. Five European *Maculinea* species are endangered and included in the European Red List. We developed habitat models for *Maculinea teleius*, *M. nausithous* and *M. alcon*, in the suburban area of Krakow, Poland. Data on butterflies abundance were collected in 2003 and 2004 in foodplant patches (*Sanguisorba officinalis* for *M. teleius* and *nausitous* and *Gentiana pneumonathe* for *M. alcon*). Effects of variables describing the patches (measured using GIS) on presence/absence and densities were estimated using logistic and linear regression models, respectively. Small and highly fragmented (with high proportion of edge zone and small compactness) patches supported higher densities of *M. teleius* and *nausithous* whereas the best sites for *M. alcon* were patches with high proportion of edge zone and foodplant density. The reason is that high proportion of edge zone and small compactness support host ant colonisation. Additionally, Several Small sites might seem a better conservation solution than a Single Large one. (Funded by the European Commission RTD project MacMan (EVK2-CT-2001-00126) and Polish Committee of Scientific Research grant SPUB-3024.)

634. MONITORING SPECIES POOR COMMUNITIES: MACROINVERTEBRATE ASSEMBLAGES FROM ALPINE PONDS (SWISS NATIONAL PARC). OERTLI, BEAT; Hinden, Hélène; Stoll, Aurélien. University of Applied Sciences of Western Switzerland - EIL, Department of Nature Management, 150 route de Presinge, CH -1254 Jussy-Geneva, Switzerland (beat.oertli@etat.ge.ch) (OB, SA).University of Geneva, Laboratoire d'Ecologie et de Biologie aquatique, 18 chemin des Clochettes, CH-1206 Geneva, Switzerland (HH).

Biotic communities of alpine environment are characterised by a weak species richness but a high degree of endemism. To monitor these particular systems, key questions have to be resolved: the scale of diversity to be assessed (sample, community, site, region), and the taxonomic groups to be used. The investigation of the aquatic macroinvertebrate communities from 23 ponds of the high alpine cirque "Macun" (Swiss National Park) evidenced a very low species richness per pond, dominated by Chironomidae (Diptera). Coleoptera and Oligochaeta were also relatively well represented. Other groups, frequent in low land ponds, had particularly poor species numbers (Trichoptera) or were absent (Gastropoda, Heteroptera, Odonata, Ephemeroptera). Regional species richness (Macun cirque) was very low, following the local (pond) richness trends. For long term monitoring, Chironomidae, Coleoptera and Oligochaeta have to be privileged; nevertheless, other groups should not be discarded, since climate changes might favour colonisation by new species. An assessment of four different scales of diversity (sample, pond, Macun site, Swiss oriental Alps) was also conducted and underlined the main directives that have to be followed for the monitoring, particularly the quantitative aspects (i. e. number of samples, choice of representative ponds).

635. EFFECTS OF THE LOUISIANA CRAYFISH INVASION AND OTHER HUMAN IMPACTS ON THE AFRICAN CLAWLESS OTTER IN THE EWASO NG'IRO ECOSYSTEM. OGADA, MORDECAI O.; Obudho, Penninah A.; Okelo, Romanus O. P.O. Box 1629 Sarit Centre 00606, Nairobi, Kenya (MOO), mordyogada@yahoo.com. Department of Biological Sciences, Kenyatta University, P.O. Box 43844-00200, Nairobi, Kenya (PAO, ROO).

The introduction and spread of exotic species into new habitats has always been shown to have far-reaching ecological effects, particularly within the confines of inland aquatic ecosystems. This study examined the effect of the exotic Louisiana crayfishon the African clawless otter and the indigenous freshwater crab *(Potamonautes neumannii)* in the Ewaso Ng'iro ecosystem in central Kenya. Laboratory analysis of spraints revealed that crayfish was the primary food source used by the otters in the lower Ewaso Ng'iro, and that the availability of this resource varied between seasons. A relationship was found between the seasonal variation in otter territorial behaviour and the variation in availability of crayfish. This

appeared to be 'crayfish-driven' because seasonal variation in otter behaviour was not observed in the sections where water temperatures were too low for crayfish. This study recommends ways in which people can exploit rivers with minimum effect on aquatic fauna. This needs to be addressed urgently because currently in Kenya, there is no regulation on water extraction, pollution by 'small' (non-industrial) polluters is largely unchecked, and sport fishermen continue to introduce or 'stock' aquatic ecosystems with exotic species totally disregarding the ecological impacts of these activities.

636. HIV/AIDS AND CONSERVATION CAPACITY BUILDING: IMPACTS AND COPING STRATEGIES. OGLETHORPE, JUDY; Gelman, Nancy. World Wildlife Fund (WWF), 1250 24th Street, NW, Washington, DC 20037, USA, judy.oglethorpe@wwfus.org (JO). Africa Biodiversity Collaborative Group, c/o WWF. Washington, DC (NG).

HIV/AIDS is having tragic impacts on conservation capacity in sub-Saharan Africa and it threatens the conservation workforce in next wave regions including Eastern Europe, Asia, Latin America and the Caribbean. Human losses in the conservation community have been significant in many countries. Conservation personnel are particularly vulnerable when they travel for training or are posted to remote protected areas without their families, where they may engage in high-risk behaviors. Capacity of communities managing natural resources is being lost, as is indigenous knowledge. AIDS-affected households are often forced to use land and natural resources unsustainably as they lose labor and seek livelihood alternatives. Research on conservation impacts and coping strategies for maintaining conservation capacity reveals that some conservation organizations in Africa have developed best practices to deal with HIV/AIDS impacts. Many others are uncertain about what action to take, or are held back by stigma and lack of leadership in HIV/AIDS issues. There is a huge demand for information and support. Strategies include development of HIV/AIDS organizational policies and procedures (in collaboration with the health and labor sectors), innovative training programs that help maintain the conservation workforce, development of alternatives to unsustainable resource use, and promotion of low-labor sustainable enterprise.

637. REPRODUCTIVE TRAITS OF MAGELLANIC WOODPECKERS (*Campephilus magellanicus*): IMPLICATIONS FOR CONSERVATION AND MANAGEMENT. OJEDA, VALERIA. Departamentos de Zoologia y Ecología, Universidad Nacional del Comahue, Bariloche, 8400, Argentina, campephilus@bariloche.com.ar.

The Magellanic Woodpecker (*Campephilus magellanicus*) is a vulnerable and poorly known species endemic of the sub-antarctic forests of South America (35-56°S). Since it is threatened of extinction in several parts of its distribution, recovery plans based on reliable biological data are needed. For six years I studied the woodpeckers' reproductive biology and habitat requirements in native forests of Argentine Patagonia. Here I present key information, and recommend managing forests not just for the retention of potential cavity-trees (192±40 years old, 0,60±0,17 cm diameter at breast height, DBH) but also stand units suitable for this species. A pair excavates a new nest and several roosting holes each year, and cavities normally cluster at the stand level. To accommodate a completed cavity 25,6±3,7 cm wide and 32,3±5,3 cm deep, a tree at least 32 cm in diameter at nest height is required, but most (>90%) completed cavities are excavated in trees larger than 35 cm DBH, so this constitutes a more realistic and measurable threshold value. In addition to considerations on habitat requirements, life history traits such as brood size (one) and parental investment (very high) should be included as relevant issues in the delineation of recovery plans for this species.

638. THE IMPACTS OF LAND USE INTENSITY ON BIRD COMMUNITY IN SOUTH NGURUMAN IBA KENYA. OKELO, ANNE AUMA; Amutete, G.; Ogoma, M.; Chelule, D.; Nalianya, N. Ornithology Department, National museums of Kenya, P O Box 40658-00100, Nairobi, Kenya. anokelo@yahoo.com.

South Nguruman is an IBA because it has globally threatened species (Grey-crested Helmet-shrike, Red-throated Tit, and Jackson 's Widowbird), restricted range species (Hunter's Cisticola) and regionally-threatened species (Lammergeier, African Crowned Eagle, Stripped Flufftail and Purple-throated Cuckoo-shrike (Bennun and Njoroge 1999, Birdlife International, 2000). Unfortunately this IBA is unprotected. Information about these species and their conservation status/threats has been lacking. In order to institute any conservation efforts, a thorough avifauna survey was deemed a first and a high priority project of the Ornithology Department of National Museums of Kenya and National bird Committee under Nature Kenya. To undertake the survey, we conducted an analysis using DISTANCE programme version 3.5 (Laake et al. 1998) to calculate the densities of birds. The densities for each study site were then compared using t-tests. Riverine (Gallery) forest surveys and the vegetation surveys were also conducted in different site. The percentage similarities between pairs of study sites were generally low with Congo and Oloibortoto being the least similar. None of the pairs showed more than 55% similarity. Bird compositions between all different sites in South Nguruman IBA are widely different. As the distance increases the raptors increase and the frugivores decrease, thus different guilds show different responses to habitat change. A reasonable number of important vegetation structural attributes differed significantly between the sites with different land use and management. Globally threatened birds exist in South Nguruman but under intensified human pressure on this unprotected IBA. Integrated approachs for conserving the threatened unprotected IBA are urgently required. This must involve proper application of researched knowledge specific to South Nguruman area. To achieve this, the focus should be on supporting community-based adaptive habitat management for sustainable conservation of biodiversity.

639. SEX HORMONE MEASUREMENT IN WILD ANIMAL FECES. OLIVEIRA, CLAUDIO A. Departamento de Reprodução Animal, Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo, São Paulo, 05508-000, Brazil, cadolive@usp.br.

Fecal hormone metabolite measurement is a non-invasive technique which does not require animal manipulation, reducing stress to a practically zero level. Because of this, it has been widely used in wild animal research around the world. Traditional methods for evaluation of endocrine reproductive status involve animal restraint and invasive blood sampling. Frequent serial blood sampling, normally causes significant stress to the animals which may produce questionable results or even hinder researches in this area. The fecal techniques also make it feasible multiple daily analyses in only one animal, thus permitting individual longitudinal studies instead of cross-sectional studies which in turn require the use of a large number of animals, so avoiding bio ethical concerns.

The present paper describes the recent advances reached by the FMVZ-USP/Laboratory of Hormonal Measurements, regarding to its main research projects related to the conservation of primates, carnivores, aquatic mammals and some reptile and bird species of the Brazilian wild fauna.

640. THE ROLE OF REFORESTED AREAS TO SMALL MAMMAL COMMUNITY IN AN AMAZONIAN RAIN FOREST, BRAZIL. Oliveira, Leonardo; MENDEL, SYLVIA; Fernandes, Geraldo; Castilho, Alexandre. Museu de Ciências Naturais - PUCMinas, Rua Dom José Gaspar 290, Coração Eucarístico, Belo Horizonte, MG, 30.535-610, Brazil, leonardoco@pucminas.br (LO); Pampulha, Belo Horizonte, MG, 30270-901, Brazil, gwilson@mono.icb.ufmg.br (GF, SM); Mineração Rio do Norte S.A. Porto de Trombetas, PA, castilho@mrn.com.br (AC).

The Amazonian forest has been under intensive deforestation process and only under rare situations the deforested areas are restored. For the first time we compared the small mammals communities of reforested areas (decades 80 and 90) with that of primary forests, in Porto Trombetas, Pará, Brazil. From 2002 to 2004, six trapping sessions of eight nights each were conducted. Two live-traps were spaced at each 20m along transects with 10 and 25 trap stations in both reforested and primary forests, respectively. The richness and abundance of marsupials were higher in the reforested areas, while rodents dominated the community in the primary forest. The greatest abundance of small mammals was recorded in the reforested areas. Species composition and richness varied between the re forested areas (80's and primary forest = 7 species, 90's = 8 species). The dominance of marsupials in the reforested areas is probably related to their capacity to explore secondary forest. Although much work is called for, we argue that the elevated abundance of small mammals in reforested areas is related to the high productivity of these areas. Reforested areas with native species may provide conditions for the colonization and permanence of small mammals in the tropical rain forest.

641. ARE THE HIGHEST SPECIES RICHNESS AREAS OF BIRDS AND MAMMALS UNDER A PROTECTED STATUS IN VENEZUELA? OLIVEIRA-MIRANDA, MARIA A.; Rodríguez, Jon Paul; Lazo, Rodrigo; Zambrano, Sergio; Tapiquén, Efraín; Ruiz, Augusto; Gutiérrez, Eliécer; Armas, Manuel; Solórzano, Luis Aníbal; Rojas-Suárez, Franklin. Centro Internacional de Ecología Tropical, Instituto Venezolano de Investigaciones Científicas, Apdo. 21827, Caracas 1020-A, Venezuela, molivei@usb.ve (MAOM). Centro de Ecología, Instituto Venezolano de Investigaciones Científicas, Apdo. 21827, Caracas 1020-A, Venezuela (JPR, SZ, ET, AR, EG, MA). Centro Internacional de Ecología Tropical, Instituto Venezolano de Investigaciones Científicas, Apdo. 21827, Caracas 1020-A, Venezuela (RL). Conservation International Venezuela, Av. San Juan Bosco, Edif. San Juan, Piso 8, Ofic. 8A, Altamira, Caracas, Venezuela (LAS, FRZ).

Species richness is one of the features considered for setting conservation priorities, and for evaluating the extant protected areas as well. Thus, it is relevant relying on maps for the distribution of this variable, particularly in the Neotropic. We have built a first version of richness maps for birds and mammals by implementing a geographical information system. Observed patterns of richness were compared with the Venezuelan network of strict protected areas (NSPA). Areas of higher richness for birds are dispersed in the country while for mammals are located mainly along a mountainous region. Maximum values obtained were 565 species (41.3% of country total) for birds, and 207 species (64.1% of country total) for mammals. NSPA includes 86% (531-565 spp) of areas with highest richness for the birds, and 72% (185-207 spp) for mammals. However, NSPA included the other levels of richness in less than 40% for birds and 24% for mammals. The distribution of species within groups and the richness centers among groups does not overlap. The results obtained suggest that the protection of birds and mammals in Venezuela requires reviewing extant NSPA and setting different strategies of management and conservation for each group.

642. CURRENT STATUS OF THE CONSERVATION UNITS IN THE BRAZILIAN MID-NORTH: MARANHÃO STATE. OLIVEIRA, T. G. DE. Depto. Biologia, Universidade Estadual do Maranhão / Instituto Pró-Carnívoros, R. Quaresmeiras, Qd-8 No. 14 65076-270 São Luís, MA, Brazil, tadeu4@yahoo.com.

Located in a transitional area where the major biomes of northern, central and northeastern Brazil converge, the state of Maranhão presents a series of peculiarities. The area is also under a series of impacting factors, which, in turn, puts the state's conservation units (CU's) in a position of utmost importance in maintaining the local biodiversity. The present paper intends to make an overview of the current situation and conservation status of the conservation units found in Maranhão. An analysis of the impacting factors of the total protection conservation units in the state: Lençóis Maranhenses National Park, Gurupi Biological Reserve, Mirador State Park and Bacanga State Park was performed. Impacting factors were placed in 15 categories. Their intensity was considered as high, medium, low, or inexistent/not applicable. From the 15 identified threats, inadequate management, hunting pressure and human encroachment were the most impacting, followed by natural resources use and deforestation/logging. Bacanga was the mostly impacted, followed by Gurupi and Mirador. All the CU's, but Bacanga, showed a high importance for conservation, whether by the occurrence of rare/threatened/endemic species, by their size and unique conditions, or both. The status of Maranhão's CU' s was considered extremely precarious.

643. GENETICS AND POPULATION DYNAMICS OF MATRILINES IN SIMULATED MONKEY POPULATIONS. OLIVIER, THOMAS. Green Creek Paradigms, LLC, 4632 Green Creek Road, Schuyler, VA 22969, USA, tolivier@cstone.net.

This paper analyzes genetic compositions and dynamics of matrilines in simulated monkey populations. The simulations are built with CRITTRZ, an open-source population modeling library written in the Python computer language. Structures and processes of simulated social groups resemble those found in some cercopithecine multi-male groups. Each group normally contains immigrant adult males and a natal segment composed of adult females and their immature offspring. Each natal segment is organized into matrilines, groups of females related by descent through females and their resident immature male offspring. Simulated groups may fission when large. In group fissions, natal segments divide matrilineally. This study examines gene distributions in matrilines, matriline numbers and sizes in simulated monkey groups, and matriline influences on group fission processes. In simulations series, multiple polymorphic loci are present in populations. Simulation series vary depth of pedig ree reckoning of matrilineal relationships and demographic circumstances. Matrilines also may be defined by descent through females from females present in the founding population of each simulation. The study also considers evolution over time of the numbers, sizes, distributions and genetic

compositions of such matrilines. The implications of these results for conservation are discussed.

644. COARSE-FILTER, FINE-FILTER CONSERVATION TARGETS: HOW WELL DOES A CONTINENTAL-SCALE COARSE-FILTER ANALYSIS CAPTURE CONSERVATION PRIORITY AREAS? OREN, DAVID C.; Matsumoto, Marcelo. The Nature Conservancy do Brasil, SHIN, CA-05, Conjunto J, Bloco B, 3o Andar, 71-503-505 Brasília, DF, Brazil, doren@tnc.org.br.

The Nature Conservancy's South America Conservation Region scientists recently conducted a continental-scale analysis to establish terrestrial conservation priority areas. They used a NatureServe-based classification that overlapped Global Land Cover (GLC) and four additional data layers to generate terrestrial ecological systems, which were then mapped and treated as coarse-filter conservation targets. Differential conservation goals (percentage of area) for each South American ecoregion were established using past habitat conversion. SPOT (Spatial Priority Optimization Tool) software runs determined the most efficient set of areas to achieve full representation of the coarse-filter targets. To test whether this methodology produced reliable results, we compared the results of the continental analysis with a detailed ecoregional assessment (ERA) just completed for the Gran Chaco Americano. Overlap between the continental analysis and the ERA results was high, 73%, but the continental analysis represented a much smaller area (210,000 km^2 vs 442,750 km^2). We conclude that the continental analysis gives a good indication of some of the priority areas in an ecoregion and is a good way to establish priorities between ecoregions. At the same time, coarse-filter terrestrial analyses at a continental scale cannot be used to replace full ecoregional assessments, as they fail to consider most fresh-water and fine-filter conservation targets, such as specialized ecological communities and species.

645. REPRODUCTIVE BIOLOGY OF RED-CROWNED KAKARIKI (*Cyanoramphus novaezelandiae*) ON TIRITIRI MATANGI ISLAND, NEW ZEALAND. ORTIZ-CATEDRAL, LUIS; Brunton, Dianne. Institute of Natural Resources, Massey University, Auckland, New Zealand, luiscatedral@hotmail.com (OL), d.h.brunton@massey.ac.nz (DB).

The breeding biology of red-crowned kakariki (*Cyanoramphus novaezelandiae*) was studied during the 2004-2005 breeding season on Tiritiri Matangi Island, New Zealand. This is the first reproductive study on a translocated population of this species. The aims were: to document clutch size, hatchability and mortality during the nestling stage. Egg laying peaked in December with an average clutch size of 6 eggs (range 1-9). Most females immediatly commenced incubation with the first egg which resulted in asynchronous hatching. Hatchability was low when compared to a natural population (37.6% in this study vs 83.6%). Unhatched eggs include infertile, cracked and dead embryos. Mortality was higher for last hatched chicks as with other parrot species. It is not clear if reduced hatchability is associated with environmental conditions of with the small founder population size (84 birds released between 1974-1976), as h as been suggested for other New Zealand birds. If reduced hatchability represents a fitness cost of small founder size management of the red-crowned kakariki would benefit from analyses of genetic diversity of remaining populations. Similarly, larger and more genetically diverse founder population sizes could be considered in future translocation programs.

646. FLAGSHIP SPECIES FOR LOCAL CONSERVATION: SELECTING CULTURALLY APPROPRIATE SPECIES OVER INTERNATIONALLY CAPTIVATING ONES. OTTERSTROM, SARAH M.; Velazquez, Ileana. Proyecto Paso Pacifico, OR-14, Managua, Nicaragua, dryforest@dslextreme.com.

Flagship species are a useful tool for promoting specific conservation initiatives. However, organizations risk losing the interest of local people by selecting charismatic species that draw only international attention but do not reflect local concerns. Where conservation actions occur at a local-scale, flagship species should target the local audience. We approach the challenge of selecting appropriate flagship species within the Chococente Wildlife Refuge, Nicaragua. Chococente is an international conservation priority because it is a major sea turtle nesting site and maintains Nicaragua's largest stand of tropical dry forest. To assess cultural values, we carried out structured interviews at 103 randomly sampled households inside the reserve. Questions referred to the use of NTFPs and wildlife as well as perceived changes to forest and wildlife populations. Results demonstrate that species of most significant concern to local people were also considered desirable as food. However, species of highest priority for international conservation efforts, such as sea turtles and parrots, were not a concern. We recommend that locally threatened species most prized by communities (i. e. iguana, white-tailed deer) be used as flagships, despite being far less charismatic internationally than sea turtles. Flagship species that reflect cultural values and subsistence concerns are more likely to engender local participation and support for ecosystem conservation initiatives.

647. THE AMAZON RIVER AND FLOODPLAIN: OVERVIEW OF WWF-BRAZIL CONSERVATION PLANNING FOR A FRESHWATER ECOREGION. OVIEDO, ANTONIO; Scaramuzza, Carlos A. M.; Meneses Filho, Luis C.L. WWF-Brazil, SHIS EQ QL6/8, Conj. E, Brasília-DF, 71620-430, Brazil, antonio@wwf.org.br (AO, CAMS, LCLMF).

The Amazon River and Floodplain Ecoregion is defined as those areas periodically or permanently flooded by freshwater in the Amazon basin. The prominence of ecological processes in shaping habitats, aquatic species and human activities creates a challenge for long-term conservation of the Ecoregion's biodiversity features. The biodiversity vision is a planning tool developed to protect adequately the biodiversity, habitats and human activities. The Biodiversity Vision represents the minimum requirements in terms of areas and management practices, to guarantee the conservation of biodiversity in perpetuity. It highlights the most important areas of the ecoregion where efforts should be focused, and helps stakeholders to plan their strategies toward a co-management of varzea resources. The following objectives were established to define the conservation landscape for the biodiversity vision: Guarantee representation of all existing habitat types; Maintain terrestrial and aquati c connectivity, both lateral and longitudinal; Preserve hydrological and sedimentation cycles; Maintain viable populations of endemic species, typical species, and economically important species. The result of this prioritization exercise is a set of 16 priority catchments. Now WWF-Brazil is applying a systematic conservation planning framework with the use of decision support system to improve the implementation of the biodiversity vision action plan.

648. AN EVALUATION OF RAPID BIOLOGICAL ASSESSMENT PROGRAMS. OWEN, EMILY K.; Trombulak, Stephen C. Program in Environmental Studies, Middlebury College, Middlebury, Vermont 05753, USA, eowen@middlebury.edu (EKO), trombulak@middlebury.edu (SCT).

The evolution and effectiveness of Rapid Biological Assessments (RBAs; e. g., Conservation International's RAP and The Nature Conservancy's REA programs) were evaluated through critical review of 38 RBA reports and ten surveys of scientists involved in such assessments. This evaluation indicated that the evolution of RBAs from their inception in the late-1980s has been toward management-oriented conservation recommendation, rather than the catalysis of conservation initiatives. Up to the present time, RBAs are viewed to have been successful at raising public awareness, developing protected areas, and aiding management efforts. Conversely, they are viewed as deficient in the quick and effective dissemination of results and the involvement of local communities and in-country conservation organizations in the RBA process, both of which are vital to the continuation of conservation efforts in the study area. In the future, we recommend that organizations involved in RBAs focus on improving the programs through conducting RBAs as part of an in-country conservation program sponsored by a local or national conservation organization, implementing an active participatory planning process with local communities, and disseminating quickly the results of the RBAs in various formats, targeting local government agencies, decision makers, academic institutions, communities, and national and international conservation organizations.

649. MONITORING HABITAT AND LANDSCAPES USING LIFE-FORMS: THE BIOHAB METHODOLOGY. PADOA-SCHIOPPA, EMILIO; Bunce, Bob; Gromm, Geoffrey Brian; Jongman, Rob. Dipartimento di Scienze dell'Ambiente e del Territorio, Università degli Studi di Milano-Bicocca, Piazza della Scienza 1, 20126, Milano, Italy, emilio.padoaschioppa@unimib.it (EPS). Centrum Landschap, Alterra, Droevendaalsesteeg 3, 6708 PB Wageningen, The Netherlands, Bob.Bunce@wur.nl, Rob.Jongman@wur.nl (BB, RJ) Departemt Wildlife Ecology and Biodiversitet, National Environment Research Institute, Frederiksborgvej 399, 4000 Roskilde, Denmark gbg@dmu.dk (GBG).

Habitat and landscapes are an essential component of biodiversity, and their monitoring is crucial to understand the effects of climate change and of antropic pressure. The project BioHab (EU fifth Framework, Concerned action, nr. EVK2-2001-00362) is carried out by a consortium of 11 European research institutes. The objectives of BioHab are addressing the need for a methodology appropriate for coordinating the existing information on habitats in field monitoring and linking other projects involving measurements of biodiversity. The BioHab categories are based on life forms as described in the classical phytogeographical work of Raunkiaer. Life forms also provide a direct link to biomes, which are major biotic communities, characterized by the dominant forms of plant life and the prevailing climate. The final product of BioHab is an handbook to monitorate in the field different European habitats. Here we present the methodology, with some examples from Lombardy (Italy). A list of General Habitats (107 categories from 16 life forms) was predetermined. The variation within General Habitat Categories is expressed by environmental qualifiers (combinations of soil humidity, nutrient status and acidity). The BioHab system appears useful because linkages with different approaches (EUNIS, CORINE land cover and phytosociological habitat classification) may be easily done.

650. MONITORING FLOODS AND ANALYSIS OF FIRES IN THE PANTANAL WETLAND. PADOVANI, CARLOS; Mourão, Guilherme; Calheiros, Débora. Laboratory of GIS and Remote Sensing, Embrapa Pantanal, Rua 21 de Setembro, 1880, Bairro N. S. Fátima, Corumbá, MS, Brazil, guara@cpap.embrapa.br, 79320-900, (PC, MG, CD).

The GIS and Remote Sensing laboratory of the Embrapa Pantanal is developing a flood and vegetation/deforestation monitoring system based on imagery of MODIS and the Brazilian sensor RRD, CBERS-2 satellite as part of the GIS Pantanal project - Duks Unlimited - USA and Wageningem University - Netherlands. This monitoring could be the baseline information for estimating the Pantanal flood pulse hidrology dynamics and can be very useful to evaluate and modelling the possible negative impacts of projects like the waterway Paraná - Paraguai. Wildlife aerial surveys have been performed by the Wildlife laboratory in the last years and the wildlife data distribution and abundance has been mapped for analysis with the floods, vegetation, deforestation and fires. Monitoring and analysis of fire data has been done. Additionally, Brazil, Bolivia, Paraguay, Argentina and Uruguay should start a international environmental treaty for the conservation of the Upper Paraguay River Basin to stablish regulation measures for deforestation and soil conservation at the highlands and deforetation, fires and hydrology management of the Pantanal, perhaps building on the Tratado del Rio de La Plata, 1974. The future of the Pantanal and the Bacia de la Plata is uncertain and the monitoring system can help a lot to find solutions for conservation of the Pantanal.

651. WHEN ENVIRONMENTAL EDUCATION MEETS SUSTAINABLE DEVELOPMENT. PADUA, SUZANA M. IPÊ Instituto de Pesquisas Ecológicas, SHIS QI 13 Conjunto 8 Casa 5 71535-080 Brasília, DF, Brazil.

Environmental education emerged from the need for new values and more ethical behaviors that could contain the unsustainable modern way of life. With the majority of human beings living in urban centers, the link with the natural world has been at stake, and nature's value has decreased. In this complex scenario, environmental education, which at first was somewhat naïve, began to incorporate broader approaches that include sustainable development. In order to protect the rich, but increasingly threatened remnants of natural ecosystems, many educators have integrated sustainable alternatives into their programs, so people and nature can be equally contemplated. When this occurs, people who were often known to act against the natural environments now are allies to conservation. This is especially true among communities who rarely have opportunities to improve their livelihoods, for living in remote regions where natural areas still exist. Education together with sustainable development has become a powerful combination to empower people to protect nature and improve their quality of life. Brazilian examples developed by IPÊ - Instituto de Pesquisas Ecológicas (Institute for Ecological Research) will be presented to illustrate the effectiveness of this combination.

652. A COMPARISON OF CONSERVATION PRIORITY SETTING INITIATIVES IN THE ATLANTIC FOREST. Paese, Adriana; PAGLIA, ADRIANO; Foster, Matthew; Bedê, Lúcio C.; Pinto, Luiz Paulo S.; Fonseca, Mônica; Lamas, Ivana. Conservação Internacional, Av. Getúlio Var-

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In the last ten years the Brazilian Atlantic Forest has been the subject of several complementary conservation priority-setting initiatives. This is a reflection of the current threat to the biome and also of the quality and quantity of the data that has become available. Given that there are several approaches to establish priority sites for conservation, we need to understand the relative pros and cons of each approach and their potential to the definition of conservation strategies. The workshop for establishing conservation priorities, held in 1999, identified knowledge gaps and priority areas based on an extensive map database and the knowledge of the experts in attendance. More recently, we conducted a gap analysis for the Atlantic Forest and identified its most irreplaceable sites for conserving globally threatened species, using data on species extent of occurrence and explicitly defined conservation targets. Most recently we identified fine scale sites of global conservation importance using point data on species occurrence and the Key Biodiversity Areas methodology. We have compared the methodologies and results of these three recent priority-setting processes which although are somewhat spatially coincident, present different levels of omission and commission errors and also differ significantly in the objectivity and repeatability of their methodologies.

653. THREATENED ENDEMIC BIRDS IN ISOLATED FOREST PATCHES OF CEBU: A STRUGGLE FOR SURVIVAL. PAGUNTALAN, LISA MARIE; Jakosalem, Philip Godfrey; Orlanes, B. Orlyn. 1499 Torralba St., Lahug, Cebu City, Philippines.

The Island of Cebu, Philippines is almost denuded and has lost most of its endemic species of flora and fauna. Information on threatened endemic birds of Cebu, generated over three years of monitoring (2002-2004), revealed a number of supposedly extinct bird taxa surviving in a number of small, degraded patches of forest. Methods used include mist netting, line transects and purposive search for threatened birds. Four (4) threatened endemic birds were observed in at least three sites on Cebu Island. Ten (10) out of the twelve (12) presumed extinct endemic subspecies from Cebu were confirmed extant. Surveys further confirmed the presence of the supposedly extinct Citrine Canary Flycatcher *Culicicapa helianthea* and the Metallic Wood Pigeon *Columba vitiensis*. Surviving populations of threatened and endemic birds of Cebu largely depend on the existence of forest patches. These patches are highly threatened by various factors. Unless protective measures are carried out, the survival of these species remains questionable.

654. GENETIC VARIABILITY IN THE MARSUPIAL *Didelphis aurita* IN THE RIO DOCE PARK (PARQUE ESTADUAL DO RIO DOCE/PERD, MINAS GERAIS, BRAZIL). Paiva, Ana Luiza B.; Dias, Isabela M. G.; ASSIS, JOANA B.; Paglia, Adriano; Heitor, Cunha; Carvalho, Maria Raquel S.; Fonseca, Cleusa G. Departamento de Biologia Geral e Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Belo Horizonte, MG, 31270-901, Brazil, imgdias@icb.ufmg.br.

Didelphis aurita is found only in southeastern fragments of the Atlantic rainforest in Brazil. The genetic diversity analysis using molecular markers is essential to the development of conservation strategies for populations having undergone habitat loss by human action. Populations with low levels of genetic variability are more susceptible to extinction. In this study, we estimate the genetic diversity of a sample from the Rio Doce Park population of *D. aurita*. Microsatellite loci are suitable molecular markers for this study due to their polymorphism and co-dominant expression. DNA samples were isolated from 15 individuals. PCR products were separed by polyacrilamide gel electrophoresis. The number of alleles (Na), expected (He) and observed (Ho) heterozigosity for markers Dm1, Dm3, Dm7 and Dm9 in the 15 individuals analysed were, respectively: Na = 5, He = 0.75 and Ho = 0.33; Na = 7, He = 0.8 and Ho = 0.76; Na = 6; He = 0.76 and Ho = 0.70; and Na = 9, He = 0.83 and Ho = 0.91. The 4 loci are suitable for genetic diversity analysis due to their high values of observed heterozygosity. There were no evident loss of genetic diversity in the sample according to the results.

655. LITTERFALL DYNAMICS IN MAULINO FOREST FRAGMENTS, CHILE. PALACIOS, PILAR A.; Simonetti, Javier A. Departamento de Ciencias Ecológicas, Universidad de Chile, Santiago, Chile (PAP, JAS). Department of Wildlife Ecology, 210 Nutting Hall, University of Maine, Orono, ME, 04469, USA, pilar.palacios@umit.maine.edu (PAP).

Forest fragmentation disrupts functional biodiversity, altering processes like litterfall production and decomposition. Despite its relevance for nutrient cycling, litterfall dynamics in fragmented temperate forest is yet to be assessed. We evaluated litterfall production and decomposition in the Maulino forest, a unique forest with high level of endemism, severely deforested and fragmented in central Chile. We assessed a) litter production, as dry weight per surface unit (g/0.25 m^2), using 0.5 x 0.5 m collecting traps, and b) decomposition rate, estimated as dry weight loss of litterfall through time, in litterbags with 6 g of *Nothofagus glauca* leaves. Sampling was performed at Los Queules National Reserve, VII Region (our continuous forest) and four adjacent forest fragments during 2001-2003. Annual litterfall production did not differ between continuous forest and forest fragments, although components varied. Seeds, lichens and cortex were more common in litterfall from the continuous forest, while leaves wee more frequent in forest fragments. Litterfall decomposition rate was 1.4 times higher in the continuous forest. Such difference in decomposition translates into heavier litterfall accumulation in fragments' floor, which might hamper seedling growth. Forest fragmentation does not alter litterfall production but decomposition, suggesting that impacts might be more complex than expected.

656. ECOLOGY AND HABITAT USE OF THE MONK SAKI MONKEY (*Pithecia monachus*) IN SOUTHEASTERN PERU: A DIETARY GENERALIST WITH A PERPLEXING DISTRIBUTION. PALMINTERI, SUZANNE; Powell, George; Collado, Edgard. World Wildlife Fund-US, 1250 24th Street, NW, Washington, DC 20037 USA, suzanne.palminteri@wwfus.org, (SP, GP). World Wildlife Fund-Peru Program Office, Trinidad Morán 853, Lince, Lima-14, Peru (EC).

The little-studied monk saki monkey (*Pithecia monachus*) inhabits rainforest canopies in the western Amazon, from Colombia to Bolivia. Its patchy distribution- evidenced by its scarcity or absence from heavily-studied areas in two large national parks in southeastern Peru, well within its range- makes its study important for

conservation planning. We monitored the daily movements, hab itat use, and behavior of three troops of *P. monachus* in high terrace and floodplain forests in southeastern Peru. We collected preliminary ecological data, including feeding samples of over 60 different seeds or fruits, from over 20 tree families, consumed between June - December, 2004. The sakis also fed extensively on invertebrates. The groups maintained areas of between 20 and 35 hectares with minimal overlap; their varied diet, predominated by seeds of immature fruits, may enable them to maintain small home ranges yet seems contradictory to the irregularity of the species' occurrence. Our results indicate that this species consumes a wide range of forest fruit/seeds and occupies relatively small areas, suggesting that some other factor contributes to its sporadic distribution.

657. IDENTIFYING KEY MARINE BIODIVERSITY AREAS: A CASE STUDY FROM THE PHILIPPINES. PALOMAR, NADIA E. Conservation International - Philippines, 20 South Lawin Avenue, Philam Homes, Quezon City 1104 Philippines, npalomar@conservation.org.

The Key Biodiversity Area (KBA) selection process was derived principally from experiences in terrestrial conservation. For the marine realm, this process needs to be tested in consideration of the more open and dispersive nature of its environment and the huge lack of data on species conditions. This presentation summarizes the results of a marine biodiversity assessment and workshop which identified potential marine KBAs for the province of Palawan in the Philippines. Data were compiled to produce a species database with information on eight taxonomic groups (seagrasses, seaweeds, mangroves, corals, mollusks, reef fishes, turtles and cetaceans). This information together with spatial data was utilized by biological experts to select and prioritize areas for marine biodiversity conservation and research. Major considerations for selecting marine biodiversity conservation areas were the presence of habitats along critical channels and marine biogeographic zones, habitat complexity, occurrence of threatened species, and previous and ongoing research efforts. Endemicity was not an important criterion during selection. As global data coverage for marine species increases, rigorous criteria will supercede these qualitative considerations, but the exercise to date provides a useful starting point for identifying KBAs in the marine environment.

658. AN INTERACTIVE KEY TO ASSESS STREAM HABITAT QUALITY: A NEW TOOL DEVELOPED FOR WATERSHED MANAGEMENT. PAPROCKI, HENRIQUE; Perry, Jim. Pontíficia Universidade Católica de Minas Gerais, Rua do Rosário 1081, Betim-MG-32 630 000, Brazil papr002@umn.edu (HP); University of Minnesota, Fisheries and Wildlife, 204 Hodson Hall, 1980 Folwell Ave, St Paul, MN 55108, USA (JP).

There is a great need for stream habitat assessment for reference conditions in Neotropical countries. Environmental agencies and researchers in developing countries struggle with score systems constructed for temperate regions. A habitat classification system should be regionally developed to better fit the local array of ecological conditions. We present here an interactive key for stream habitat assessment initially developed for Cerrado streams. Interactive keys for habitat assessment are a novelty and should be of interest of state environmental agencies, NGO's and water quality researchers. An interesting characteristic of interactive keys is its predictive potential. The ability to virtually altering watershed characteristics to predict overall habitat quality changes should be extremely useful for evaluating water quality impact. This predictive power can be very useful in policy making for watershed management. Interactive keys can be easily adapted to different biomes and stream type and are very useful in establishing reference conditions for water quality assessment and monitoring. The methodology and logic of constructing an interactive key are also discussed. Interactive keys can be disseminated quickly and inexpensively through CD's or the Internet. Interactive keys are also suitable as an educational tool for either beginners or advanced students of water quality.

659. TEN YEARS OF CONSERVATION BIOLOGY TRAINING IN BRAZIL: A PARTNERSHIP, IPÊ, SMITHSONIAN INSTITUTION AT THE BRAZILIAN CENTER FOR CONSERVATION BIOLOGY. PARANAGUA, PATRICIA; Rudi, Rudran. IPÊ Instituto de Pesquisas Ecológicas, C. Postal 47, 12960-000 Nazaré Paulista, SP, Brazil, paranagua@ipe.org.br.

Capacity building is essential for conservation initiatives to occur in tropical countries. Since 1995, IPÊ - *Instituto de Pesquisas Ecológicas* (Institute for Ecological Research), a Brazilian NGO, and the Smithsonian Institution have been offering an annual course in Conservation Biology for Latin American professionals and graduate students. Applicants always exceed the number of openings and the selection is based on several criteria, especially in their possibility of putting the content into practice. Formal evaluations and informal comments have documented the scarcity of training programs in conservation and results suggest the following: (1) conservationists from Latin American most countries need training opportunities, though most lack the resources to pay for their attendance; (2) students are not sufficiently skilled in conservation practices in conventional university programs; (3) interdisciplinary training is recognized as essential, as offered in the IPÊ/Smithsonian course; and (4) training opportunities are critical to enrich the academic learning, which is important because 48% of the students come from academia. The main lessons learned include: (1) Latin American students need training in this field; (2) the integration of practical with theoretical learning, as offered in the course, complements academia; and (3) content should always be assessed and up-dated to attend current demands.

660. UPDATE ON THE POPULATION STATUS OF BLACK LION TAMARIN (*Leontopithecus chrysopygus* MIKAN 1823) IN MORRO DO DIABO STATE PARK, SP, BRAZIL. PARANHOS, KARLA M.; Martins, Cristiana S.; Cullen, Laury; Valladares-Padua, Claudio; Ropper, James J. IPÊ - Instituto de Pesquisas Ecológicas, C.P.47, Nazaré Paulista, SP, 12.960-000, Brazil, karla@ipe.org.br (KMP, CSM, LC, CVP). Programa de Pós-Graduação em Ecologia e Conservação, Setor de Ciências Biológicas, Universidade Federal do Paraná, Curitiba, PR, 80.531-970, Brazil (JJR, KMP).

Wildlife population density, especially for endangered species, is an important parameter for the analysis of population viability, and design of necessary conservation actions. In order to update our knowledge in terms of the status of black-lion-tamarin population in Morro do Diabo State Park, one of the most important remnants of Atlantic Forest in the extreme west of São Paulo State, a new census was carried out from January 2003 to February 2004. The census was conducted through the use of line transects. Fifteen transects were established in four different vegetation types, and 1305 km were walked. Through the implementation of this sampling effort we were able to gather 19 sightings of black-lion-tamarins, 12 of these in areas of mature forest and 7 in regeneration areas. Data analysis was carried out using Distance 4.0 software.

Density estimates resulted in 3.37 individuals/km^2, with a confidence interval between 1.8 and 7.3 individuals/km^2. According to these results, the species population in the park should be of approximately 1180 individuals or 274 tamarin groups. Comparing our results with previous studies, we noticed that the density did not change significantly over time, reinforcing the extreme importance of this area for the conservation of this species.

661. THE ROLE OF FOREST STRUCTURE, FRAGMENT SIZE AND CORRIDORS IN MAINTAINING SMALL MAMMAL ABUNDANCE AND DIVERSITY IN AN ATLANTIC FOREST LANDSCAPE. PARDINI, RENATA; Souza, Sergio M.; Braga-Neto, R.; Metzger, Jean Paul. Departamento de Zoologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, 05508-900, Brazil, renatapardini@uol.com.br (RP, SMS, RBN). Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, 05508-900, Brazil.

Using the distribution of small mammals at 26 sites in an Atlantic forest landscape, we investigated how abundance and alpha and beta diversity are affected by fragment size and presence of corridors. To account for the variability in forest structure, we described and minimized the influence of foliage density and stratification on small mammal data. Sites were distributed among three categories of fragment size and in continuous forest. For small and medium-sized categories, we considered isolated fragments and fragments connected by corridors to larger remnants. Forest structure influenced the abundance, but not the diversity of small mammal communities. Total abundance and alpha diversity were lower in small and medium-sized fragments than in large fragments and continuous forest, and in isolated compared to connected fragments. Three species were less common, but none was more abundant in smaller fragments. At least one species was more abundant in connected compared to isolated fragments. Beta diversity showed an opposite relationship to fragment size and corridors, increasing in small and isolated fragments. Results highlight the importance of secondary forest for the conservation of tropical fauna, the hyper-dynamism of small isolated fragments and the potential of corridors to buffer habitat fragmentation effects in tropical landscapes.

662. FROM OFFSHORE REFUGIA TO MAINLAND RESERVES, A SHORT HISTORY OF NEW ZEALAND CONSERVATION. PARKER, KEVIN A.; Brunton, Dianne; Anderson, Sandra H.; Ussher, Graham; Lovegrove, Tim G. Institute of Natural Resources, Massey University (Albany Campus), Private Bag 102-904, North Shore Mail Centre, Auckland, New Zealand, k.parker@auckland.ac.nz (KAP, DHB). School of Biological Sciences, University of Auckland, Private Bag 92019, Auckland, New Zealand (SHA). Auckland Regional Council, Private Bag 92012, Auckland, New Zealand (GU, TGL).

New Zealand conservation has evolved from a single species focus to one of ecosystem restoration and protection. The New Zealand landmass broke away from the Gondwanan supercontinent 80-100 mya. Early separation and subsequent isolation led to the development of a unique ecosystem dominated by birds, reptiles and invertebrates. Human colonisation began approximately 1000 years ago with the arrival of Polynesians, followed by Europeans in the late 1700s. This has had a massive impact on biodiversity, with habitat clearance and the introduction of 31 specie s of mammals devastating endemic ecosystems. Translocations to islands free of introduced mammals and other human impacts have become a mainstay of New Zealand species protection, and the saviour of many highly endangered species. On the mainland, habitat fragmentation associated with human colonisation created patches of natural habitat amidst a human landscape. The natural boundaries created by fragmentation, together with intensive pest control, provide opportunities to create “virtual islands”. These islands provide opportunities to restore existing ecosystems and to reintroduce locally extirpated species. They bring conservation back to the mainland while serving the dual purpose of ecosystem restoration, commu nity advocacy and education. The importance of offshore island reserves has not diminished and these complimentary approaches maximise protection of indigenous biodiversity.

663. DETECTING AND KILLING SURVIVORS OF INITIAL ATTEMPTS AT ERADICATION - THE NATURE OF REFUGIA AND HOW TO DEAL WITH THEM. PARKES, JOHN P. Landcare Research, PO Box 69, Lincoln 8152, New Zealand.

For some pest species (e. g., rabbits) application of the best control always leaves some alive, while for others (e. g., Norway rats) the increasing scale of eradication attempts may increase the risk that some survive. I explore potential causes of such failures and suggest generic diagnoses and solutions for the different categories of refuges by using predator-prey theory as an analogue for human-pest management. Sometimes not all pests can be killed because of the presence of physical refuges in which the control cannot be applied. In this case, additional methods must be sought as just adding more ’predators’ will not change the relationship from a Type III functional response. Sometimes not all pests can be put at risk because of the behaviour of some pest individuals (e. g., neophobia) and again alternative methods must be applied. Sometimes the failure is due to the behaviour of the ’predator’ (e. g., hunters’ reluctance to work in unproductive or unpleasant areas) in which case more of the same (better training or more hunters) might work. Finally, I discuss detection and search theory that might be used to detect survivors (or immigrants) and the consequences of detection in a cost/benefit framework.

664. GAME VERTEBRATE DENSITIES AND LOCAL HUNTING PATTERNS WITHIN PRIMARY AND SECONDARY FORESTS IN THE BRAZILIAN AMAZON. PARRY, LUKE T. W.; Barlow, Jos; Peres, Carlos A. Centre for Ecology Evolution and Conservation, School of Environmental Sciences, University of East Anglia, Norwich, NR4 7TJ, United Kingdom, e-mail: l.parry@uea.ac.uk; CIFOR (Centre for International Forestry Research), Convênio Embrapa - CIFOR, Embrapa Amazônia Oriental, Trav. Enéas Pinheiro s/n, CEP: 66095-100, Belém, Pará, Brazil; Museu Paraense Emilío Goeldi, Av. Magalhães Barata 376, Caixa Postal 399, CEP: 66040-170 Belém, Pará, Brazil.

Secondary forests account for 40% of all tropical forests yet little is known regarding their suitability as wildlife habitat and their value as hunting grounds to forest communities. Line transect surveys and game harvest studies were used to assess game vertebrate densities and patterns of hunting in four areas of secondary forest and adjacent undisturbed primary forest. Mammalian and avian biomass in secondary forest was equal to that in primary forest though the two forest types had different community assemblages and were subjected to differing patterns of hunting. Some important prey species, such as brocket deer *Mazama* spp and agouti *Dasyprocta agouti*, were 2-3 times as abundant in secondary forest, and this habitat is favoured over primary forest for the hunting of these species. Conversely, densities of other game species such

as peccaries *Tayassu* spp was far lower in secondary forests and these were hunted only in primary forest. Although secondary forest has limitations in terms of faunal richness and composition, the high abundance of large vertebrates emphasises the important role this habitat can play for wildlife conservation and its importance in supplying communities with protein. Secondary forests may serve to reduce hunting pressure in adjacent primary forest.

665. ANADROMOUS SALMONIDS IN PATAGONIA: INVADERS OF TWO WORLDS. PASCUAL, MIGUEL A.; Ciancio, Javier E.; Riva Rossi, Carla M.; Becker, Leandro A. Centro Nacional Patagónico (CONICET), Blvd. Brown 3600, Puerto Madryn, Chubut, Argentina (MP, JC, CRR), pascual@cenpat.edu.ar; Universidad Nacional de la Patagonia SJB, Blvd. Brown 3700, Puerto Madryn, Chubut, Argentina (MP, LB).

Salmonids are among the most conspicuous exotic species in lakes and rivers of Patagonia. In recent years, a number of species and varieties have been discovered in major river basins of Southern Patagonia that perform migrations across the freshwater/ocean boundary during their life cycle, a behavior known as anadromy. The feeding migration to the highly productive waters of the southern oceans results in greater net benefits for individuals, increasing body growth and fecundity, promoting profound life history changes. From an ecological perspective anadromy projects impacts to marine communities and provides a mechanism for the importation of marine derived nutrients into freshwater ecosystems. By virtue of their dispersal ability, anadromous salmonids can also form the nucleus for the invasion of new river basins. We use information on three different species (rainbow and brown trout, and chinook salmon) that inhabit rivers of Argentina's Southern Patagonia to analyze the colonizing ability of different species and the aptitude of different river systems to be colonized by and sustain salmonid species. Our data clearly demonstrate that the colonization of patagonian rivers by anadromous salmonids is an ongoing process; based on our current knowledge we provide an overview of the ecological role of anadromous salmonids both in freshwater and ocean, identifying what we believe are major risks associated with their establishment. Finally, we discuss the prospects for future environmental impacts and identify critical information and analyses that future research should contemplate.

666. TSUNAMI IMPACT ON THE YALA NATIONAL PARK, SRI LANKA. PASTORINI, JENNIFER; Wikramanayake, Eric; Weerakoon, Devaka K.; Janaka, H.K.; Gunawardena, Manori D.; Jayasinghe, L.K.A.; Fernando, Prithiviraj. Centre for Conservation and Research, 35 Gunasekara Gardens, Nawala Road, Rajagiriya, Sri Lanka (JP, EDW, DKW, HKJ, MDG, LKAJ, PF), jenny@aim.unizh.ch. Conservation Science Program, World Wildlife Fund - United States, 1250 Twenty-Fourth St. NW, Washington D.C. 20037, USA (EDW). Department of Zoology, University of Colombo, Colombo, Sri Lanka (DKW). Wildlife Trust Alliance, Palisades NY 10964, USA (PF).

The tsunamis that impacted the shores of Sri Lanka and other Asian countries on the 26th of December 2004 represented a catastrophic environmental event. Such major flooding by salt water is a natural phenomenon that may shape eco-systems and occur with a periodicity of a few hundred years. We assessed the environmental impacts of the tsunamis on the Yala National Park in southeast Sri Lanka. The effected area was first identified using maps and ground surveys. As parts of the coastline were protected by coastal sand dunes sea incursion occurred only in some areas. A transect was conducted along the centre of each affected area, perpendicular to the sea-shore, and data collected every 100 meters. We assessed sand deposition, damage to grasses, herbs, bushes and trees. Trees were divided into 16 categories representing different sizes (trunk diameter) and degrees of damage. Effects on the eco-system could be divided into two main categories - physical effects from the force of the waves and physiological effects from flooding by salt water. Tree damage was co-related to size and distance from the beach, and provided an indirect measure of wave force.

667. UNDERSTANDING COMMUINITY HETEROGENEITY FOR AN ADAPTIVE CO-MANAGEMENT: CASE STUDY OF THE SUNABEDA WILDLIFE SANCTUARY, NUAPADA, ORISSA, INDIA. PATRA, JYOTIRAJ. School of Environmental Sciences, Jawaharlal Nehru University, New Delhi,110 067, India, (raj_1515@rediffmail.com).

Centrality of community and their participation in decision making has been the *sine qua non* for a conservation practice which is not only ecologically sound but also socially just. A considerable increase in cat (tiger and leopard) population in the Sunabeda Wildlife Sanctuary in Orissa has attracted unprecedented attentions and policy measures from a variety of conservation actors, state, environmental NGOs, researchers and media. Recent move by the state government to declare this ecosystem as a Tiger Reserve has spiralled up much concerns among the communities in and around this sanctuary, from displacement to shrinking livelihood opportunities. Adopting strategies of Political Ecology, I analyzed the diversity and heterogeneity of communities, discussing this sanctuary a s an evolving social-ecological system (SES). Heterogeneity within and between communities is along caste, gender, age, knowledge base and political affiliations. Participant observations and ethnographic studies have hinted towards the influence of this heterogeneity with regard to community participation in initiatives for conservation and management of resources. A high degree of complexity and dynamism of cross-scale interactions and levels of organizations centred around conservation is under operation. This study comes up with some of the much needed policy ingredients for institutional arrangements in order to open up space for an adaptive co-management.

668. POPULATION DYNAMICS OF LEPTOSPIROSIS IN FREE LIVING CAPYBARAS (*Hydrochaeris hydrochaeris*) IN PIRACICABA REGION, BRAZIL. PAULA, CATIA D.; Marvulo, Fernanda; Ferreira, Patrícia M.; Morais, Zenaide M.; Ferraz, Kátia M. P. B.; Verdade, Luciano M.; Amaku, Marcos; Ferreira, Fernando. Departamento de Medicina Veterinária Preventiva e Saúde Animal, Av.Prof.Dr.Orlando Marques de Paiva, 87 - Cidade Universitária São Paulo - SP - Brasil CEP: 05508-900 catiadp@hotmail.com.

As human populations grow and modify landscapes or invade new wild areas, diseases involving humans, domestic and wild animals occur. An example is leptospirosis which is a zoonotic disease caused by bacteria that affects men, domestic and wild animals. The capybara (*Hydrochaeris hydrochaeris*) is a leptospira reservoir in Brazil. This work proposes a mathematical model that simulates the disease in a wildlife population of capybaras living at the campus of the Escola Superior de Agricultura "Luis de Queiroz, Universidade de São Paulo. The model aims to control the disease reducing the role of capybaras as a source of infection for domestic animals and men. The prevalence of leptospirosis in the studied area was 56%. Due to the lack of knowledge about the way the agent infects the capybara, the model considered two

modes of infection: density dependent and frequency dependent. The density dependent model allowed estimating the susceptible maximum density threshold that prevents the agent dissemination in the population that was detected as 3.2 individuals per hectare. Due to the fact that with the frequency dependent model it was not possible to establish this threshold, the possibilities are the vaccination or selective culling of infected animals.

669. CHALLENGES TO ASSESSING THE ECOLOGICAL RISKS OF GENETICALLY ENGINEERED FISH THROUGH CONFINED TESTS. PAULSON, KELLY M.; Kapuscinski, Anne R. Conservation Biology Graduate Program, University of Minnesota - Twin Cities, 200 Hodson Hall, 1980 Folwell Avenue, Saint Paul, MN 55108, USA, kmp@umn.edu (KMP). Institute for Social, Economic, and Ecological Sustainability, University of Minnesota - Twin Cities, 186 McNeal Hall, 1985 Buford Avenue, Saint Paul, MN 55108, USA, kapus001@umn.edu (ARK).

The first marketed genetically engineered animal in the world is an aquarium fish, but other fish planned for large-scale aquaculture operations are currently under review. For example, transgenic Atlantic salmon and tilapia could soon be raised in insecure aquaculture facilities from which they will probably escape. If escapees interbred with wild conspecifics, what would be the consequences for the conservation of such populations? How might a conservation biologist interested in assessing the ecological risk of transgenic organisms do so in a contained setting? We are testing the reliability of one methodology for predicting transgene flow, the "net fitness" model. Our study is among the first to use real transgenic fish (growth-enhanced medaka, *Oryzias latipes*) in a semi-natural setting (mesocosms) to confirm the model's predictions of gene flow and its consequences. We will discuss the strengths and weaknesses of this approach. Regulatory decisions regarding releases of transgenic animals are looming globally, and decisions are currently being made with little or no empirical data on ecological effects. Conservation biologists can help make certain that risk assessments use appropriate ecological data and openly address sources of uncertainty to ensure that governance of genetically engineered animals draws on the best available conservation science.

670. JAGUAR (*Panthera onca*) POPULATION DECLINE IN THE UPPER PARANÁ ATLANTIC FOREST OF BRAZIL AND ARGENTINA. Paviolo, Agustín; De Angelo, Carlos; DI BITETTI, MARIO. CONICET; Programa NEA, Laboratorio de Investigaciones Ecológicas de las Yungas (LIEY), Universidad Nacional de Tucumán, Av. Córdoba 464, N3370COQ Puerto Iguazú, Misiones, Argentina, dibitetti@yahoo.com.ar.

Recent studies suggest that the only portion of the Atlantic Forests of South America that could maintain a viable population of jaguars in the long term (>100 individuals) is the Green Corridor of Misiones, Argentina, and nearby areas of Brazil. To assess the status of this jaguar population we are collecting evidence of its presence and using camera traps to estimate absolute densities. Using program CAPTURE we estimated a mean (± SE) adult population density of 0.66±0.35 inds/100 km^2 for Iguazú National Park (N=4 individuals, 1599 trap-nights, 39 sampling stations, area sampled=604.67 km^2). At another site (Urugua-í Provincial Park) we captured only one individual during 1428 trap-nights (34 stations, area sampled=246,8 km^2). Extrapolating these numbers to areas where jaguars are still present (94,000 km^2) we estimated a total population of less than 100 adult individuals for the Green Corridor. This jaguar population has suffered a dramatic decline in the last ten years: density estimates for this population in the early 1990s are 5-9 times higher. This decline is coincident with a reduction in the abundance of peccaries (their most important prey in the area) and with an increase in the abundance of pumas (*Puma concolor*).

671. DISTRIBUTION, HABITAT USE, AND REPRODUCTIVE BIOLOGY OF RAINBOW SKINKS (*Lampropholis delicata*) IN NEW ZEALAND. PEACE, JOANNE; Brunton, Dianne; Mitchell, Neil; Ussher, Graham. Institute of Natural Resources, Massey University (Albany Campus), Private Bag 102-904, North Shore Mail Centre, Auckland, New Zealand, joanne_peace@hotmail.com (JP, DB). School of Geography and Environmental Science, The University of Auckland, Private Bag 92019, Auckland, New Zealand (NM). Auckland Regional Council, Private Bag 92012, Auckland, New Zealand (GU).

Rainbow skinks (*Lampropholis delicata*) are the only introduced reptile that has successfully established outside of captivity in New Zealand. However little, if any, ecological research has been conducted on them in New Zealand, and there is no indication of impacts on native fauna. Bioclimatic modelling based on records of current distribution and climate suggests great potential for continued spread of this species inland and south of their currently known range. Rainbow skink dispersion is facilitated by human activity, and care is advised when transporting materials to areas of high conservation interest. Observations of selected populations in the North Island, New Zealand showed a wide range of habitat use with diverse and highly opportunistic general microhabitat use. Sympatric populations of rainbow skinks and native copper skinks (*Cyclodina aenea*) were revealed. Dissection of rainbow skinks from Auckland, New Zealand showed higher mean annual reproductive output than copper skinks (4.75 eggs versus two offspring respectively), and a higher reproductive output from rainbow skinks would be expected where the two species co-occur. This project has begun to clarify the ecology of rainbow skinks in New Zealand and has raised many questions especially considering the potential for competition between rainbow and native skinks.

672. TEACHING CONSERVATION BIOLOGY IN THE 21ST CENTURY. PEARL, MARY. Wildlife Trust, 460 West 34th Street, New York, NY USA pearl@wildlifetrust.org.

The process of graduate education and professional training has remained static for decades in universities around the world. For a complex, applied, and rapidly evolving field such as conservation biology, this status quo is particularly inappropriate. The organization of knowledge into disciplinary divisions, the separation of technology and ethics, the Cartesian approach to problem solving - all actually contribute to the environmental crisis. It is unlikely that more of the same approach to graduate education will produce the major, worldwide changes needed to solve complex, multi-source problems in conservation and environmental sustainability. Fortunately, many imaginative approaches to graduate and mid-career training can be found at universities and research institutions around the world. We have the opportunity and obligation now to create a variety of approaches to teaching, based on transdisciplinary, systems-oriented, and practical case studies. The ease of instantaneous global communication and data sharing, as well as rapid travel, makes practicable for the first time to build cooperative graduate programs linking students and faculty at outstanding institutions throughout regions of high biodiversity. Each

institution does not have to build expertise in a full set of disciplines, but can create a joint program of unparalleled depth and diversity for their students.

673. POSSIBLE IMPACT OF SALMON FARMING ON THE HEALTH OF WILD SALMON POPULATIONS. PEET, COREY R.; Mazumder, Asit; Volpe, John P. University of Victoria, Dept. of Biology, P.O. Box 3020, Station CSC, Victoria, B.C. Canada V8W 3N5, (crpeet@uvic.ca), (CRP, AM), University of Victoria, School of Environmental Studies, PO Box 1700 Stn CSC, Victoria, BC, Canada, V8W 2Y2 (JPV).

Amplification and transfer of parasites and pathogens to wild fish populations is a serious issue associated with open-net fish farming. The salmon louse (*Lepeoptheirus salmonis*) is a common ecto-parasite of salmonids with a history of causing significant losses of farm salmon. Over the last several years, salmon lice outbreaks on wild juvenile pink (*Oncorhynchus gorbuscha*) and chum (*O. keta*) salmon have been documented in a near shore marine area of British Columbia, Canada where salmon farming activities are concentrated. As outbreaks of salmon lice on wild salmon are considered rare, concern exists as to what effect the increased lice densities may have on the health of juvenile salmon populations. Currently, no data exist to quantify the potential impact of high lice densities on juvenile salmon health or survivourship. We artificially infected captive populations of juvenile salmon with varying intensities of infective lice larvae. Results show both pink and chum salmon are significantly adversely affected when small with susceptibility diminishing with size for pink salmon only. Further, field surveys suggest lice densities on wild juvenile salmon are higher where salmon farming is present. Given the results of this study and the risk factors in BC, we suggest that salmon aquaculture poses a significant threat to the health of juvenile pink and chum salmon populations.

674. FIRE HISTORY OF ENDANGERED GARRY OAK ECOSYSTEMS IN SOUTHWESTERN BRITISH COLUMBIA, CANADA. PELLATT, MARLOW; Gedalof, Ze'ev; McCoy, Marian; Mathewes, Rolf. Dr. Marlow G. Pellatt, Coastal Ecologist Parks Canada, Western Canada Service Centre 300-300 West Georgia Street Vancouver, British Columbia V6B 6B4 Canada, and School of Resource and Environmental Management Simon Fraser University Burnaby, British Columbia V5A 1S6 Canada marlow.pellatt@pc.gc.ca.

Garry oak (*Quercus garryana*) ecosystems are one of the most endangered ecosystems in Canada with only 5 percent of the ecosystem remaining intact. Garry oak ecosystems are home to at least 91 "at risk" species that occur in an area where natural processes have been severely altered. Land use pressure and global climate change will impact on Garry oak ecosystems. Already many natural processes (e. g., fire) have been altered and landscape connectivity is an issue. Parks Canada has established a national park reserve in the Gulf Islands of southern BC and Garry oak ecosystems exist within the park. In order to manage the park the understanding of fire history is essential. We are undertaking a multi-year study examining the paleoecology, dendroecology, ecological and climate modeling of Garry oak ecosystems. The first phase of this study uses pollen, charcoal, and dendroecological analyses to examine ecosystem responses to European colinization, subsequent changes in land use and fire suppression. We examine the characteristic changes in community structure and examine implications to the long-term conservation of these "at-risk" ecosystems. Challenges in protected area management in areas of high human population growth and visitor use will be discussed.

675. LEARNING WITH THE SURVIVORS OF THE BRAZILIAN ATLANTIC FOREST: HOW MUCH AND WHY A SAPROPHAGOUS INSECT SPECIES IS AFFECTED BY FOREST FRAGMENTATION? PELLENS, ROSELI; Grandcolas, Philippe. Universidade Federal do Rio de Janeiro, CCS, Bl. A, Ilha do Fundão, CEP 21941-590, Rio de Janeiro, Brazil. Post-Doctor, CNPq (RP). UMR 5202 CNRS, Département Systématique et Evolution, Muséum national d'Histoire naturelle, 45, rue Buffon, 75005 Paris, France, pellens@mnhn.fr. Tel: 33 1 40 79 38 48; Fax: 33 1 40 79 56 79 (RP, PG).

The cockroach *Monastria biguttata* was studied in remnants of the Brazilian Atlantic forest to understand how saprophagous insects are affected by forest fragmentation. Its distribution was studied in 24 sites, and a detailed populational study was developed during one and half year in four sites. The resource availability and the fluctuating asymmetry of the fore and mid femora were also studied. *M. biguttata* was very ubiquitous in reserves and in fragments, but absent in the matrix. Colony size, sex ratio and age structure were similar among sites, without interaction between seasonality and fragmentation. Fluctuating asymmetry did not indicate developmental instability of either characters. But the density of individuals on the trunks was much higher in the fragments, where the density of clumps of trunks as well as the density of colonies per area was also very high. Total population size in the fragments was estimated to be of at least a few hundred. This species is not negatively affected by forest fragmentation, and the abundance of its resource seems to be the main contributing factor.

676. PRIORITIZING LAND ACQUISITION PROJECTS USING A BIODIVERSITY PORTFOLIO. PENCE, GENEVIEVE Q. K.; Gordon, Doria R.; Freeman, Kathy; Shaw, Douglas. The Nature Conservancy, 222 S. Westmonte Drive, Suite 300, Altamonte Springs, FL 32714-4269, USA; gpence@tnc.org (GQKP, KF). The Nature Conservancy, University of Florida, Department of Botany, P.O. Box 118526, Gainesville, FL 32611-8526 (DRG). The Nature Conservancy, University of Florida, H.T. Odum Center for Wetlands, P.O. Box 116450, Gainesville, FL 32611-6450 (DS).

Conservation planning to focus resources where they will be most effective is playing an increasing role in directing both global and local conservation actions. Ecologically-based plans direct us to areas of highest conservation value. Yet a key conservation strategy - land acquisition - is opportunistic and unpredictable by nature. Moreover, individual properties can include areas of vastly varying conservation value. To better reconcile opportunities with plans and determine which acquisitions will best meet conservation objectives, we have developed a set of criteria to evaluate how much individual areas in Florida contribute to meeting defined ecoregional conservation goals. We used GIS data to assess the degree to which each parcel corresponds with our established ecoregional portfolio boundaries, as well as how much it contributes to species and natural community conservation goals, and enhances the greater protected area network. These measures have allowed us to determine the relative significance of potential acquisitions, evaluate past transactions, and gain assurance that land protection projects will contribute to biodiversity goals. This type of assessment of potential projects will increase consistency in addressing ecoregional conservation goals even when the portfolio shifts because of changes in land use and availability.

677. SUSTAINABLE HARVEST OF TWO LARGE PREDATORY CATFISH IN THE CUIABÁ RIVER BASIN, NORTHERN PANTANAL, BRAZIL. PENHA, JERRY M. F.; Mateus, Lúcia A. F. Laboratório de Ecologia e Manejo de Recursos Pesqueiros, Instituto de Biociências, Universidade Federal de Mato Grosso, Cuiabá, MT, 78060-900, Brazil.

Fishery may reduce adult mean size, size at first maturity, and mean individual growth rate of exploited populations. These changes affect the structure and dynamics of target populations and can lead to the growth or recruitment overfishing. This study assesses the structure, exploitation and stock management of *Hemisorubim platyrhynchos* and *Sorubim* cf. *lima*, the sixth and seventh largest Pimelodidae catfish of the Pantanal. The analysis is based on fish caught by commercial fishing in the Cuiabá river and landed at the "Antônio Moysés Nadaf" Market in the Cuiabá city, Mato Grosso state, Brazil. The findings indicate that commercial fishing activities target several fish cohorts and that usually only individuals above mean length at first maturation are caught. Estimates of the instantaneous mortality coefficient show that the current fishing mortality is low. Simulations of relative yield-per-recruit model demonstrate that the current yield of two species could be greater if fishery effort were increased, indicating that the stocks are underexploited. However, an increase in current fishery effort should be viewed with caution, since the stock-recruitment relationship for the species is unknown. The results indicate that the current harvest of two species in the Cuiabá River Basin is sustainable.

678. THE INFLUENCE OF LANDSCAPE ATTRIBUTES ON AVIAN COMMUNITIES OF AGROECOSYSTEMS IN SOUTHEASTERN BRAZIL. PENTEADO, MARLI; Verdade, Luciano M. Laboratório de Ecologia Animal, Departamento de Zootecnia, Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, SP, 13418-900, Brazil (mpentead@esalq.usp.br). Gerência Executiva, IBAMA, São Paulo, 01417-020, Brazil, marli.penteado@ibama.gov.br.

Agriculture is one of the human activities that most affect landscape ecology and consequently biodiversity distribution and abundance. In this study we investigate the landscape attributes and spatial patterns in a agro-ecosystem located in Passa-Cinco river basin, as subsidiary information to understand the abundance and distribution of avian species. The basin selected for the study can be considered a conveniente model since many anthropogenic processes could be replicated at spatial-temporal scales. We surveyed birds from August 2002 to January 2005 by point-counts in 16 sites of the four most important landscape attributes of the basin (native forest, *Eucalyptus* plantations, sugar cane plantation and exotic pastures) taking 4 largest patches of each, considering spatial distribution and logistics. Two hundred two avian species were registered in 44 samples. There was significant more species using native forest, with low relative abundance of a greater number of species. Sugar-cane habitats, while atracting diverse bird species in different phases of the grouth cycle, presents fewer number of species. It was also revealed a separation between forested and opened habitats, considering species richness. *Eucalyptus* had the smallest abundance, while exotic pastures had the highest. Finaly, we could sugest important changes in regional landscape, mitiganting the impact of agricuture, paper industry and livestock production and providing conection between the native forested and cerrado fragments.

679. THE DISTRIBUTION OF BUTTERFLY FAUNA IN URBAN LANDSCAPE; PRELIMINARY STUDIES FROM KRAKOW, POLAND. PEPKOWSKA, ALEKSANDRA; Kudla, Wojciech; Kudlek, Joanna. Institute of Environmental Sciences, Jagiellonian University; Kraków, ul. Gronostajowa 7, 30-387 Krakow, Poland, etamin@wp.pl (AP, JK), Institute of Zoology, Jagiellonian University, Kraków, Poland (WK).

Kraków is the second biggest city in Poland (324 km^2, 700,000 inhabitants) that is still rich in biodiversity, however, its protection is difficult because of the lack of information on species distribution and richness in its landscape. To study this 36 one-square km sites (more than 10% of whole city) within city boundary were investigated with regard to butterfly fauna richness. More than 60 butterfly species were recorded. Some of them are quite common (*Gonepteryx rhamni*) whereas some restricted to a few sites. Occurrence of rare species is not obvious, some of them are limited to food plant patches (*Lycaena helle, Maculinea alcon, Maculinea nausithous, Maculinea teleius*) but in some cases the pattern of distribution is unexplained (*Nymphalis antiopa*). With regard to conservation planning in urban area it is essential to know which parts of a city are the most rich in species number. Butterflies seem to constitute a good biodiversity index therefore the next step of the research will be to find factors determining species numbers and distribution to enable modeling of them in the whole urban landscape (using Generalized Additive Model and GIS tools).

680. CONSERVATION OF FISHERIES IN THE AMAZON BASIN - DISCUSSION AND CONCLUDING REMARKS. PEREIRA, HENRIQUE S. Instituto Brasileiro de Meio Ambiente e Recursos Naturais Renováveis, R. Min. João Gonçalves de Souza s/n - Km 01 BR 319-DI - 69.075-830, Manaus, Amazonas, Brazil, henrique.pereira@ibama.gov.br.

Fishery is a vital socioeconomic activity all over the Amazon basin and the need for sustainable conservation strategies are increasingly gaining significance as deforestation, commercial exploitation and demographic pressure are putting fish stocks at risk. Fish conservation effectiveness will improve if new scientific knowledge is brought into the methodological approaches for each guild and management unit or dimension. By focusing on ecological and genetic available data for the main target species and confronting conventional policies with innovative management ongoing experiences, this symposium offers opportunities to built epistemological links between sociopolitical and biological aspects of Amazonian fisheries conservation. Metapopulation models used to explain genetic data patterns also suggest the suitability of combining local (micro) and regional (basin) management a pproaches. At local level, sub-population of sedentary species are being protected at managed fishery grounds (floodplain lakes) where capture is forbidden during reproduction season and fishing quotas and other restrictions are strictly observed by local actors and monitored by governmental agencies. Seasonal migratory species also benefits from such strategies as their growth areas at the floodplain are preserved. Large migratory channel catfishes, identified and highlighted as single populations begin to be adequately managed as fishery restrictions and rules are unified at regional level.

681. VERTEBRATE COMMUNITY STRUCTURE IN AMAZONIAN SEASONALLY FLOODED AND UNFLOODED FORESTS. PERES, CARLOS A. Centre for Ecology, Evolution

& Conservation, University of East Anglia, Norwich, NR4 7TJ, UK, C.Peres@uea.ac.uk.

Amazonian floodplain forests are one of the most seasonally variable habitats anywhere in the tropics. I present data from a standardized series of line-transect censuses of forest vertebrate assemblages of western Brazilian Amazonia occurring at ten flooded ("várzea") and fourteen unflooded ("terra firme") sampling sites. Terra firme forests invariably contained richer bird and mammal species assemblages than did adjacent várzea forests, but faunal interchanges between forest types is a typical feature of the terra firme-várzea interface. There was a clear habitat-dependent positive association among vertebrate species, particularly within várzea forests, as well as marked shifts in guild structure between forest types. Species turnover between these two forest types involved primarily ground-dwelling and understory insectivores, which were usually absent from inundated forest on a seasonal basis. On the other hand, large-bodied arboreal folivores such as howler monkeys and sloths were rare in terra firme forests, but extremely abundant in annually flooded várzea and supra-annually flooded floodplain forests. This can be largely explained by the predictable flood pulse and nutrient-rich alluvial soils of young floodplains, compared to the heavily weathered terra firme soils occurring even within short distances of major white-water tributaries of the Amazon. This study clearly shows a reverse diversity-density pattern resulting from the lower species richness, but high overall community biomass of seasonally flooded Amazonian forests, which can now be generalized to other terrestrial vertebrate taxa.

682. EXPLORING ECONOMIC VALUES OF INVASIVE SPECIES IN ISLANDS AS A TOOL FOR ERADICATION AND POPULATION CONTROL. PÉRES JR., AYRTON KLIER. Secretaria Municipal de Gestão Ambiental e Assuntos Indígenas, Rua Coronel Pinto, 465, Centro 69301-150, Boa Vista, RR, Brazil, ayrtonperes@boavista.rr.gov.br.

Invasive species of reptiles are common throughout the world, although eradication efforts are rare, especially because most species apparently do not cause significant impacts. On the other hand, large omnivorous reptiles introduced in islands, may cause significant impacts, such as the snake *Boiga irregularis*, introduced in Guam Island, on the Mariana Archipelago. Another example of a large reptile that causes impacts to islands native and endemic species is the large South American teiid lizard *Tupinambis merianae* (tegu lizard). The tegu lizard was introduced by the militaries in the Fernando de Noronha Archipelago, northeast Brazil, in the early 60's. The main goal of this introduction was to control rats' and toads' populations. Today, the lizard is considered a problem for the island ecosystem, since it feeds mainly on native birds and endemic species. Therefore, an eradication program is needed. Due to its skin and meat market, tegu lizard has a great economic value. Therefore, we focus on a management program that includes a drastic population control, using the captured animals in a large scale captive program throughout South America. Searching for economic values of invasive species can be an excellent tool for the eradication of these species.

683. EVALUATION OF AN ASSUMPTION OF THE M-RATIO BOTTLENECK TEST. PETERS, LARRY; Clay, Matt; Swanson, Bradley J. Central Michigan University, Mt. Pleasant, 48858, MI, USA, Peter1lr@cmich.edu.

The M-ratio, a method for detecting bottlenecks, is being regularly used, having been cited 51 times since 2001. This test assumes that the range of alleles (r) in a bottlenecked population decreases more slowly than the number of alleles (k). When the largest or smallest allele at a locus has a low frequency they are more likely to be eliminated by genetic drift and thus r and k will decrease at a similar rate, obscuring the evidence of a bottleneck based on the M-ratio. Examining the frequencies of the alleles at the outer limit of the size range may indicate whether r will decrease more slowly than k. We examined 300 published allele frequency distributions from 16 non-bottlenecked species and found that in 49% of the cases either the largest or smallest allele had a frequency <0.05, and in 10% of the cases both the largest and smallest alleles had frequencies <0.05. This suggests that the assumption upon which the M-ratio is built, that the largest or smallest alleles are not rare is likely incorrect and questions the ability of the M-ratio to detect bottlenecks.

684. DEMOGRAPHIC AND GENETIC EVALUATION OF AN AMERICAN MARTEN REINTRODUCTION. Peters, Larry; Kyle, Christopher J.; SWANSON, BRADLEY J. Department of Biology, Central Michigan University, Mt. Pleasant, MI 48858 USA, brad.swanson@cmich.edu (LP, BJS) Natural Resources DNA Profiling and Forensics Centre/Ontario Ministry of Natural Resources Trent University, 1600 West Bank Drive, Peterborough, Ontario, Canada, K9J 8N8.

Reintroduced populations are often of smaller size and more isolated than native populations and, even if they are demographically stable, a lack of genetic variation often presents a threat to its long-term persistence. We examined the genetic variation and demographic stability of marten (*Martes americana*) reintroduced into Michigan. We found that the Michigan martens had higher allelic diversity compared to the average variation from populations across much of their current North American distribution and similar levels of heterozygosity. We found no significant difference in allelic diversity or heterozygosity between the reintroduced Michigan population and the current levels of genetic variation in the source population, Chapleau, Ontario. There was no evidence of a bottleneck using Bottleneck or the m-ratio although the majority of the loci in Michigan showed significant FIS values. Harvest ratios of adults: juveniles and males: females indicate that the population is demographically stable. We suggest that the genetic success of this reintroduction is a result of the multiple reintroductions and subsequent translocations performed which mimicked dispersal. The success of this reintroduction indicates that it can be used as a model for the re-introduction of other species by avoiding issues that surround genetically depauperate populations.

685. FRESHWATER TURTLE GATHERING IN JAÚ NATIONAL PARK, AMAZONAS, BRAZIL. PEZZUTI, J. C. B.; Félix-Silva, D.; Lima, J. P.; Begossi, A. Universidade Federal do Pará-UFPA, Núcleo de Altos Estudos Amazônicos-NAEA Campus Universitário do Guamá, Rua Augusto Corrêa 01, CEP 66075-110 Belém, PA, Brazil.

The relationship between human populations of the Rio Negro River basin and the vertebrate fauna was studied, with emphasis on freshwater turtles. The areas studied between 1997 and 2002 were the Jaú, Carabinani and Unini Rivers, that together represent the main drainage basin of the Jaú National Park (PNJ). Study methods included the application of hunting calendars, the collections of the skulls of hunted animals, interviews and direct observation of hunting and fishing, as well as personal experimentation with local fishing and hunting techniques. Freshwater turtle fishing strategies are highly diversified and subject to spatial

and temporal variations in use, production and selectivity. The most common turtle hunting technique, a baiting and harpooning combination called "baliza", was employed in 37,5% of the hunts. This was highly productive (17,9 kg of game per hunter per day) and selective for the bir-headed Amazonian turtle (*Peltocephalus dumerilianus*), the most consumed turtle species. Some techniques are seasonal and related to the annual flooding cycle of the river. Among these, the capture of nesting "tracajá" females (*Podocnemis unifilis*), either manually or in traps, and the capture of this species in dry season aggregations are considered to represent the most serious impacts.

686. WATER RESOURCE PROTECTION IN SOUTH AFRICA: GIVING EFFECT TO RESOURCE DIRECTED MEASURES. PIENNAR, HARRISON H. Department Water Affairs and Forestry, South Africa.

The Rio Declaration on Environment and Development, Agenda 21 and the Statement of principles for the Sustainable Management of forests were adopted by more than 178 governments at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. Protection of the quality and supply of freshwater resources, and the application of integrated approaches to the development, management and development, are specifically dealt with in chapter 18 of Agenda 21. Being a global initiative, South Africa's own approach towards protection of our freshwater resources, is therefore guided by Agenda 21. Management of freshwater resources needs to allow for sustainable utilization, whilst providing for their protection. Protection principles are contained in Chapter 3 of the country's National Water Act (Act 36 of 1998). The Reserve, the Classification System and Resource Quality Objectives (RQO'S) are protection-based measures that together form the Resource Directed Measures (RDM). These measures are in various stages of development and implementation. The Department Water Affairs and Forestry is confronted by many constraints and challenges: the infinite nature of water resources; linking policy with research and development; applying scientific Reserve methods to rivers with highly variable characteristics, as well as various operational constraints. The abovementioned water legislation also requires that all significant water resources in South Africa be classified to determine the quantity and quality of water reserved for ecosystem functioning, and to ensure that they are maintained in a minimum state of health related to an acceptable level of functioning. This paper presents an outline of RDM, with an emphasis on the need for and development of a national water resource classification system (NWRCS). Further, it highlights a proposed framework approach for the development of a NWRCS underpinned by principles used for developing such a system.

687. NET INTERACTIONS OF A BEE-FLOWER SYSTEM AND ITS RELATION WITH LOCAL ORGANIZATION OF APOIDEA COMMUNITY (HYMENOPTERA) IN "CAATINGA" VEGETATION, CANUDOS. PIGOZZO, CAMILA M.; Viana, Blandina F. Programa de Pós-Graduação em Ecologia e Biomonitoramento, Instituto de Biologia, Universidade Federal da Bahia, Salvador, BA, 40.170-110, Brazil, camilamp@ufba.br.

Looking forward to understand the bee-flower system in "Caatinga"environments, an analysis was done admitting that the pollination network works as a trophic network. Data were obtained on flowers at the "Estação Biológica de Canudos, Bahia (9°56'34"S and 38°59'17" W). For analysis, the software Nestedness Calculator was used. The matrix was composed by 70 bee species and 40 plant species; in 2,800 possible interactions, 296 (10.6%) were observed. The plants received average 7 visitors species (1 to 30) and the bees visited average 4 plant species (1 to 35). A nested system (T=5.92°) was obtained. According to Monte Carlo simulations (1,000 randomizations) the matrix was considered significantly not aleatory ($p<0.001$). This system reveals that specialist plants attract subsets of bee species assemblages visiting more generalized plant species, and the most specialized bees use a subset of the plants used by generalist bees. The bee species concentration on some plant species suggests that those are not similarly attractive, and the food choice of bees seem to be based on some another characteristic not only floral availability. A nested network is highly robust, generalist species interact themselves, making an interaction web that affects all the community, generating available niches to rare species. (This project was supported by CNPq and FAPESB)

688. DIVERSITY AND MOVEMENT OF REEF-ASSOCIATED ELASMOBRANCHS AT A CARIBBEAN OCEANIC ATOLL (GLOVER'S REEF, BELIZE): IMPLICATIONS FOR MARINE RESERVE DESIGN. Pikitch, Ellen K.; Chapman, Demian D.; Babcock, Elizabeth; Shivji, Mahmood S.; DOUKAKIS, PHAEDRA. Pew Institute for Ocean Science, Rosenstiel School of Marine and Atmospheric Science, University of Miami, 126 E 56th St., New York, NY 10022 USA (EKP, PD) (pdoukakis@rsmas.miami.edu). Wildlife Conservation Society, 2300 Southern Blvd, Bronx, NY 10460 USA (EKP, DDC, EB). Guy Harvey Research Institute, Oceanographic Center, Nova Southeastern University, 8000 North Ocean Drive, Dania Beach, FL 33004 USA (DDC, MSS). Pew Institute for Ocean Science, Rosenstiel School of Marine and Atmospheric Science, University of Miami, 4600 Rickenbacker Cswy. Miami, FL 33149 USA (EB).

Little is known about the sharks and rays of the Mesoamerican Caribbean. Studies of the elasmobranch fauna of Glover's Reef Marine Reserve (GRMR), Belize, demonstrate its importance for a diversity of elasmobranchs and provide essential information for marine protected area design. A five year survey documents GRMR as a nursery area for four species of elasmobranchs and the use of the atoll by eight other species (6 sharks, 2 batoids), including the Galapagos shark, *C. galapagensis*, previously known in the Caribbean from only one specimen. Differences exist in elasmobranch abundance, species composition and intraspecific size distribution among shallow lagoon, deep lagoon, ocean reef, and inshore habitats. Telemetry studies of two common sharks illustrate movement within and outside of the atoll and across the boundaries of the no-take zone of the marine reserve. GRMR is an important breeding ground for several species of elasmobranchs and in need of further study and conservation. For effective conservation of elasmobranchs, an ecosystem based approach should be taken in designing marine protected areas. Zoned management plans are needed that incorporate a fairly large no-take reserve that protects diverse habitats and the connections between them, surrounded by a larger area where fishing is regulated.

689. HOW SIGNIFICANT IS THE BIODIVERSITY VALUE OF INVESTMENTS BY THE GLOBAL CONSERVATION FUND? PILGRIM, JOHN D.; Ashkenazi, Erica; Rodrigues, Ana S. L. Center for Applied Biodiversity Science, Conservation International, 1919 M Street NW, Suite 600, Washington, DC 20036, USA, j.pilgrim@conservation.org.

The Global Conservation Fund (GCF), established in 2001, is the first major non-governmental fund designed to quickly mobilize resources to finance the creation, expansion and long-term management of protected areas. The GCF has funded over 30 organisations and 70 projects to date, contributing to the protection of over 22 million hectares - the vast majority in tropical moist forest wilderness, particularly in the Neotropics. The GCF focus on investment in biodiversity hotspots, high-biodiversity wilderness areas and important marine regions ensures that scarce conservation dollars are directed to the most vulnerable and irreplaceable regions globally. However, these regions are still extremely broad, and so here we assess the site-scale value of GCF investments. As one test of this, we evaluate how well the GCF has performed in contributing to the conservation of globally threatened species. In these terms, we find that GCF investment value is considerably better than expected. Biodiversity criteria must always be used alongside cost, feasibility and sustainability criteria when assessing potential GCF projects, but they must be the criteria against which success is ultimately measured.

690. THE CHANGING NATURE OF RIBEIRINHO LAND USE IN THE DYNAMIC ENVIRONMENTS OF THE VARZEA. PINEDO-VASQUEZ, MIGUEL; Padoch, Christine; Sears, R. Robin. Center for Environmental Research and Conservation (CERC), Columbia University 1200 Amsterdam Ave, New York, NY, 10027, USA, map57@columbia.edu (MPV) and rrs26@columbia.edu (RRS) Institute of Economic Botany, The New York Botanical Garden, 200th St. and Kazimiroff Blvd, Bronx, NY, 10458, USA, cpadoch@nybg.org (CP).

Changes in land use on the várzea in the Amazon have multiple and complex drivers. Among these are demographic shifts, changing market for agricultural and forest products and alterations in land use, natural resource, and economic policies. The characteristics of each driver are different in each region, as are the impacts on land use decisions and on biodiversity. In this paper we contrast the nature and effects of demographic, economic, and policy changes in Brazil and Peru. We place recent changes in a historical context highlighting the history of riverine populations' adaptation to almost constant exogenous change, a notion we describe as a "tradition of change. Focusing on the impacts of the aforementioned drivers on the ecological services and products of the várzea, we examine the temporal aspects of adaptation, and the problems of resource degradation that result from "time lags" in adaptation. We combine biodiversity, agrodiversity, and household income data to examine the integrated and evolving nature and hybrid quality of ribeirinho production systems. We contrast the situation in several Peruvian and Brazilian sites where we have studied the responses to similar but subtly different drivers, and the changes observed in várzea environments.

691. COMMUNAL OWNERSHIP AS A TOOL IN RESOURCE MANAGEMENT AND CONSERVATION: A COMMUNITY-BASED ZONING SYSTEM IN THE CENTRAL AMAZON TOWN OF SILVES. PINHO, PATRICIA; Chernela, Janet. Depart of Anthropology Graduate Group in Ecology, University of California, AT Davis, 1 Shields Ave, CA, 95616, USA, pfpinho@ucdavis.edu. (PP); Department of Anthropology, Latin American Studies Center, Uuiversity of Maryland, 1111 Woods Hall, College Park, MD 20742, USA, chernela@umd.edu (JC).

Neotropical rainforests are being devastated at increasingly rapid rates. In the Brazilian Amazon, commercial development by export agriculture (including large-scale soybean cultivation), commercial fishing, ranching, and illegal logging, not only harm undisturbed forested landscapes, but also threaten the livelihoods of the local communities that inhabitant them. In the central Amazon, the fishing villages that constitute the municipality of Silves recently initiated an innovative zoning program to advance the conservation and management of collectively-owned and monitored aquatic and terrestrial resources. Data gathered through a methodology of rapid biodiversity assessment (RBA), show greater diversity and abundance of aquatic resources in communally-owned and protected areas than in those outside collective village surveillance. This paper, based upon those data, gathered in the lakes and surrounding floodplains and forests of Silves, suggests that communally-owned and managed areas are at least as efficient mechanisms for conservation and management of tropical forest ecosystems than are other types of land ownership and management. This precedent-setting case strongly supports the position, held by the authors, that culture and conservation are interlinked and can, when called upon, lead to creative and successful natural resources management.

692. HARNESSING SOCIAL CAPITAL FOR CO-MANAGEMENT: EXPERIENCES FROM ARRAIAL DO CABO, BRAZIL. PINTO DA SILVA, PATRICIA. NOAA Fisheries 166 Water Street Woods Hole, MA, USA, 02543.

Brazilian coastal communities are being faced with increasing pressures on the living marine resources that they depend on. Policies related to property rights of the marine environment, specifically the creation of direct use collaboratively managed marine protected areas, may provide the mechanism for supporting and sustaining traditional coastal livehoods. Maritime Extractive Reserves, a relatively new type of government-community collaborative management regime, are being established in coastal areas of Brazil in order to protect natural resources while sustaining local livehoods. These reserves may enable fishing dependent communities to maintain or even strengthen the traditional institutions that have governed these resources over time. This paper explores the opportunities and challenges of harnessing and sustaining social capital in order to achieve these objectives.

693. HOME RANGE AND SURVIVAL OF MARSH DEER *Blastocerus dichotomus* (MAMMALIA: CERVIDAE): THE ARTIFICIAL FLOODING FOR HYDROELECTRIC POWER PRODUCTION. PIOVEZAN, UBIRATAN; Andriolo, Artur; Torres, Hermógenes A.; Lemes, Marcos R. S.; Ramos, Hernani G. C; Costa, Mateus J.R.P.; Duarte, José M. B. Embrapa Pantanal, Caixa Postal 109, Corumbá, MS, 79320900, Brazil, piovezan@cpap.embrapa.br.

Marsh deer and flooding habitat relation is well known. Movement and survival of 38 females and 20 males of marsh deer were monitored since August 2000 to November 2002, at the basin of the river Paraná, Brazil. The animals were radio tracked upstream the Sérgio Motta hydroelectric power plant. Our hypothesis was the home range (HR) and surviving probabilities vary according the reduction of suitable habitat. We studied the Minimum Convex Polygon estimator of HR using a General Linear Model procedure. The model: "$\sqrt{HR}$ = const. + sex + season + margin side" was the better to explain HR variation (R^2 = 0.302). The males showed areas of 574.2 ± 613.1 ha which differ from the female areas 203.4 ± 211.8 ha ($P < 0.001$). The home range was larger during the wet season ($P = 0.003$) and also in the right margin of the Paraná river ($P < 0.042$). The Kaplan-Meier surviving plot seemed to be pourer

close to the dam (P = 0.065), the margin side weren't significantly different for survival (P = 0.70). We conclude home range and survival of marsh deer were affected by the suitable habitats availability in the areas flooded by the hydroelectric reservoir.

694. FRAGMENT SIZE AFFECTS SEED DISPERSAL AND SEEDLING RECRUITMENT OF THE PALM *Astrocaryum aculeatissimum* IN THE BRAZILIAN ATLANTIC FOREST. PIRES, ALEXANDRA S.; Galetti, Mauro. Departamento de Ecologia, Instituto de Biociências, Universidade Estadual Paulista, Rio Claro, SP, 13507-700, Brazil, aspires@biologia.ufrj.br (ASP, MG). Laboratório de Ecologia e Conservação de Populações, Departamento de Ecologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, 21941-590, Brazil (ASP).

Palms, an important food resource in tropical forests, are currently threatened by habitat loss, logging and defaunation. Seed fate was compared between two large (2400 and 3500ha) and three small (< 60ha) forest fragments. Endocarps within a 2m radius around stems were categorized as intact, predated by beetles or by rodents. In each fragment 20 experimental stations, with five threaded fruits each, were placed at 50m spacing. Experiments were checked 30 days latter and seeds categorized as intact, moved, buried or predated by rodents. In each area densities of seedlings, juveniles and adults were estimated in 0.5ha. The numbers of endocarps remaining below parent trees were significantly greater at small fragments, which had less seeds predated by rodents. In all fragments seeds not removed were heavily predated by beetles. The number of stations showing removal was significantly greater in larger fragments. Fate of removed seeds differed significantly among fragments; more buried seeds were found in the larger ones. Camera-traps showed the agouti *Dasyprocta leporina* as the principal consumer of *A. aculeatissimum* seeds. Seedling density was correlated with fragment size but independent of adult density, suggesting that habitat loss affects recruitment patterns of *A. aculeatissimum* through reduced quality of dispersal and increased predation.

695. SEED RAIN IN ATLANTIC FOREST FRAGMENTS AT DIFFERENT LEVELS OF HABITAT ISOLATION. PIVELLO, VÂNIA R.; Petenon, Daniela; Meirelles, Sérgio T.; Jesus, Flávia M.; Vidal, Mariana M.; Alonso, Regina; Franco, Geraldo C. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, 05598-900, Brazil, vrpivel@ib.usp.br (VRP, DP, STM, FMJ, MMV, RASA). Instituto Florestal de São Paulo, São Paulo, SP, 04301-900, Brazil (GCF).

Habitat fragmentation may affect seed dispersal according to landscape pattern and community dispersal strategies. We compared the seed rain of three Atlantic forest fragments (SP, Brazil) to evaluate the influence of habitat connectivity and edge effect in the seed composition. Seed traps were placed at the border and centre of one large (175 ha) and 2 small fragments (around 5 ha), being one isolated in an agricultural matrix and the other connected to the large one by a corridor. Seeds were identified and classified according to species habit, functional group and main dispersal agent. The independence of these seed attributes were tested against their position in the fragment (centre/border), and the abundance of each seed type according to the fragment isolation, through chi-squared, DCA, ANOVA + Dunnet, and Spearman correlation analysis. The majority of the 27,873 seeds belonged to zoochoric trees of the early successional phases. Species richness was similar in all fragments, but higher in the centre of the large and small-isolated fragments. The small-isolated fragment was associated to late anemochoric tree species, and the small-connected fragment to early and zoochoric species. Vines were associated to the borders of small fragments. Edge effects were stronger in the small-connected fragment.

696. CONSERVATION GOALS ACROSS THE PROPAGATION OF *Echeveria laui*, A THREATENED SPECIES. PIÑA-POUJOL, P. C.; Valverde, T. Centro de Investigaciones en Ecosistemas, Antigua carretera a Patzcuaro 8701 Col. Ex-Hac. Sn. Jose de la Huerta, 58190, Morelia, Michoacán, México, pablop@oikos.unam.mx (PCPP). Laboratorio Especializado de Ecologia, Facultad de Ciencias, UNAM, Mexico D.F., C.P. 04510, Mexico (TV).

Propagation and reintroduction are steps employed to promote the conservation of endangered species. We analyzed different conditions for the propagation of *Echeveria laui*, a threatened species according to Mexican law. We carried out experiments on seed germination and seedling growth. For the germination experiments we evaluated the effects of different substrates, temperatures, light availability, seed source and seed age. Regarding seedling growth, we tested the effect of different levels of nutrients and light conditions. Additionally, we introduced six-month old seedlings of two size ranges under two different conditions in the field (under a nurse plant and in the open) and compared their survival rate s after one month. Seeds of *E. laui* younger than 6 months old experienced 80% survival at constant temperatures (25^oC), in the presence of light. Seedling growth rate was lower under shade conditions but was not affected by nutrient addition. Introduced seedlings showed a higher survival (60%) when planted under a nurse plant, irrespective to their size. By successfully propagating seeds of *E. laui*, a huge number of individuals for later studies (i. e. reintroduction survival) can be obtained to help on the conservation of the species.

697. DIVERSIDAD: AUTOMATED BIODIVERSITY PROSPECTING AT LAGUNA MERÍN. PODOLSKY, RICHARD; Picasso, Gonzalo; Bierlink, Christian; de Sherbinin, Alexander. Avian Systems PO Box 1066 Rockport, ME 04856-1066 USA.

Field assessments of biodiversity are absolutely critical, yet they are among the most capital intensive and intellectually demanding activities that ecologists can undertake. We discuss this dilemma and present a cost effective method for mining digital earth imagery for biodiversity hotspots. We present field results from Diversidad software which computes pixel heterogeneity and uses it as a surrogate for biodiversity. Field data from Laguna Merin will be presented. Diversidad is based on the premise that much of the spectral variability often considered "noise" in earth imagery is actually closely correlated with landscape and taxonomic heterogeneity. We present groundtruthing data for plants, birds and reptiles that support the hypothesis that spectral diversity correlates with biodiversity at the community level and that the method offers a quick and inexpensive way to identify biodiversity hotspots in the landscape.

698. GENETIC AND DEMOGRAPHIC ANALYSIS OF THE MARSH DEER (*Blastocerus dichotomus*) BRAZILIAN CONSERVATION PROGRAM. POLEGATO, BRUNA F.; Capalbo, Christina R.; Duarte, José M. B. Projeto Cervídeos

Brasileiros, Departamento de Zootecnia, FCAV/UNESP Jaboticabal, Via de Acesso, Prof. Paulo Donato Castellane, s/n, 14884-900, Jaboticabal, SP, Brazil, br_polegato@yahoo.com.br, chriscapalbo@bol.com.br, barbanti@fcav.unesp.br.

The construction of the Porto Primavera hydroelectric plant, at Paraná River, flooded an extensive amount of marshes and practically extinguished the local population of Marsh Deer. Part of this population was rescued to initiate a captive conservation program. It began in 1998, with the aim of to keep the genetic variability and to avoid selection. Eighty two animals (27M e 55F) were captured and sent to 18 partner institutions of the program. Until December of 2004, 90 births and 115 dead have occurred, what indicate a decrease of the population size. Thirty three founders contribute for the population genetic basis, 21 of them still alive. The range of contribution is 0.33 to 7.02%, and the average is 3.04%. The inbreeding coefficient obtained through Sparks 1.4 was 0.002, what demonstrate s that inbreed is not a problem for this population. These data show a tendency to population decrease, thus a careful captive management is necessary to avoid founder and descendent mortality and increase the population size. Under represented founders and their offspring must be priorized to equalize the founders' contribution and avoid the allelic differential perpetuation.

699. A PATTERN OF VULNERABILITY TO EXTINCTION IN RELATION TO LIFE HISTORY TRAITS FOR BRAZILIAN AND RUSSIAN MAMMALS. POLISHCHUK, LEONARD V.; Brito, Daniel. Department of General Ecology, Biological Faculty, M. V. Lomonosov Moscow State University, Moscow 119899, Russia, leonard_polishchuk@hotmail.com (LVP). Graduate Program in Ecology, Conservation and Wildlife Management (ECMVS), Institute of Biological Sciences, Federal University of Minas Gerais, Avenida Antônio Carlos 6627, Belo Horizonte, MG 31270-901, Brazil (DB).

Threatened species are known to differ from non-threatened species in regard to their life history, but a pattern of the probability of being under threat of extinction is just beginning to emerge. Using a logistic-regression approach as applied to life history data and threatened species listing, we derive the probability of being under threat of extinction as a function of life history traits for mammals of Brazil. A comparison with taxonomically different and geographically distant Russian mammals shows that Brazilian and Russian probabilities are remarkably similar and are closely associated with the same traits, mo st closely with annual fecundity. This allows us to pool the Brazilian and Russian samples and to calculate the resulting probability of being under threat in relation to life history traits, in particular to annual fecundity. An invariant characteristic of such generalized vulnerability function is that while annual fecundity decreases by one offspring per year the odds on being under threat of extinction increase by a factor of 2.2. We suggest that the vulnerability pattern revealed by this study may provide the basis for a predictive theory of conservation priorities with regard to species life history.

700. THE EFFECT OF TIMBER PRACTICES ON USABLE CAVITIES FOR BIRDS IN THE PIEDMONT OF ARGENTINA. POLITI, NATALIA; Rivera, Luis; Hunter Jr., Malcolm. Department of Wildlife Ecology, University of Maine, 210 Nutting Hall, Orono, ME 04469, USA, natipoliti@yahoo.com.ar (NP, MH). Fundación CEBIO, Roca 44, S.S. de Jujuy, 4600, Argentina (LR).

Piedmont forests of Argentina have experienced extensive deforestation and remnants are subject to unsustainable timber harvesting. We compared a reserve (Pintascayo) with an area subject to timber harvesting (Anta Muerta) to determine how logging affects the availability of tree cavities usable for birds' nests. At each site we surveyed 12 0.05 ha vegetation plots and 12 300-m long transects of variable width to search for cavities. We found three usable cavities in Anta (one in *Calycophyllum multiforum* [CM]; two in *Phyllostilon rhamnoides* [PR]) and 32 in Pintascayo (13% CM; 41% PR) of which three were active cavities (one CM; two PR). PR was the third most abundant tree species in Anta (37 stems/ha) and first in Pintascayo (57 stems/ha); CM was fifth in abundance in Anta (17 s tems/ha) and fourth in Pintascayo (30 stems/ha). Basal area was significantly higher in Pintascayo than Anta. These data suggest that the original piedmont forest dominated by PR-CM is important for cavity nesters, but forest practices may change tree composition and decrease basal area, reducing usable cavities for cavity nesters.

701. A SUSTAINABLE ALLIANCE TO INCREASE HABITAT FOR NORTHERN MURIQUIS (*Brachyteles hypoxanthus)* AND WATER FOR NEIGBHORING FARMERS IN CARATINGA, BRAZIL. PONTUAL, FRANCISCO; Boubli, Jean P.; Mendonça, Janaína; Veado, Eduardo M.; Couto-Santos, Fabiana; Bragança, Antônio; Strier, Karen B. Estação Biológica de Caratinga, Caixa Postal 082, CEP 36950-000, Ipanema, MG, Brazil franciscopontual@terra.com.br (FBP, JM, EV, FCS, AB). Conservation and Research for Endangered Species, Zoological Society of San Diego, San Diego, USA (JPB); Department of Anthropology, University of Wisconsin, Madison, USA (KBS).

The northern muriqui is a critically endangered primate species. One of the largest populations inhabits the 900ha of secondary forest at the Estação Biológica de Caratinga/ RPPN Feliciano Miguel Abdalla, MG, Brazil. A project to recover degraded areas was expanded in 2004 to increase the availability of habitat for the muriquis. The first step was to contact and mobilize the neighboring farmers towards a common goal. The lack of water was identified as one of the main regional problems. Through a partnership with the National Rural Lear ning Service (SENAR), 11 rural extension courses were offered to 152 people in the local communities. The courses demonstrated that the reforestation of degraded areas plus the fencing and protection of springs could increase water available to fuel rural production and sustain forest. A plant nursery has been expanded to produce 200,000 seedlings of native trees each year. Saplings and forest soil translocations, artificial poles, and other reforestation techniques have been tested in a 1 ha area. To date, 15 farms have become partners, 10 km of fencing was installed, and 30 ha of degraded area is now protected. The developed methodology may be useful to the larger regional corridor project of CI-Brazil.

702. FRAGMENT SIZE AND EDGE EFFECTS ON LITTERFALL AND LITTER HUMIDITY IN ATLANTIC RAIN FOREST FRAGMENTS IN SOUTH-EAST BRAZIL. PORTELA, RITA DE C. Q.; Santos, Flavio A. M. Programa de Pós-Graduação em Ecologia, Departamento de Botânica, IB, UNICAMP, Campinas, SP, CP 6109,13.083-970, Brazil, rita@quiteteportela.com.br.

We assessed the litterfall, litter humidity, litter accumulation on the ground and canopy openness during 2001 and 2002 at the edge and interior of three small (14, 20, 29 ha) and one large (11,000 ha with three replicates) fragments of Atlantic Forest in São Paulo

State. The litter production was bigger in the larger fragment, litter humidity and canopy openness did not vary with fragment size, and thickness of the litter layer was bigger in the smaller fragments. We can infer that the differences between litter fall and accumulation in the ground may be related with differences in the decomposition rate in these areas. Difference in the litter production and thickness of the litter layer was not found between fragments edges and interiors, litter humidity was bigger in the interior of the fragments, and the canopy of the forest was more opened in the edges. In the dry season there were an increase of litter production, a reduction of litter humidity and an increase of canopy openness, but did not have difference in the thickness of the litter layer.

703. THE CONSERVATION RESOURCE ALLOCATION PROBLEM. POSSINGHAM, HUGH P.; McCarthy, Mick A.; Pressey, Robert L.; Wilson, Kerrie. The Ecology Centre, The University of Queensland, Brisbane, Queensland, 4072, Australia.

We formulate the general conservation resource allocation problem. This encompasses all issues of resource allocation in conservation, including: national spending on threatened species, reserve system design and problems of local biodiversity management. The general formulation tells us how to optimally allocate effort to different management actions in both time and space. The approach is illustrated with two examples. First, we show how funds should be allocated to threatened species in a country or region using an example of Australian birds. This introduces the controversial issue of ecological triage. Second, we show how habitat destruction, metapopulation dynamics and other dynamic ecological processes can be accommodated into conservation planning. We will resolve the concern about whether more classical static conservation planning is a valid approach to real world reserve system design - an issue that is controversial in the current literature.

704. GENETIC VARIABILITY OF A BRAZILIAN NATIVE SEMI-ARID SPECIES BY RAPD MARKER. PÓVOA, JOEMA S. R.; Lacerda, Ana Luiza M.; Ciampi, Ana Y. Universidade Federal de Lavras, Lavras MG, Brasil, joemap@hotmail.com (JSRP). Embrapa Recursos Genéticos e Biotecnologia, PqEB final W5 norte, CEP 70770-900 Brasília DF, Brasil (JSRP, ALML, AYC).

Genetic studies are very important mainly for species under strong antropic pressure and with high economic and ecologic potential. To provide the conduction of collect and conservation plans of native semi-arid species with pharmacological potential, genetic studies are being made to investigate the genetic variability between and within populations of species belonging to Bignoniaceae using RAPD markers. Four populations of distinct locality in Brazilian semi-arid were analyzed, totaling 96 individuals. Nineteen primers provided 130 polimorphic loci. The similarity dendrogram showed formation of three groups: population A, population B and populations C and D. Dissimilarity of 30% was found showing low genetic variability in populations. The dendrogram of populations showed that these are divided in two groups: A and B, and C and D. The Mantel Test between matrixes of Jaccard similarity and cophenetic values showed high correlation and no significance ($r = 0.864$, $p = 0.1672$), and between matrixes of Jaccard similarity and Euclidian distances between points of the dispersion graphic showed high correlation and significance ($r = 0.999$, $p = 0.0438$). This indicates that the 3D dispersion graphic is more efficient in show the genetic variability between sampled populations. All populations analysed are genetic distinct one of others.

705. DEVELOPING A BIODIVERSITY CONSERVATION PLAN FOR THE VÁRZEA FLOODPLAINS OF THE MIDDLE AND LOWER AMAZON. PRESSEY, ROBERT L.; Albernaz, Ana Luisa; Scaramuzza, Carlos A. M.; Ridges, Malcolm J.; Watts, Matthew E. Department of Environment and Conservation, PO Box 402, Armidale, NSW 2350 Australia, bob.pressey@environment.nsw.gov.au (RLP, MJR, MEW); Ciências da Terra e Ecologia, Museu Emilio Goeldi, Av. Perimetral 1901, Belém, PA 66077-530, Brazil (ALA); WWF Brazil, SHIS EQ QL 6/8 conj E, Brasília, DF 71620-430, Brasil (CAMS).

We are developing a biodiversity conservation plan for the middle and lower várzea floodplains of the Solimões and Amazon. Several stages have been completed: (1) biological surveys to inform the delineation of environmental surrogates; (2) compilation of a spatial framework of environmental surrogates defined by the major factors determining species distributions; (3) design guidelines for protected areas; and (4) preliminary data analyses in decision-support software (C-Plan and Marxan) to inform decisions about size of planning units, targets, weightings for compactness, and cost surfaces to favour proximity to established protected areas and distance from deforestation and urban centres. We are ready to present the data sets and preliminary analyses to stakeholders, including local and regional experts who will recommend specific boundaries and configurations of new protected areas. With the experts, we will use the software to map and resolve options (irreplaceability values of planning units) for achieving targets and design preferences. This part of the planning exercise will use information from socio-economic studies and attempt to minimise conflict between conservation management and extractive uses. After this design phase, the software systems will facilitate ongoing adjustments to conservation design. We expect these adjustments to be frequent during the protracted period of implementation.

706. A SPATIAL FRAMEWORK FOR CONSERVATION PLANNING IN THE VÁRZEA FLOODPLAINS OF THE BRAZILIAN AMAZON. PRESSEY, ROBERT L.; Albernaz, Ana Luisa; Scaramuzza, Carlos A. M. Department of Environment and Conservation, PO Box 402 Armidale, NSW 2350, Australia, bob.pressey@environment.nsw.gov.au (RLP); Ciências da Terra e Ecologia, Museu Paraense Emilio Goeldi, Av. Perimetral 1901, Belém, PA 66077-530, Brazil (ALA); Ecologia da Paisagem, WWF Brazil, SHIS EQ QL 6/8 conj E, Brasília, DF 71620-430, Brazil (CAMS).

Conservation planning for the várzea floodplains of the lower and middle Amazon will attempt to deal with biodiversity pattern and process. Biological data in the várzea are sparse and highly biased geographically and taxonomically. Therefore, to provide a consistent picture of biodiversity pattern, and based on advice from experts and a thorough review of the literature, we have developed a spatial framework of surrogates that reflect the major factors known to determine species distributions. The framework is a system of floodplain subdivisions based on major longitudinal zones, local variation in flood depths, structural vegetation units, river confluences, and areas influenced by small, lateral catchments. Three other fixed surrogates are intended to reflect the processes of species movements between the várzea and associated environments. These are the várzea “edge” or interface with terra firme, terra firme biogeographic subregions defined by river barriers, and lateral blackwater and clearwater tributaries. To these fixed sur-

rogates, we added design recommendations for protected areas to promote the persistence of várzea processes. These deal with the persistence of space-demanding species, longitudinal movements of aquatic species, lateral movements between várzea and the river, and lateral movements between várzea and terra firme.

707. TEN YEARS OF THE GOLDEN LION TAMARIN (*Leontopithecus rosalia*) TRANSLOCATION PROJECT. Procópio de Oliveira, Paula; KIERULFF, M. CECÍLIA M.; Lapenta, Marina J.; Pinto, Susie R.; Veruli, Vanessa P.; Moraes Junior, E. A. Associação Mico-Leão-Dourado, Caixa Postal 109.995, Casimiro de Abreu - Rio de Janeiro, 28.860-970, Brazil (PPO, MJL, SRP, VPV, EAMJ). Conservation Internacional. Conservação Internacional, Av. Getúlio Vargas 1.300 7o andar, Belo Horizonte, MG, 30.112-021, Brazil (MCMK).

During a survey of *L. rosalia* populations in the Atlantic Forest of Rio de Janeiro State, Brazil, twelve groups were found isolated in very small and secondary forest fragments with a total area of less than 200 ha each. The risk of demographic and/or genetic problems consequent to small population size, threats to these areas and the high costs that would be required to preserve these small fragments, made translocation the only viable option to save these groups. Between 1994 and 1997, 42 tamarins in six groups were captured and immediately translocated to União Biological Reserve, one of the largest and most preserved forest within the original species distribution, and without a native golden lion tamarin population. In 2004 the translocated population numbered 200 individuals in more than 30 groups. From these, only nine were surviving "founders" and the other were born at the release site. The translocation population was never provisioned and it was self-sustaining immediately after release. The unsaturated habitat and the low population density increased the opportunities for the establishment of new groups by individuals dispersing from the original translocated groups. A comparison with other populations showed that the translocated tamarins behave as "normal wild" tamarins.

708. A SCHOOL IN A LIBRARY: MANAGING COMPLEXITY AND VALUING SCIENCES IN STRENGTHENING ENVIRONMENTAL EDUCATION IN GUNUNG HALIMUN NATIONAL PARK. PUSPITASARI, SHINTA. Peka Indonesia Foundation. Jl. Kecipir I Blok A No. 33, Perumahan IPB Alam Sinarsari, Cibeureum-Darmaga, BOGOR-West Java, Indonesia, shinta@peka-indonesia.org.

The greatest challenge in environmental education (EE) in protected areas in Indonesia is how to express complex environmental issues in an accessible way, while still demonstrating the importance of science in explaining, evaluating and, above all, solving those issues. All is not well at Gunung Halimun - one of Indonesia's most fragile National Parks. Illegal logging is jeopardising both the wildlife and local population. The most critical thing for us was to educate the next generation about the importance of conservation. However, managing the gap of what the young *see* and what they *understand* about environmental problems is vital. Science can fill this gap. The idea for a learning library came after extensive discussions with the local community: here science could be used to teach the children about their environment. The library is not just about books: it provides the focal point for our many approaches to environmental education, such as storytelling, nature observation, and slide shows. We also produce children's books and modules, based on the results of our long-term, biodiversity research in Halimun. Programs have been evaluated through monitoring and questionnaires. The children benefit greatly: they read enthusiastically, and their eagerness to protect the natural world is overwhelming.

709. HAVING YOUR CAKE AND EATING IT TOO: IDENTIFYING RESERVE NETWORKS THAT CONSERVE BIODIVERSITY NOW AND ARE ROBUST TO FUTURE CLIMATE CHANGE. Pyke, Christopher; ANDELMAN, SANDY; Midgley, Guy. NCEAS, 735 State Street, Suite 300, Santa Barbara, CA, USA, andelman@nceas.ucsb.edu (CP, SA). South African National Biodiversity Institute, Private Bag X7, Claremont 7735, Cape Town, South Africa.

Climate change threatens biodiversity persistence and challenges the effectiveness of reserve networks as a conservation strategy. Reserves are fixed in space, yet relatively small changes in climate can lead to shifts in the distribution of suitable habitat and environmental conditions for species and communities, jeopardizing the role of reserves as safe havens for biodiversity. Many reserve networks do not proportionally capture the range of environmental conditions currently occupied by species and communities. These biases will likely be exacerbated by habitat loss and climate change. We demonstrate a method to identify and prioritize reserve networks that maximize representation despite climate change, habitat loss, and changes in species distributions. We assessed representation provided by existing reserves for 301 Proteaceae species in the Cape Floristic Region of South Africa under historic and projected 2050 climate. If the current reserve system is not supplemented, reserves in 2050 will capture an increasingly skewed sample of climatic conditions suitable for Proteaceae. We demonstrate how these biases can be repaired by systematically establishing new reserves using an approach that achieves nearly the best possible improvement in climatic representation while also meeting current biodiversity representation goals.

710. CURRENT SITUATION AND PERSPECTIVES FOR THE CONSERVATION OF THE MAMMALIAN TERRESTRIAL FAUNA OF URUGUAY. QUEIROLO, DIEGO; Dotta, Graziela. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, 05508-900, Brazil, diqueirolo@yahoo.com.br (DQ). Laboratório de Ecologia Animal, Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba, SP, 13418-900, Brazil (GD).

Uruguay presents 79 species of terrestrial mammals, five of them considered as extinct and just one endemic. Actually, the existent information is very scarce, promoting knowledge gaps that hinder the formulation of conservation proposals. In the last years, the faunistic inventories have been showing new occurrences and confirmed the presence of rare or a long time not registered species. We believed that the total number was not still reached, mainly when we analyzed the existent faunas in boundaries countries, where we noticed among ten and 15 species with potential distribution. The whole country is inserted in a single phitogeographic province, the Pampean, and we verified that 40% of the species are in some threat category in regional and international lists of threatened species. In this way we believe that any conservation politics should contemplate the neighboring areas. We consider that the increment of studies regarding not only species lists, but also biological and ecological aspects should be stimulated, making possible a better knowledge of the mammalian fauna in the country. Public politics of conservation should also be proposed, as the establishment and accomplishment of the current National System of Protected Areas, promoting new laws of protection and

control of the fauna.

711. MANAGEMENT NEEDS IN PROTECTED AREAS - BIODIVERSITY CONSERVATION AND MANAGEMENT AT A PROTECTED AREA OF SUSTAINABLE USE IN THE BRAZILIAN VÁRZEA. QUEIROZ, HELDER L.; Souza, Isabel; Pires, Andréa; Estupiñan, Guillermo; Peralta, Nelissa; Valsecchi, João. Mamirauá Institute for Sustainable Development (IDSM-OS/MCT), Rua Brasília 197, Bairro Juruá, Tefé, Amazonas, Brazil, 69.470-000, helder@mamiraua.org.br (HLQ).

Given the strong threats to the Brazilian várzea due to the recent increase in the antropogenic pressure for natural resources, biodiversity conservation today depends more on the ability to regulate the use of resources, than in the promotion of strict protection of this environment. Many different initiatives for conservation are been carried out during the last 15 years. Most of the little official protection present is based on the establishment of areas for sustainable use, as the Sustainable Development Reserves. Implementation of areas such as these involves not only the protection of strict zones, but the establishment of participatory systems of management, with shared responsibilities and determination of specif roles for all the stakeholders. The efficient participation of representativies of main social players, sat in recognized councils have to be considered as important as the development of scientific research for conservation or the effective regulation of sustainable use of natural resources, together with protection, control, and survailance. At the Mamirauá and Amanã Sustainable Development Reserves, the creation of different means for participation for locals and their involvement in the management of the area and its natural resources shows that these are key issues for the success of local biodiversity conservation. These experiences have to be considered when planing for further levels of protection for the Brazilian várzea.

712. LOCAL EXTINCTIONS AND CHANGES IN SPECIES RICHNESS OF GRASSLAND BIRDS IN RELATION TO CHANGES IN AGRICULTURAL LAND-USE IN THE PAMPAS REGION OF ARGENTINA. RABUFFETTI, FABIÁN L.; Di Giacomo, Adrián S.; Reboreda, Juan C. Departamento de Conservación, Aves Argentinas/Asociación Ornitológica del Plata, 25 de Mayo 749 2° 6, C1002ABO Buenos Aires, Argentina (FLR, ASDG), rabuffetti@avesargentinas.org.ar. Departamento de Ecología, Genética y Evolución, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Pabellón II Ciudad Universitaria, C1428EHA Buenos Aires, Argentina (JCR).

One of the main causes of decline and extinction in birds is habitat loss and fragmentation. We analyzed patterns of local extinction of grassland birds associated with intensification of agriculture during the last 100 years in the Pampas region of Argentina. We focused our analysis in 111 species that depend partially or totally on grasslands. We analyzed: 1) the proportion of species that have been extirpated locally since 1900 in four districts that experienced different degrees of agricultural intensification (proportion of its area converted to croplands), and 2) present richness of grassland birds in 15 districts with different degrees of agricultural intensification. The proportion of grassland birds locally extirpated during the last 100 years varied between 15 and 45%. Local extinctions were more severe in districts with greater conversion of grasslands to croplands. The temporal pattern of extiction progressed from local to regional. The present richness of grassla nd birds (range 44-77 species per district) was negatively associated with the proportion of the district area converted to croplands (range 1-70%). Our results show that changes in agricultural land use during the last 100 years within the Pampas grasslands are associated to local extinction of grassland birds.

713. IDENTIFYING KEY BIODIVERSITY AREAS FOR HIGHLY DIVERSE GROUPS: PLANTS. Radford, Elizabeth A.; RUDGE, JONATHAN. Plantlife International, 14 Rollestone Street, Salisbury, SP1 1PX, UK. liz.radford@plantlife.org.uk.

Key biodiversity areas for plants; ' Important Plant Areas' (IPAs), are being identified around the world under the framework of the CBD Global Strategy for Plant Conservation. Traditionally key biodiversity areas are identified using comprehensive species assessments of whole groups of organisms; birds, mammals, amphibians. For highly diverse groups such as 'plants', that contain many species whose threat status has not been globally assessed, this process can seem impossible, but also essential, as plants are a fundamental component of the world's biodiversity. IPA methodology has been developed to address these difficulties. IPAs are identified using systematic justifiable criteria that combine the rigour of species-based methodologies using 'official' data sources, with the assessment of botanically rich sites and sites containing threatened habitats/vegetation types. Examples of the identification of key biodiversity areas for plants (IPAs) will be demonstrated in countries where there is limited information on the plant species distribution. The underlying principles of IPA selection will be explained; the use of scientific data, supplemented with up-to-date expert knowledge, national discretion in site selection and ensuring the engagement of all stakeholders. The suitability of IPA methodology for providing a credible approach to the inclusion of important sites for plants in key biodiversity area networks will be explored.

714. APPLICATIONS OF ECONOMICS TO BIODIVERSITY CONSERVATION: NONMARKET VALUATION OF MARINE RESOURCES IN THE ALASKAN ARCTIC. RAHEEM, NEJEM. 517 Onate Place, Santa Fe, NM 87501 USA.

Along the remote northwestern coast of Alaska, the US Army Corps of Engineers (USACE) have proposed portsite improvements at the Red Dog Mine, the world's largest lead and zinc mine. In 2003, Ecology and Law Institute (ELI) was hired to conduct an independent benefit cost analysis (BCA) of the project. The USACE had already conducted some preliminary BCAs that found that the project was justifiable economically. ELI found that the improvements could result in adverse effects to the marine and terrestrial environment, which would result in unaccounted costs to hunters of the Inupiat community of Kivalina, 15 miles north of the mine. This presentation documents our findings from a Contingent Valuation study and from interviews with native hunters about the effects of the mine and the resultant costs. When these costs were included in the BCA, the project was no longer economically justifiable. ELI managed to halt the project after presenting our findings to the USACE, evidence that fairly conventional economic methodology can be useful in preserving coastal habitat.

715. INVOLVING COMMUNITIES IN THE CONSERVATION OF THREATENED PLANTS IN THE CAPE FLORAL REGION, SOUTH AFRICA. RAIMONDO, DOMITILLA C.; Ebrahim, Ismail; Donaldson, John S. South African National Biodiversity Institute, Kirstenbosch Gardens, Rhodes Drive, Claremont, Cape Town, 7800, South Africa, raimondo@sanbi.org.

The Cape Floristic Region (CFR) has over 9000 species of plants. Recognized as a Global Biodiversity Hotspot, it currently has 526 threatened plant species. Given the large number of threatened plants, and the limited capacity of conservation organizations, monitoring the status of populations of these species is extremely challenging. The South African National Biodiversity has set up a program that capitalizes on botanical amateur expertise through recruiting volunteers from communities based in the Threatened Lowlands of the CFR. Volunteers survey fragments of threatened habitats for threatened plant populations, capturing abundance data, distribution data and threats affecting each species. These data are captured in a national database used for red listing and land-use planning. In addition, volunteers contribute to conserving critical sites for threatened plants through active management and awareness creation amongst landowners. Here we provide updated information on the threat status of plants in the Cape Floral region, explore the effectiveness of using volunteers for monitoring and look at the challenges of systematically surveying areas to ensure all populations are encountered for accurate threat status analyses.

716. CONSERVATION IN A HETEROGENEOUS LANDSCAPE: IDENTIFYING REPRESENTATION TARGETS FOR THE MIKEA SPINY FOREST, MADAGASCAR. RAKOTOMALAZA, PIERRE J.; McKnight, Meghan; Powell, George; Tomasek, Adam J. Programme Ala Maiky, Toliara, Madagascar (PJR). Curriculum in Ecology, University of North Carolina, Chapel Hill, NC 27599 USA (MWM). WWF Conservation Science Program, WWF US, Washington DC, 20037 USA (GVNP). WWF Endangered Spaces Program, WWF US, Washington DC, 20037 USA (AJT) adam.tomasek@wwfus.org.

The spiny forest of southwestern Madagascar's Mikea region forms a transition between dry deciduous forest to the north and spiny desert to the south. The region is noted as a conservation priority due to its high levels of plant endemism and diversity. However, the paucity of quantitative information regarding spatial patterns of diversity has made it difficult to delineate protected area boundaries that adequately represent Mikea's floristic heterogeneity. We use recently compiled vegetation data to determine the extent needed to capture the floristic uniqueness of the region. To quantify the rate and direction of compositional change and identify representation targets, we employ site dissimilarity indices and hierarchical clustering methods based on both presence-absence and relative abundance data. The heterogeneity of the region is extremely high, with 7 of the 13 sites needing individual representation. Site associations and the rate and direction of change differ markedly between the two data types. Compositional change quantified using presence-absence data is correlated with latitude, while change based on abundance data has a longitudinal trend. Conservation of the Mikea region must address the processes driving both a north-south turnover of species identities and an east-west change in community structure.

717. DISTRIBUTION, ABUNDANCE, HABITAT, AND THREATS OF THE ALAOTRAN GENTLE LEMUR (*Hapalemur griseus alaotrensis*). Ralainasolo, Bruno F.; Andrianandrasana, Herizo; Ratsimbazafy, Jonah; Durbin, Joanna C.; Randriamahefasoa, Jonah; RASOAMAMPIANINA, VANESSA. Durrell Wildlife Conservation Trust - Madagascar Program, B.P. 8511, Antananarivo101, Madagascar (BFR, HA, JHR, JCD, JR),.

Hapalemur griseus alaotrensis is only found in the marshes of Lac Alaotra, central Madagascar, and is considered to be one of the world's most endangered primates. To evaluate the distribution status and habitat of this species we conducted censuses of the lemur population in four sites in 2001 and 2002. Study methods involved direct lemur observations, and mapping of marsh habitats. Results from this study indicate that the lemurs are only present in marshes that have not been burned for more than three years. Encounter rates were also lower in sites where lemurs were hunted. Marsh burning and hunting were identified as the main threats to the species survival. The area of marshes burned reduced from 7,300 ha in 2000, 4,430 ha in 2001 to 392 ha of the total marsh area in 2002. We recommend the establishment of a strict protected area to protect the lemurs from hunting and burning.

718. QUALITY OF SEEDS PRODUCED BY *Psychotria tenuinervis* (RUBIACEAE): DISTANCE FROM ANTHROPOGENIC AND NATURAL EDGES OF ATLANTIC FOREST FRAGMENT. RAMOS, FLAVIO NUNES; José, Juliana; Solferini, Vera Nisaka; Santos, Flavio A. M. Programa de Pós-Graduação em Ecologia, IB, UNICAMP, CP 6109, 13083-970, Campinas, SP, Brazil (FNR); Programa de Pós-Graduação em Genética e Evolução, IB, UNICAMP, CP 6109, 13083-970, Campinas, SP, Brazil (JJ); Departamento de Genética e Evolução, IB, UNICAMP, CP 6109, 13083-970, Campinas, SP, Brazil (VNS); Departamento de Botânica, IB, UNICAMP, CP 6109, 13083-970, Campinas, SP. Brazil (FAMS).

Anthropogenic edges created by fragmentation and natural edges may disrupt gene flow and affect the quality of seeds produced by plants located in these habitats. The aim of this study was to investigate whether there were differences in the (1) genetic variability, (2) genetic structure, (3) seed mass, and (4) germination rate and velocity of the seeds produced by *Psychotria tenuinervis* individuals located at anthropogenic edges (AE), natural edges (NE) and forest interior (FI). Among the three habitats, the populations of *P. tenuinervis* showed no differences in genetic variability or genetic structure (G_{ST} =0.07 ± 0.09). However, there was an indication of inbreeding (G_{IS} =0.71 ± 0.08), which was significantly higher on NE (0.82) than on AE (0.74) and FI (0.64). There were no differences in the seed mass, germination rate and velocity among the three habitats, probably because most of them showed within-habitats variation. These results suggest that other characteristics of the fragment, such as gaps, edge age and type of matrix exert more influence on seed mass and germination than the distance from the edges. Seed characteristics were not influenced by the genetic pattern of *P. tenuinervis*, since there was little difference in the genetic variability and structure among and within habitats.

719. INTEGRATED TRAINING IN CONSERVATION: FROM THE UNIVERSITY TO APPLIED MANAGEMENT AND RESEARCH IN LAO PDR AND MYANMAR. RAO, MADHU; Johnson, Arlyne. Wildlife Conservation Society-International Programs, 185th Street and Southern Blvd., Bronx, New York, NY 10460, U.S.A.

High levels of biodiversity have earned recognition for the region covered by Laos and Myanmar as a conservation hotspot. However, underlying critical threats to the persistence of biodiversity is the lack of capacity to implement conservation. Specifically, lack of access to educational and training resources is a significant obstacle to building capacity for biodiversity conservation. The Wildlife Conservation Society in partnership with the Center for Biodiversity Conservation, American Museum of Natural History

is implementing an initiative known as the *Network of Conservation Educators and Practitioners (NCEP)*. NCEP is an international initiative to design, create, and foster the implementation of a comprehensive set of teaching and learning materials in support of biodiversity conservation. The primary goals of the program are to enhance the ability of university faculty to train students in the principles and methods of biodiversity conservation. In addition, working directly with students, faculty and conservation professionals on research projects at key WCS sites, the program aims to raise capacity in applied conservation research and management. Project implementation has highlighted issues of scope and scale that are critical for greater effectiveness of training activities and the concomitant need for greater investment of financial and technical resources.

720. RESTORATION; A FULLY ARTIFICIAL PROCESS? REBELO, CAMILLE; Kahumbu, Paula; Martins, Dino J.; Baer, Sabine. Lafarge Eco Systems, P.O.Box 81995 Mombasa, Kenya. Camille.Rebelo@bamburi.lafarge.com.

Restoration involves not only the re-introduction of species into a restored ecosystem, but the successful implementation of self sustainable ecosystem processes. This study investigates the rate at which continual variation in species diversity occurs by natural means - without human intervention - under different restoration scenarios of abandoned coralstone quarries. Odonata were used as an indicator species. In a static study simulating a time series 8 sites of 0 - 30 years in age and under different initial management scenarios were analysed for species diversity and abundance. Each site was assessed daily over 3 months, spanning wet and dry seasons. Preliminary results show that the rate at which restored ecosystems develop can be manipulated through inputs, especially at the early stage of development. However, once an initial ecosystem has been re-established, a definitive point at which these processes begin to occur and species begin to arrive unaided, in pinpointed. This 'take-over' point varies greatly with local microclimates and differences in initial inputs. These results were then used to put the restoration process into a community context, highlighting the value of restoring ecosystems for education, research and conservation of rare or endemic species.

721. POVERTY ALLEVIATION AND BIODIVERSITY CONSERVATION: POLITICS, CONCEPTUAL COMPLEXITY, AND CONTEXTUAL VARIETY. REDFORD, KENT H.; Agrawal, Arun. WCS Institute, Wildlife Conservation Society, Bronx, NY, 10460, USA, kredford@wcs.org (KR); School of Natural Resources and the Environment, University of Michigan, Ann Arbor, MI, 48103, USA (AA).

Poverty alleviation and biodiversity conservation are both important global social objectives. Unfortunately, the relationship between these two is sufficiently difficult that the existing literature on the subject has generated highly divergent and conflicting conclusions. Our paper reports results of an analysis of four specific programmatic interventions that have attempted simultaneously to alleviate poverty and conserve biodiversity. We show that the outcomes of these interventions have registered great variety both because of the fuzziness of basic underlying concepts of poverty and biodiversity, and tremendous variations in the political, ecological and social contexts of the interventions. We conclude with a discussion of the importance of context-sensitive criteria in developing programs to address both poverty alleviation and biodiversity conservation.

722. CREATING AND MANAGING A MULTIPLE LANDOWNER CONSERVATION INITIATIVE THAT CONTRIBUTES TO TARGET ACHIEVEMENT: A CASE STUDY OF THE ST FRANCIS CONSERVANCY. REEVES, BRIAN; Cowling, Richard M. Biodiversity Conservation Unit, Wildlife and Environment Society of South Africa, 2(b) Lawrence St, Central Hill, Port Elizabeth 6001, South Africa (breeves@wessa-bcu.co.za) (BR). Terrestrial Ecology Research Unit, Department of Botany, University of Port Elizabeth, PO Box 1600, Port Elizabeth 6000, South Africa (RMC).

We need a greater emphasis on private landowner conservation to achieve the targets of South Africa's conservation plans. In order to effectively conserve ecosystems that span property boundaries, it may be easier to work with an organised collection of landowners than it is to work with a number of individual landowners. Research should therefore be directed at promoting and understanding multiple landowner co-operation for conservation. With this in mind, the St Francis Conservancy was created, as part of a two-year pro ject, by uniting the landowners of 73 properties. The project focussed on the development of the institutional structures of the Conservancy and the subsequent management of the area for biodiversity conservation. The latter component consisted mainly of the development of a defensible system to allocate resources within the Conservancy towards alien vegetation eradication. The Conservancy provides landowners with a structure for initiating collective action. The resource allocation system enables participants to agree to invest in the management priorities of the Conservancy (i. e. the collective property) rather than maintaining a focus within their own individual property boundaries. Our experience of this case study indicates that multiple landowner co-operation has emerging potential to be included as a tool for conservation target achievement.

723. ROBUST DECISION MAKING UNDER SEVERE UNCERTAINTY FOR CONSERVATION MANAGEMENT. REGAN, HELEN; Burgman, Mark A.; Ben-Haim, Yakov. Biology Department, San Diego State University, San Diego, CA 92182-4614, USA, hregan@sciences.sdsu.edu (HR). School of Botany, University of Melbourne, Parkville, VIC 3010, Australia (MAB). Faculty of Mechanical Engineering, Technion-Israel Institute of Technology, Haifa 32000, Israel (YBH).

In conservation biology it is necessary to make management decisions for endangered and threatened species under severe uncertainty. Failure to acknowledge and treat uncertainty can lead to poor decisions. To illustrate the importance of considering uncertainty, we reanalyze a decision problem for the Sumatran rhino, using information-gap theory to propagate uncertainties and to rank management options. Information gap theory takes a fundamentally different approach to decision making under uncertainty than standard methods in uncertainty and sensitivity analysis. Rather than requiring information about the extent of parameter uncertainty at the outset, information-gap theory addresses the question of how much uncertainty can be tolerated before our decision would change. It assesses the robustness of decisions in the face of severe uncertainty. In the information gap approach, rather than optimizing the performance of decisions, we satisfy minimal performance requirements and optimize the robustness to uncertainty. We show that different conservation management decisions may result when uncertainties in utilities and probabilities are considered in decision-making problems. We highlight the importance of a full assessment of uncertainty in conservation management decisions to avoid, as much as possible, undesirable outcomes.

724. INCORPORATING UNCERTAINTY INTO THE MANAGEMENT OF INVASIVE SPECIES. REGAN, TRACEY J.; Possingham, Hugh P.; McCarthy, Michael A. The Ecology Centre, School of Integrative Biology, University of Queensland, St. Lucia, Queensland 4072, Australia, t.regan@uq.edu.au (TJR, HPP); Australian Research Centre for Urban Ecology, The University of Melbourne, Parkville, 3010, Victoria, Australia (MAMc).

Invasive species are a major threat to natural and managed systems. When a species invades an area, it is often difficult to decide on the best strategy for managing the invasion due to the interaction of factors such as the extent of the invasion, how the invasion responds to different management strategies, the dynamics of the system, and cost. Uncertainty in our knowledge of these factors and natural variation exacerbates the decision process further. We have applied a decision theory approach to determine optimal and cost effective management options for weed invasions. Focusing on Branched broomrape (*Orobanche ramosa*), a parasitic weed found on broad-leafed plants in South Australia, we develop a discrete-time Markov chain that describes the dynamics of the system through processes of colonization, germination and seed bank decay and apply stochastic dynamic programming to determine the optimal management strategy. By incorporating uncertainty in transition probabilities, we can investigate the trade-offs between optimal and suboptimal management strategies. The best management strategy depends on the state of the system, the magnitude of variation in transition probabilities and cost. These results can be use to inform managers of optimal and cost-effective management strategies in the face of uncertainty and management constraints.

725. GENETIC VARIABILITY OF THE ARARIPE MANAKIN *Antilophia bokermanni* (AVES: PIPRIDAE) AND IMPLICATIONS FOR ITS CONSERVATION. RÊGO, PÉRICLES S.; Araripe, Juliana; Sampaio, Iracilda; Girão, Weber; Albano, Ciro; Brito, Paulo; Campos, Alberto. Laboratório de Genética e Biologia Molecular, Universidade Federal do Pará, Bragança, PA, 68600-000, Brazil, periclessena@yahoo.com.br (PSR, JA, IS). AQUASIS - Associação de Pesquisa e Preservação de Ecossistemas Aquáticos, Praia de Iparana s/n, Caucaia, CE, 61600-000, Brazil (PSR, JA, WG, CA, PB, AC).

The Araripe manakin *Antilophia bokermanni* is a bird species endemic to the Chapada do Araripe (Araripe Plateau, NE Brazil), found only in the gallery forests along the streams in the northeastern slope of the Chapada (Ceará State). It is classified as "Critically Endangered" with a high risk of extinction due to its restricted distribution and small population associated with habitat degradation. Information related to genetic diversity of isolated or small populations have greatly contributed to conservation strategie s. In this work we collected tissue samples of 31 individuals distributed along 11 localities within the known range. Three fragments of mitochondrial genes with different evolution rates were sequenced and analyzed. Preliminary results indicate the absence of sub-structures in the population, showing gene flow between sampling stations. However, the genetic variability found in individuals was low. The use of genetic data combined with information regarding the biology of the species and the environment in which it is inserted, should allow the building of a broader scenario, helping decision-making related to the conservation of the species.

726. GUARATUBA BAY, PARANÁ COAST, SOUTH OF BRAZIL: A POTENTIAL AREA TO BE DESIGNATED AS RAMSAR SITE. Reinert, Bianca Luiza; Bornschein, Marcos R.; BELMONTE-LOPES, RICARDO. Av. 24A, 1076, Rio Claro, São Paulo, 13506-700, Brazil, ricardobelmonte@ufpr.br (BLR, RBL). R. Olga de Araújo Espindola, 1380; bl N, apto. 31, Curitiba, Paraná, 81050-280, Brazil (MRB).

The Atlantic Forest, the most devastated biome in Brazil, shelters several habitats, as flooded forests, mangroves and swamps, which constitute humid areas poorly represented in conservation units of integral protection. The Guaratuba Bay and surroundings, shelters a well preserved portion of those habitats, especially swamps which spans over a great flooded plain known as Lagoa do Parado (*c*. 1000 ha). In this region, 322 bird species were recorded, 13 of them threatened with extinction, such as *Amazona brasiliensis*, *Hemitriccus kaempferi* and *Stymphalornis acutirostris*, whose world's largest area of continuous occurrence is located in the Lagoa do Parado region. Other endangered animals are also present, like *Lontra longicaudis*. The region was considered of maximal priority for conservation (MMA, 2000), and as an Important Bird Area, by BirdLife International (Bencke & Mauricio, 2002). Its environmental attributes attend at least four criteria adopted by the Ramsar Convention for the designation of Wetlands of International Importance (WII). For this, the area of Guaratuba Bay and surroundings may be indicated by Brazil to the Ramsar Convention to obtain the designation of WII.

727. A SPATIAL LANDSCAPE ASSESSMENT META-MODEL TO EVALUATE THE EFFECTIVENESS OF BIODIVERSITY CONSERVATION STRATEGIES. REMPEL, ROBERT S. Centre for Northern Forest Ecosystem Research, OMNR, Lakehead University, Thunder Bay, ON, P7B 5E1, Canada (rob.rempel@mnr.gov.on.ca).

Management for conservation of biodiversity involves development of strategies that must be implemented and tested for effectiveness. Prior to implementation, it is also desirable to simulate the effects of the strategies, and then evaluate the future landscape in terms of expected responses of biodiversity. An essential element in this approach is the development of a spatial landscape assessment meta-model to test the effects and effectiveness of alternative land management strategies across spatial scales. To help guide the development of forest management policy in northern Ontario, Canada, I developed a meta-modeling approach to integrate spatial pattern, biodiversity, forest succession, stand development, and harvest pattern projection models. The biodiversity model was developed using a suite of neo-tropical breeding forest songbirds that "bound" an ecological space affected by forest management activities. This talk will focus on the overall structure of the meta-model, detailed development and testing of the biodiversity model, and interpretation of alternative forest management scenarios. The distribution and abundance of predicted occupied-habitat was modeled over time, and among forest management scenarios. Management polices and prescriptions that create a spatial pattern of well-spaced habitat 'hot spots' were considered superior to those that create evenly dispersed medium-quality habitat.

728. CHALLENGES FOR LINKING VICUNA CONSERVATION AND BENEFITS FOR LOCAL PEOPLE. RENAUDEAU D'ARC, NADINE; Lichtenstein, Gabriela. School

of Development Studies, University of East Anglia, Norwich, NR4 7TJ, UK, n.d-arc@uea.ac.uk (NRD); Instituto de Geografia, Facultad de Filosofia y Letras, Universidad de Buenos Aires/INAPL/CONICET, CP 1406, Buenos Aires, Argentina, glichtenstein@fibertel.com.ar (GL).

Vicuna is a wild South American camelid distributed in the high Andean Region of Argentina, Chile, Bolivia, Peru and Ecuador. Vicuna fibre is as fine as silk and is highly valued in international markets. Under CITES and the Vicuna Convention, exploitation of vicuna populations are controlled and regulated, and commercial use of fibre is only allowed if obtained from live-shorn vicunas. Much attention has been given to the different techniques to manage vicuna and obtain its fibre, but very little attention to vicuna management issues concerning local people. This paper identifies these issues by exploring two different systems: vicuna management in the wild by community groups in Bolivia and captive management of vicuna by individual producers in Argentina. Our analysis is based on primary and secondary data collected from 1997-2002 in both countries. Data includes interviews, meeting to key informants and reviews of documents from international to national and local levels. The paper suggests that the distribution and scale of benefits, the nature of property rights and the local capacity are key issues that emerge from vicuna management experiences that need to be addressed for linking vicuna conservation and benefits for local people.

729. IMPACT OF LAND USE ON THE BIRD COMMUNITY IN A CLOUD FOREST OF GUATEMALA - IMPLICATIONS FOR CONSERVATION. RENNER, SWEN C. Conservation and Research Center, Smithsonian Institution, 1500 Remount Road, VA 22630 USA, swen.renner@web.de.

To evaluate conservation strategies to preserve the remaining natural cloud forests in Guatemala, the birds' populations of different habitats are determined by mark-recapture and distance sampling methods. The natural cloud forest is fragmented and reduced substantially to less then 50% of its original cover. It is surrounded by agriculture (corn), area of reforestation, and secondary growth. Within the different habitats, the species diversity and abundance are different, i. e. the abundance of species changes rapidly with deforestation. In many cases the diversity of several organisms temporarily increases in secondary growth compared with natural oak-pine cloud forest. Nevertheless this does not imply an optimal habitat. There might be species present without any breeding success. These populations need support by immigrating individuals from disjunct population patches (source-and-sink theory). The Guatemaltecian forests are used heavily by humans, and the remaining cloud forests are threatened by extinction. They are still sources for many bird populations but there are first indicators showing the pressure and the human impact. Some species like Blue-throated Motmot (*Asphata gularis*) or Highland Guan (*Penelopina nigra*) are rare and the populations are no longer reproducing successfully and sufficiently to maintain a stable population. An example from a different animal group is the Yucatan Black Howler Monkey (*Alouatta pigra*). This species is crowded within the remaining forests. More than 60% of the area is not suitable for it because of too many small forest fragments.

730. VALE DOS CRISTAIS: A NEW PARADIGM FOR URBAN DEVELOPMENT OF THE METROPOLITAN AREA OF BELO HORIZONTE, MINAS GERAIS, BRAZIL. RESENDE, SAULO R. O.; Brito, Adilson A.; Drumond, Maria Auxiliadora; Souza-Lima, Patrícia. Sete Soluções e Tecnologia Ambiental, Av. Getúlio Vargas 1420, 16º andar, Savassi, Belo Horizonte 30112-021 MG Brazil (SROR, AAB), sete@sete-sta.com.br; Pós-graduação ECMVS - UFMG Belo Horizonte MG Brazil (MAD); Mercatto Ambiente e Articulação Rua Conde de Linhares 1071 sala 11 Belo Horizonte 30.380-030 MG Brazil (PSL), souzalima@mercattoambiente.com.br.

Real estate developments in the Metropolitan Area of Belo Horizonte (MABH) have been conceived with disregard to environmental and biological conservation issues. Once the engineering teams have their projects ready, solutions devised for these issues seem like patches and are seldom efficient. This paradigm was avoided in the concept of Vale dos Cristais, an urban district which is being implemented inside a Protected Area (category V, IUCN), in MABH. The site measuring ca. 600 hectars allocated for the implementation of this urban district was previously subjected to a comprehensive diagnosis of biological, physical, and socio-cultural aspects. A map was made for each theme considering different levels of restrictions regarding human occupation. A workshop dealt with the environmental premises and zoning in order to subsidize a masterplan also based on biological conservation and sustainability concepts. The creation of a private reserve and the protection of ecological corridors were duly considered in this workshop. Afterwards, the masterplan was designed and submitted to the workshop team for careful analyses concerning the environmental premises and zoning. Suggestions were incorporated and only then engineering projects were developed. The early consideration of environmental issues allowed for a balanced result regarding human occupation and biological conservation.

731. MANAGING FRESHWATER ECOSYSTEMS FOR BIODIVERSITY AND HUMAN WELL-BEING: INDICATORS TO MEASURE PROGRESS. REVENGA, CARMEN; Bryer, Mark; de Villiers, Pierre. Global Priorities Group, The Nature Conservancy, 4245 N. Fairfax Drive Suite 100, Arlington, VA 22203-1606, USA, crevenga@tnc.org (CR, MB). Department of Tourism, Environmental and Economic Affairs, Private Bag X20801, Bloemfontein 9300, Free State Province, South Africa, devilp@dteea.fs.gov (PV).

Human activities have severely affected the condition of freshwater ecosystems worldwide. Physical alteration, water withdrawal, pollution, overexploitation, and the introduction of nonnative species all contribute to the decline in freshwater biodiversity. In North America alone, the projected extinction rate for freshwater fauna is five times greater than that for terrestrial fauna–a rate comparable to the species loss in tropical rainforests. Human population growth and development will place even higher demands on already stressed freshwater ecosystems, unless an integrated approach to managing water for people and nature is more broadly implemented. We report on a global assessment of the extent and quality of data available about populations of freshwater species, and change in the extent and condition of natural freshwater habitats and propose a suite of indicators that can be applied at multiple scales to fill some information gaps. The indicators we propose can be used to measure progress in halting the rapid decline in freshwater species, and to craft policies that support an integrated approach to water management, taking into account development and biodiversity goals.

732. PLANNING IN PARADISE: WHAT TO DO WHEN THERE ARE NO DATA. REYERS, BELINDA; Ginsburg, Aimee. Environmentek, CSIR, PO Box 380, Stellenbosch, 7599,

South Africa, breyers@csir.co.za (B). Biocomplexity Research Group, Department of Botany and Zoology, University of Stellenbosch, Stellenbosch, 7602, South Africa, aimee@sun.ac.za (AE).

South Africa's Wild Coast, referred to as the country's "last remaining paradise", is recently the scene of much conservation and development attention. This study aimed to identify geographic areas where this conservation attention should be focussed. The Wild Coast is undeveloped and therefore has little information on the distribution of biodiversity, making available methods of systematic conservation planning inadequate. Expert mapping, a process whereby specialists capture their knowledge of the area's biodiversity spatially, has proven useful in several conservation assessments with similar data constraints. We conducted and compared results of systematic conservation assessments based on limited biodiversity information and assessments based on expert mapping. The currently undeveloped nature of the Wild Coast resulted in high levels of flexibility in achieving conservation targets using systematic conservation planning, while expert mapping identified a very large proportion of the Wild Coast as priority areas. A high degree of congruence existed between the outputs of both approaches. A combination of the approaches, using a rule-based algorithm, resulted in a very efficient solution of conservation targets within expert identified priority areas; a solution with high levels of stakeholder support.

733. DIET STUDY OF NEOTROPICAL RIVER OTTER (*Lontra longicaudis*) IN A RIVER OF SOUTHEASTERN BRAZILIAN COAST (ANGRA DOS REIS, RJ). RHEINGANTZ, MARCELO; Rodrigues, Livia; Muanis, Manoel; Andrade, Raquel; Waldemarin, Helen. Organização Não-Governamental Associação Ecológica Ecomarependi, Rua Paissandu, 362, Laranjeiras, Rio de Janeiro, RJ, 22010-080, Brazil, marcelolr@mn.ufrj.br.

This research aimed to study diet of Neotropical otters in Rio Mambucaba, southeastern Brazil. During monthly field trips, we collected spraints in 15km of river, from April 2001 to July 2003. They were washed, dried and checked for feeding items remnants, separating them in major taxonomic groups. The study area was divided in three sectors to data analysis. P1, a mangrove region; P2, a downstream region, with sand in the bottom; P3, with stones. During study we collected 346 otter spraints. Fish were founded in 84%, crustaceans in 71%, amphibians in 10%, mammals in 6%, mollusks in 1%, birds in 1% and others items in 3%. Crustaceans were divided in two groups: shrimps with 3% and crabs with 65% of occurrence. The t-test for percentage comparison showed significant difference between fish and crustaceans occurrence ($p < 0,01$). Comparing the spraints of different parts of the river, it was observed that occurred significantly less fishes in P3 than P2 ($p=0,01$) and P1 ($p < 0,01$). It was observed that occurred significantly less amphibians in P1 than in P2 ($p < 0,01$) and P3 ($p < 0,01$). Similarly to other studies with otters, the results of this work indicated that otter in this region feed mainly fish and crustaceans.

734. IS ALL THE CERRADO EQUALLY VULNERABLE? WHAT CAN WE LEARN FROM THE BIOGEOGRAPHICAL DISTRIBUTION OF PLANTS AND ITS SUSTAINABLE USE. RIBEIRO, J. FELIPE; Ratter, James A.; Bridgewater, Samuel. Recursos Naturais CMBBC - Embrapa-Cerrados, Brazil, felipe@cpac.embrapa.br & Royal Botanic Garden Edinburgh-United Kingdom.

The mosaic of different types of plant communities in the Cerrado coexist under a similar climate, being mostly determined by soil features, water regime and disturbances such as fire and frost. Available studies show a total of 70 land systems based on climate, landscape and soils, within 25 physiographic units in the region. We analyzed 315 surveys of trees and large shrubs distribution throughout the core Cerrado and southern outliers and recorded 914 species. Only 300 species occurred in more than eight surveys (i. e. $\geq$2.5% of the total) and only 38 at $\geq$50%, while the remaining 614 are very rare. Therefore only 300 woody species are frequent in all Cerrado. Alpha diversity is often high, commonly exceeding 100 species. Multivariate analysis gave a provisional division of Cerrado into at least six phytogeographic groups. Current challenges for preservation and sustainable use of natural Cerrado areas cannot be dissociated from the pattern of high heterogeneity at both landscape and species diversity levels and the sustainable utilization of native species with economical potencial. Therefore, trade-offs between conservation and land use must consider alternatives for specific public policies and environmental and cultural heterogeneity.

735. IMPACTS OF LAND USE PATTERNS AND LAND OCCUPATION POLICES ON THE INTEGRITY OF LANDSCAPE AND AQUATIC ECOSYSTEMS FROM 1986 TO 2003 IN AN ENVIRONMENTAL PROTECTION AREA WATERSHED IN CENTRAL BRAZIL. RIBEIRO, MAURO C. L. B; Veríssimo, Mônica; Rosa, José W. C.; Perdigão, Victor S. J. Reserva Ecológica do IBGE, Brasília - DF, Cx. Postal 08770 70.312-970, Brazil, mauro@lambert.net (MCLBR, VSJP); Laboratório de Geoprocessamento, Departamento de Geologia, UnB, Brasília - DF, Brazil (JWCR); Fundação Sustentabilidade e Desenvolvimento, Centro Empresarial Norte, Brasília - DF, Brazil (MV).

Long term trends (1986 - 2003) on the ecological (biotic, physical and geochemical) integrity of aquatic ecosystems draining an environmental protection area of Cerrado in central Brazil were monitored. Habitat models of aquatic environment response to terrestrial and terrestrial - aquatic ecotone (ZTTA) landscape attributes under the influence of different land use patterns and land occupation polices were established. A total of 40 sampling stretches were monitored according to stream order (second (15), third (20) and fourth (5) and land use (agriculture (10), urban (10) and conservation units (20)) along Ribeirão Gama drainage. Ecological integrity of aquatic systems were inferred on the basis of 16 fish communities and populations attributes, 60 physical habitat variables and 35 water and sediment quality parameters. Disturbances measured as Euclidian distance of sampling stations in relation to "respective sampling conditions controls" in a multidimensional scaling reduced hyperspace were registered along the years in all urban ($p=0.000$) and agriculture ($p<0.007$) influenced stream stretches, and in the lower course of conservation units streams flowing to disturbed areas ($p<0.03$). Connectivity (47%), diversity (27%), size and form (13%) of landscape and ZTTA fragments were significantly related ($p=0.000$) to aquatic habitat (39%), biotic (28%) and chemical (19%) integrity in the area. Three Discriminant Functions (DF) indicated that conversion of floodplains and gallery forests, urbanization of watershed and population density (First DF; $r=0.99$), agriculture (Second DF; $r= 0.74$) and land occupation polices (Third DF; $r=0.69$) explained 85% of aquatic integrity variance and may be used as robust aquatic integrity predictors. Adaptive management strategies for the conservation of aquatic system organization are addressed.

736. THREE, FIVE, OR 10 MINUTES POINT COUNTS: IS THERE ANY DIFFERENCE TO OBTAIN RICHNESS ESTIMATES OF ATLANTIC FOREST BIRDS? RIBON, RÔMULO; Barreto, Francisco C. C. Departamento de Ciências Biológicas, DECBI, Universidade Federal de Ouro Preto, Ouro Preto, MG, 35400-000, Brazil, ribon@iceb.ufop.br (RR). Setor de Entomologia, DBA, Universidade Federal de Viçosa, 36570-000, Viçosa, MG, Brazil (FCCB).

Point counts are a well developed tool for sampling birds in northern temperate regions but their effectiveness in tropical areas is still poorly known. We tested the efficiency of 3, 5, and 10 minutes protocols for sampling birds by point counts in Atlantic Forest fragments in the Viçosa region, Minas Gerais, Brazil. Species richness estimates were obtained by the Estimate S package. For one forest fragment the values obtained by three estimators (Chao, Jacknife and Bootstrap) were compared with species richness obtained in the long-term by different methods. This was done to verify the accuracy of the different estimators. Chao was a more accurate estimator but the least precise one, as it produced confidence intervals more than 10 times larger than those obtained by Jacknife and Bootstrap, which indicated that the 10 minutes protocol produces a significantly larger species richness estimate than 3 and 5 minutes. Estimates by Chao did not show any difference among the three protocols. At least 10 minutes should be used to estimate species richness in Atlantic Forest fragments by point counts. When the avifauna is poorly known by the researcher, other methods should be more feasible if species richness is the only variable to be obtained.

737. MAPPING THE VALUE OF NATURE: INCORPORATING ECOSYSTEM SERVICE VALUES INTO BROAD-SCALE CONSERVATION PLANS. RICKETTS, TAYLOR H.; Naidoo, Robin; Dinerstein, Eric. Conservation Science Program, World Wildlife Fund, 1250 24th St. NW, Washington, DC, USA, taylor.ricketts@wwfus.org.

Ecosystem goods and services - the economic benefits that people derive from nature - have received increasing attention as a tool to inform land use decisions that balance biodiversity conservation and human needs. Studies to date, however, typically focus on individual services (e. g., crop pollination, water purification), analyzed at local scales in a non-spatial manner. Here, we develop spatially-explicit analyses that integrate several ecosystem services over regional scales. These analyses are intended to better match the scale and scope of conservation plans developed by many conservation organizations and national governments. Testing our methods in a high-biodiversity forested ecoregion, we find first that important areas for ecosystem services overlap imperfectly with areas previously identified as biodiversity priorities. Second, benefits from ecosystem services accrue to human populations at multiple scales, including beyond the boundaries of the ecoregion in question. Finally, the economic value of ecosystem services from conserved areas can match or exceed the opportunity costs associated with habitat transformation, making conservation an economically competitive land-use. While preliminary and imperfect, maps of ecosystem goods and services and their economic value can inform conservation planning over broad scales, illuminating both the trade-offs and synergies between conservation and development.

738. USING CAMERA TRAPS TO ESTIMATE SPECTACLED BEARS (*Tremarctos ornatus*) DENSITY. RÍOS-UZEDA, BORIS; Gómez, Humberto; Wallace, Robert B. Wildlife Conservation Society - Greater Madidi Landscape Conservation Program, (591)-2-2786642, Casilla 3-35181, San Miguel, La Paz, Bolivia. brios@wcs.org (BRU, HG, RBW).

To date field based density estimations for spectacled bears have been unavailable, a situation mainly due to the logistical complications of working in Andean montane forests. We conducted a standardized camera trapping campaign to establish a robust density estimate of bears at a montane forest and humid grassland site in north-western Bolivia. Using marking patterns on the face and the neck, it was possible to recognize three spectacled bears across a 17 km^2 study area. A density of 8 bears was calculated by 100 km^2 for the study area. We also present a series of recommendations to improve future studies on spectacled bears using this methodology.

739. GENETIC STRUCTURE OF THE ENDANGERED RADIATED TORTOISE (*Geochelone radiata*) IN SOUTHERN MADAGASCAR AND CONSERVATION ISSUES. RIOUX PAQUETTE, SEBASTIEN; Louis, Edward E.; Lapointe, Francois-Joseph. Departement de Sciences Biologiques, Universite de Montreal, C.P. 6128 Succursale Centre-ville, Montreal, QC, H3C 3J7, Canada, sebastien.rioux.paquette@umontreal.ca (SRP, FJL). Center for Conservation and Research, Henry Doorly Zoo, Omaha, NE 68107, USA (EEL).

The radiated tortoise of Madagascar (*Geochelone radiata*) inhabits the semi-arid spiny forest of the southern part of the island, where habitat destruction and illegal harvesting greatly threaten this species. Furthermore, demand for radiated tortoises and their derived products has significantly increased recently, despite the legal protection prohibiting trade of this CITES-Appendix I species. In order to undertake appropriate conservations actions, it is essential to acquire a better knowledge of its genetic structure. For this study, 300 blood or skin samples were collected across the species' range and thirteen microsatellite markers were used to analyse population structure across its distribution. Results indicate that although many populations are genetically homogenous, the Menarandra river acts as a barrier to dispersal and gene flow. This contradicts the hypothesis that empty riverbeds during the dry season do not represent a geographical barrier explaining the genetic structure of this species. On average, populations exhibited high values of allele diversity and heterozygosity. Poaching in the region where genetic diversity is the highest has been reported recently, which is worrying since it was thought that this zone had been spared so far because of the presence of sacred forests and local beliefs prohibiting tortoise collection.

740. ALDER AMAZON -DEFINING ITS CONSERVATION STATUS AND PRIORITY AREAS. RIVERA, LUIS; Abendaño, Luciana; Politi, Natalia. Fundación CEBIO, Roca 44, S.S. de Jujuy, 4600, Argentina, luosvriv@yahoo.com (LR, LA). Department of Wildlife Ecology, University of Maine, 210 Nutting Hall, Orono, ME 04469, USA (NP).

Alder Amazon (*Amazona tucumana*) is an endemic and poorly known parrot that inhabits the montane cloud forest in Northwestern Argentina and Southern Bolivia. The species has suffered a severe capture for the pet trade in the 80s and is severely affected by habitat loss. We assessed the population numbers and distribution of Alder Amazon in Argentina. We surveyed 19 localities and found the species in 12 -seven are new sites for the species. The numbers decreased as we moved southwards. We recorded 5387 individuals, 74% of the individuals were detected in Sierra de Santa Barbara, Jujuy Province, where we found the largest roost

known for the species and detected six active nests. This area is threatened because it is still affected by intense use and conversion by humans. Conservation efforts for the species should focus on this area. The number of individuals recorded represents less than the third part of the number of Alder Amazons exported between 1985 and 1989 (18,641), what demonstrates that those captures had a strong effect on wild population levels. We propose that Alder Amazon be maintained in Appendix I of CITES and recategorized as Vulnerable in the Red List of IUCN.

741. NEGATIVE ENVIRONMENTAL PERTURBATIONS MAY IMPROVE SPECIES PERSISTENCE. ROBERT, ALEXANDRE. UMR 5173 CNRS MNHN Conservation des espèces, restauration et suivi des populations. Museum National d'Histoire Naturelle, CRBPO 55, rue Buffon, 75005 Paris, France (arobert@mnhn.fr).

There has been a controversy over the respective roles of environmental perturbations and genetic deterioration in limiting the viability of small isolated populations, with some theoretical studies suggesting that the environment may be of greater importance than the genetic aspects in reducing persistence. Here, I use a modeling approach to examine the impact of environmental perturbations on the persistence time of small isolated populations subject to inbreeding depression and mutation accumulation. However, rather than examining the respective weights of these two types of threat, I focus on their interaction. Following the results reported by recent studies that uncovered the stronger severity of inbreeding depression in stressful than in benign environments, I assume that environmental perturbations can induce additional selection against harmful mutations. Under this assumption, I demonstrate that perturbations that have a strong negative effect on demography may also limit mutation accumulation. Therefore, perturbations may paradoxically lead to improved species persistence times for realistic values of perturbation frequencies and severity distribution. This suggests that population viability assessments neglecting the environment-genetics interaction may underestimate the extent of selection, yielding biased estimates of fitness and extinction rates.

742. CONSERVATION SCIENCE AND POLICY: A ROLE FOR SCB IN PROVIDING SCIENTIFIC PERSPECTIVE TO THE 2010 BIODIVERSITY TARGET. ROBINSON, JOHN G. Wildlife Conservation Society, 2300 Southern Boulevard, Bronx, New York 10460, USA, jrobinson@wcs.org.

By providing scientific counsel and analysis, SCB and its members can effectively influence the policies of international conventions, national and local governments, and private organizations and companies. Given the multitude of conservation targets, and the different ways to influence policy (from analysis to lobbying and advocacy), SCB needs to focus our collective efforts on those issues where our scientific reputation and ability to aggregate and synthesize scientific information can produce the desired conservation outcomes. Helping to define the 2010 Biodiversity Indicators is an international policy intervention where SCB and its members have both the standing and capability.

743. MANAGEMENT EVALUATION OF 5 PROTECTED AREAS IN CONDOR BIORRESERVE, ECUADOR THRU CONSOLIDATION SCORECARD. Robles, Marco; CAMACHO, JAIME; Campaña, Jorge. EcoCiencia, Francisco Salazar E14-34 y Coruña, Quito, Pichincha, Ecuador, pep@ecociencia.org.

The evaluation of the management of protected areas using participatory tools like the Consolidation Scorecard allows identify the critical aspects of management and understand the perception of local stakeholders about the protected areas. We realized 5 participatory workshops with an average of 20 people for 5 protected areas located in the upper watershed of the Napo river, Ecuador. In each workshop we organized discussion groups with people from the Ministry of Environment, non governmental organizations, local governments, local communities, indigenous people and private enterprises. These groups qualified 27 indicators in 4 areas of management: Strategic Planning (9), Protection and Management (10), Financing (2) and local support (6). The results indicate that all protected areas are in a process of consolidation with values of 2 or 3 of a maximum of 5. There are differences in the evaluations of each group of stakeholders. In general, the people from the Ministry of Environment has a better qualification for each indicator. The evaluation reflects the urgent need to better communication between protected area management and stakeholders. After the evaluation each protected area has identified critical areas in which to work to consolidate its management.

744. ENDEMIC AND THREATENED TETRAPODS IN THE RESTINGAS OF THE BIODIVERSITY CORRIDORS OF SERRA DO MAR AND OF THE CENTRAL DA MATA ATLÂNTICA IN EASTERN BRAZIL. ROCHA, CARLOS FREDERICO D.; Van Sluys, Monique; Bergallo, Helena G.; Alves, Maria Alice S. Departamento de Ecologia, IBRAG, Universidade do Estado do Rio de Janeiro, Rua São Francisco Xavier 524, Maracanã, 20550-013, Rio de Janeiro, RJ, Brazil, cfdrocha@uerj.br.

Biodiversity corridors comprise a mosaic of land uses connecting fragments of natural forest across the landscape. Two such corridors were established along the eastern coast of Brazil: the Serra do Mar (SM) and the Central da Mata Atlântica (CMA), along which most of the coastal plains are restingas. In this study we analize the present status of the endemic and endangered terrestrial vertebrates (amphibians, reptiles, birds and mammals) along 10 restingas in both corridors. Some restingas harbor a relatively large number of endemics, and two main regions of endemism can be identified: the coastal restingas from northern Espirito Santo State (ES) to southern Bahia (BA) State, and the coastal regions between the restingas of Maricá and Jurubatiba, Rio de Janeiro State. Six species of terrestrial vertebrates considered threatened with extinction are found in the restingas of SM and CMA biodiversity corridors. The region between the restinga of Maricá and that of Jurubatiba is of special relevance for the conservation of vertebrates of the restingas of the corridors because a considerable number of threatened species of terrestrial vertebrates are found there. (Support: CI, CNPq).

745. CAN WE USE LARGE MAMMAL CONSERVATION STRATEGY TO PROTECT SMALL MAMMALS? THE CASE OF THE PONTAL DO PARANAPANEMA REGION (SP, BRAZIL). ROCHA, FLÁVIA S.; Valladares-Padua, Claudio. IPÊ - Instituto de Pesquisas Ecológicas. Rua Ricardo Fogarolli, 387. Vila São Paulo, Teodoro Sampaio, SP, Brazil, CEP 19280-000. flarocha@uol.com.br.

Strategies used to protect large mammals are also considered effective for smaller species. We support the idea that some species can be disregarded because of their different perception of the landscape. We present a case of six fragments where small mammals were studied for two years and landscape management based

on large mammals is being used for some time. We calculated landscape indices, simulated dispersal ability of species by using different radius for connectivity and used multiple regression to investigate the relationship between landscape structure and community indices. Area and proximity to other patches of same type in a short distance (750m) explained 99% of the patterns of richness, while diversity was explained only by nearest neighborhood. The measure of isolation refers to the movement between fragments, and as small mammals have low dispersal ability, an isolated patch is ideal for local extinctions and depauperate fauna. Our landscape is composed by small fragments separated by large open fields, easily crossed by large mammals, but effective barriers for small ones. We strongly recommend the establishment of stepping stones separated by short distances, and landscape management in a finer scale, to effectively mitigate isolation effects for a wider array of species.

746. PONTA DO TUBARÃO SUSTAINABLE DEVELOPMENT RESERVE (RIO GRANDE DO NORTE - BRAZIL): A NEW APPROACH FOR PROTECTED AREAS. ROCHA, LIGIA; Oliveira, Rosa M. P.; Cabral, Maria José O.; Melo, Maria das Graças Q. Instituto de Desenvolvimento Econômico e Meio Ambiente do Rio Grande do Norte - IDEMA, Rua Nascimento de Castro 2127, Lagoa Nova, 590565-450, Natal, RN, Brazil. (ligiamrocha@uol.com.br).

Ponta do Tubarão, a remote area in the north coast of Rio Grande do Norte (Brazilian Northeast) with 7500 inhabitants and fisheries as their main income, was a major battleground between local communities and external industry interests. Knowing that the implementation of a large scale tourism project and shrimp farms would threaten natural resources and their traditional way of life, local communities articulated with government, universities, and representatives to defend their rights. As a result, the state environmental agency (IDEMA) created the "Ponta do Tubarão Sustainable Development Reserve" in 2003. Since then IDEMA has been working with the local communities in order to implement the reserve in a participatory way. The Reserve Management Council and its bylaws were intensively debated and negotiated and have been working since 2004. It is one of the few working Management Councils in Brazil. Sustainable fisheries, tourism and land use were prioritized for the Management Plan. The creation and implementation of this Reserve represents a turning point in protected areas policy in Brazil. Contrary to common conservation practice, which sees local communities as obstacles, the process we report here has not only involved the participation of local communities, but has also been launched by them.

747. THE STRUGGLE FOR LAND BETWEEN AGRICULTURE AND CONSERVATION: CAN THE CARBON MARKET SOLVE IT? ROCHA, MARCELO T.; Mello, Pedro C. Centro de Estudos Avançados em Economia Aplicada, Caixa Postal 132 - 13400-970, Piracicaba, SP, Brasil, matrocha@esalq.usp.br.

According to the 2004/2005 Agriculture and Dairy Plan the Brazilian commercial agriculture will have R$ 39.45 billions to finance their activities. This could result in an increase of the soybean plantation in the Cerrado. The second survey on the intention of new soybean plantation made by CONAB, already shows an increase in area of 4.9%, compare to the last crop season. The highest absolute increase was registered in the Center-West Region (515 thousand hectares) especially in the Mato Grosso do Sul, Mato Grosso and Goiás states. According to studies made by Conservation International, if deforestation rate keeps in the actual level, the Cerrado can disappear in 2030. The Environmental Ministry launched in September of 2004, the National Conservation and Sustainable Use Program to the Cerrado Biome (Sustainable Cerrado Program), which aims to "search conditions to reverse the negative social and environmental impacts through conservation, restoration, recovery and sustainable management of the natural and agricultural ecosystems, with the valorization and recognition of traditional populations". Financial resources from the "carbon market, through reforestation and/or afforestation activities within the Clean Development Mechanism of the Kyoto Protocol, or through forest conservation activities within the non-Kyoto market mechanisms can help in the pursuit of a sustainable Cerrado.

748. MEASUREMENT OF THYROID HORMONES (THYROXINE -T4, TRIIODOTHYRONINE -T3) IN CAPTIVE NEOTROPICAL WILD FELIDS. RODINI, DÉBORA CATTARUZZI; Felippe, Érika C. G.; Oliveira, Claudio A. Departamento de Reprodução Animal da Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo, Av. Prof. Dr. Orlando Marques de Paiva, n. 87. Cidade Universitária- Butantã, São Paulo -SP, 05508-000, Brasil, decatt@ig.com.br (DCR, ECG, CAO).

Neotropical wild felids are classified as vulnerable to critically threatened according to IUCN criteria. However, informations about their physiology are scarce. The aim of this work was to contribute with basic values for the diagnosis of thyroid function alterations in wild felids. The serum thyroid hormone concentrations were measured by radioimunoassay in seven species of captive wild felids. The mean values of T3 and T4 were respectively: 56.69 ±3.45 ng/dl and 0.97 ±0.08 µg/dl for jaguars, 67.88 ±3.91 ng/dl and 1.12 ±0.12 µg/dl for pumas, 48.99 ±3.53 ng/dl and 1.38 ±0.15 µg/dl for ocelots. The oncillas showed average of 43.57 ±3.44 ng/dl and 1.00 ±0.16 µg/dl. Regarding to the geoffroy's cats was 44.66 ±4.35 ng/dl and 0.80 ±0.16 µg/dl. The jaguarundis had average concentrations of 70.07 ±3.03 ng/dl and 0.50 ±0.10 µg/dl. For the margays, the average concentrations were 48.8 5 ±4.50 ng/dl and 1.22 ±0.23 mg/dl. This results can be useful to develop normal reference ranges of T3 and T4 in these species of neotropical wild cats.

749. PROGRESS AND PROBLEMS IN THE APPLICATION OF SYSTEMATIC CONSERVATION PLANNING TOOLS TO GAP ANALYSES. RODRIGUES, ANA S. L.; Brooks, Thomas; Langhammer, Penny; Foster, Matthew; Knox, David; da Silva, Namaal. Center for Applied Biodiversity Science, Conservation International, 1919 M St, NW, Suite 600 Washington DC 20036, USA, a.rodrigues@conservation.org (ASLR, TMB, PL, MF, DK, NS).

Systematic conservation planning approaches have gained huge currency in the literature over the past 20 years, but until recently were criticized for the chasm between theoretical developments and application to conservation practice. In the past few years, however, they have became extremely popular amongst conservation planners, their application made easier by the dissemination of user-friendly software. This represents significant progress, delivering transparency and objectivity to conservation, with individual protected areas planned as part of networks rather than one at a time. However, there are risks in using these approaches as black boxes, without giving due consideration to the limitations imposed by data quality, and with little adjustment of the methods to the

particular objectives of each conservation planning exercise. Here we discuss and illustrate those risks in the context of gap analyses. They include the use of land classes as surrogates for species, the use of extrapolated and modeled data rather than actual locality data, and the use of grid cells rather than land management units. These result in a tendency to exacerbate commission errors, proposing the conservation of sites not adequate for the species' conservation. We propose the key biodiversity areas approach to circumvent these problems.

750. GENETIC DIFFERENTIATION OF THE WOOLLY MOUSE OPOSSUM (*Micoureus paraguayanus*) IN ATLANTIC FOREST FRAGMENTS. RODRIGUES, FERNANDO P.; Rocha, Flávia S.; Matioli, Sergio R. Departamento de Zootecnia, Universidade Estadual Paulista, Jaboticabal, SP, 14870-000, Brazil, fprodrigues_consgen@yahoo.com.br (FPR). Instituto de Pesquisas Ecológicas - IPÊ, Teodoro Sampaio, SP, Brazil (FSR). Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo, SP, Brazil (SRM).

The Brazilian Atlantic Forest is one of the most endangered ecosystems in the planet and its last great remnant at the inner part is the Morro do Diabo State Park, at West of São Paulo state. Around this protected area, with 35000 hectares, we can find other small forest patches surrounded mainly by cattle pasture. This scenery, developed during the last sixty years, is a good area to the monitoring of genetic changes imposed by recent habitat fragmentation. Tissue samples from 95 woolly mouse opossums, representing seven populations, were screened for polymorphism at four microsatellite loci. Mean observed heterozygosity was 0.42. Significant but intermediate to low levels of differentiation (F_{ST} = 0.060 and Rho = 0.053) were observed between some populations, while hierarchical analyses of differentiation among them using F_{ST} and Rho values show a weak genetic structure. Although little is known about the dispersal pattern of this speci es, it seems that the weak genetic structure found must be a consequence of the recent habitat fragmentation and ancestral polymorphism retention instead of migrant exchanges between populations. If so, the genetic changes may be pronounced in the next decades, contributing with other perils that threaten these populations.

751. INFLUENCE OF HABITAT USE ON HEALTH STATUS OF MANAE WOLF (*Chrysocyon brachyurus*). RODRIGUES, FLÁVIO H. G.; de Paula, Rogério C.; Azevedo, Fernanda C.; May, Joares; Santos, Fernanda V.; Morato, Ronaldo; Santos, Jean P. Univeridade Federal de Minas Gerais, Departamento de Biologia Geral, Av. Antônio Carlos 6627. CP 486. CEP31270-901. Belo Horizonte, MG, rodrigues@procarnivoros.org.br (FHGR). Instituto Pró-Carnívoros (FHGR, RCP, FCA, JM, FVS, RM, JPS). CENAP, IBAMA, Atibaia, SP (RCP, RM).

The intense human occupation of the Cerrado ecosystem, leading into habitat alteration and fragmentation has been considered the main risk for the maned wolf conservation. Additionally, contact with domestic animals represents a threat related to epidemiological issues. The objective of this research was to gather information concerning habitat use and the epidemiological risks from contacts between maned wolves and dogs in a disturbed landscape around the Serra da Canastra National Park, Minas Gerais, Brazil. Nine maned wolves were captured in box traps and blood, fecal, and urine samples were collected in order to evaluate parasitological infestation and biochemical patterns of the individuals. They were marked with radio-collars to monitore the use of habitat (natural and altered areas). Six species of intestinal parasites were detected, such as *Trichuris* sp., *Ancylostoma* sp., *Strongylus* sp., and *Toxocara* sp. The infestation, mainly from *Giardia* sp., was higher in farmlands and in areas with close contact with humans and domestic dogs. Biochemical evaluation has been indicating that wolves that use only altered landscapes have two times higher sanguine cholinesterase level in comparison with animals using only natural areas, indicating contact with high levels of pesticides.

752. INVASION OF PARANOÁ LAKE BY THE ASIAN CLAM *Corbicula fluminea* (CORBICULIDAE, BIVALVIA). RODRIGUES, JANAÍNA C. A.; Píres Júnior, Osmindo R.; Silva, Maria J. M. Departamento de Zoologia, Instituto de Biologia, Universidade de Brasília, DF, 70.910-900, Brazil, janabiologa@pop.com.br (JCAR, MJMS). Departamento de Ciências Fisiológicas, Instituto de Biologia, Universidade de Brasília, DF, 70.910-900, Brazil(ORPJ).

Corbicula fluminea is a freshwater bivalve originating from Asia. Early sexual maturity, high reproductive potential and a remarkable ability to occupy different environments makes it an aggressive invasor. This study reports the occurrence of *C. fluminea* in the Lago Paranoá, an artificial lake surrounding Brasília. The highest clam density (350 individuals/m 2) occurred under the Ponte (bridge) do Bragueto, where only open shells were found. In other areas we found 1-3 individuals/m 2. Measurements of shell length indicates the greater individuals (± 38.3 mm) to be 4-5 years old, which is consistent with local fishermen reports considering the population to have established 5 years ago. We are still investigating how this bivalve arrived into the Paranoá Lake. A monitoring program to assess the populational structure, density, distribution and control of the Asian clam in the Paranoá Lake is being designed.

753. LONG-TERM IMPACT OF CONTINUED OUTDOOR EDUCATIONAL INTERVENTIONS ON KNOWLEDGE, POSITIVE ATTITUDES, AND BEHAVIORS TOWARD AN ENDEMIC, ENDANGERED PARAKEET. Rodríguez-Clark, Kathryn M; DASHIELL, STEPHANIE L.; Faria Romero, María Alejandra; Briceño Linares, José Manuel; Neugarten, Rachel A. Provita, Apartado 47552, Caracas 1041-A, Venezuela. stephdashiell@yahoo.com (SLD, MAF, JMBL). Instituto Venezolano de Investigaciones Científicas, Centro de Ecología, Apartado 21827, Caracas 1020-A Venezuela, kmrc@ivic.ve (KMRC, JPR).

Environmental education has been used as a tool for influencing knowledge, attitudes and behaviors with respect to local environmental issues, but the results of these interventions are rarely reported. The blue-crowned conure (*Aratinga acuticaudata neoxena*) nests in the mangrove forests of Parque Nacional Laguna de La Restinga, (Margarita Island, Venezuela) and is critically endangered. In 2003, Provita, a Venezuelan NGO, used various environmental education interventions in an attempt to reduce poaching, the primary threat to this species. School-based interventions were more effective in the short term than an outdoor day camp, reaching ~8 times more students with comparable resources invested and conservation impacts achieved. However, results suggested that the day camp promoted longer-lasting attitudinal and behavioral changes. In 2004, we repeated the 2003 day camp, with nearly double the number of participants (52). Preliminary results reveal a high retention rate for changes in knowledge, attitudes and activism in repeat participants. Furthermore, this group continues to show improvement in all areas; however, improvement was greater among first-time participants. These results highlight the

value of repeated outdoor educational interventions in increasing positive attitudes toward an endangered species, and in promoting the behavioral changes that will ultimately reduce its primary threat.

754. CONSERVATION IN AUSTRAL AND NEOTROPICAL AMERICA: HOW TO BUILD SCIENTIFIC CAPACITY EQUAL TO THE CHALLENGES. RODRÍGUEZ, JON PAUL; Simonetti, Javier A.; Premoli, Andrea; Marini, Miguel Â. Centro de Ecología, Instituto Venezolano de Investigaciones Científicas, Apdo. 21827, Caracas 1020-A, Venezuela, and Provita, Apdo. 47552, Caracas 1041-A, Venezuela, jonpaul@ivic.ve (JPR); Departamento de Ciencias Ecológicas, Facultad de Ciencias, Universidad de Chile, Casilla 653, Santiago, Chile (JAS); Laboratorio Ecotono, Universidad Nacional del Comahue – CRUB, 8400 Bariloche, Argentina (AP); Departamento de Zoologia, IB, Universidade de Brasília (UnB), 70.910-900, Brasília, DF, Brazil (MÂM).

How large is the demand for conservation capacity building in Austral and Neotropical America (ANA)? How many people are available for the job? How much is there to conserve? To answer the first question we analyze the demand for two recent graduate-level training opportunities available to ANA students. The second and third questions are addressed by calculating the ratio between the number of conservation biology academic programs available in 26 ANA countries and (1) the total human population, and (2) the number of bird species in each country. We contrast these figures with similar figures calculated for the United States, where conservation capacity building is well developed. In the United States there are 0.329 academic programs in conservation biology for each 1 million inhabitants ($A/10^6$ people), and 8.8 academic programs for every 100 bird species ($A/10^2$ species). In ANA there are 0.064 $A/10^6$ people, and 0.1 $A/10^2$ species, one and three orders of magnitude lower, respectively. Using information on investments made in expanding conservation biology graduate studies opportunities in the United States, we estimate the costs of achieving similar objectives in ANA: 20 million U. S. dollars could change the face of the discipline of conservation biology in the region.

755. ENDANGERED AND ENDEMIC BIRDS AND MAMMALS IN STRICT PROTECTED AREAS IN COLOMBIA AND VENEZUELA: ARE THEY WELL PROTECTED? Rodríguez, Jon Paul; LAZO, RODRIGO; Armas, Manuel; Gutiérrez, Eliécer; Ruiz, Augusto; Tapiquén, Efraín; Zambrano, Sergio; Solórzano, Luis Aníbal; Rojas-Suárez, Franklin. Centro de Ecología, Instituto Venezolano de Investigaciones Científicas, Apdo. 21827, Caracas 1020-A, Venezuela, jonpaul@ivic.ve (JPR, MA, EG, AR, ET, SZ); Centro Internacional de Ecología Tropical, Instituto Venezolano de Investigaciones Científicas, Apdo. 21827, Caracas 1020-A, Venezuela, rlazop@cantv.net (RL), Conservation International Venezuela, Av. San Juan Bosco, Edif. San Juan, Piso 8, Ofic. 8A, Altamira, Caracas, Venezuela (LAS, FRZ).

Typically, gap analyses assess the presence-absence of target species in protected area networks, and suggest priority areas in the gaps thus identified. But does "presence" assure adequate conservation? Do analyses performed using different taxonomic groups agree? We explore these questions by implementing a geographical information system to quantify the proportion of the ranges of Colombian and Venezuelan birds and mammals included in these two countries' network of 129 strict protected areas. We focus on endemic or threatened species: 32 birds and 45 mammals in Colombia, and 47 birds and 14 mammals in Venezuela. In Colombia 12 birds and 4 mammals are absent from the network, while in Venezuela only 1 mammals is excluded (all birds are covered). If one focuses on species with small ranges (< 2,500 km 2) and low-level protection (<15% of range), the figures change to 14 birds and 1 mammal for Colombia, and 7 birds and 2 mammals for Venezuela. For birds, montane areas of the Andes and the Venezuelan coast are the principal gaps. For mammals, gaps are located in arid and dry tropical forest ecosystems in north western Venezuela and north eastern Colombia. Considering these two groups independently generates different conservation priorities.

756. AN ASSESSMENT OF UNEXPECTED RESPONSES BY NATIVE AND EXOTIC SPECIES TO IMPROVE CONSERVATION STRATEGIES. ROEMER, GARY; Courchamp, Franck; Bakker, Vickie; Doak, Dan. Department of Fishery and Wildlife Sciences, New Mexico State University, Las Cruces, New Mexico, 88003, USA, groemer@nmsu.edu (GR). Ecologie, Systématique and Evolution, Université Paris-Sud XI, 91405 Orsay Cedex, France, franck.courchamp@ese.u-psud.fr (FC). Department of Wildlife, Fish and Conservation Biology, University of California, Davis, California, 95616, USA, vjbakker@ucdavis.edu (VB). Department of ecology, and Evolutionary Biology, University of California, Santa Cruz, Calfifornia, 95064, USA, doak@biology.ucsc.edu (DD).

Direct effects of exotic species are well documented and often devastating to native species. Equally devastating and more sinister are indirect effects that are both unexpected and less predictable. We uncovered such a scenario whereby the presence of feral pigs enabled golden eagles to colonize the California Channel Islands, and through the process of apparent competition drove the island fox toward extinction. The colonization of the islands by golden eagles and their use of piglets as prey were both unexpected. Management actions to save the fox include the live-capture and removal of golden eagles, eradication of pigs, and captive breeding, release and monitoring of foxes. Despite success on all fronts, we show that some management actions may have unpredictable outcomes. Further, there is a lack of knowledge regarding how or if foxes have responded to heightened predation. We suggest that foxes may have responded to this intense selective pressure by becoming more noct urnal, an evolutionary response that may lessen their risk of extinction. Conservation strategies that consider unexpected responses to management actions or which consider potential evolutionary responses by the species involved maybe more efficacious than less informed approaches. Incorporating quantitative models with monitoring programs that collect the data necessary for model parameterization can assist development of more prescient strategies.

757. ACCELERATING ECOSYSTEM RECOVERY AND RESTORATION IN DEGRADED LOWLAND FORESTS. Rolph, David; GRAY, ELIZABETH; Kollasch, Tom. The Nature Conservancy of Washington, 217 Pine Street, Suite 1100, Seattle, WA 98101, USA, egray@tnc.org.

Over the last century, low elevation temperate coniferous forests in the Pacific Northwest have been managed largely for commercial timber production, which has left a legacy of degraded habitat. It is widely recognized that restoration of these forests is critical. What is unknown is which restoration methods are most promising for accelerating ecosystem recovery and maximizing species diversity. To investigate this question, The Nature Conservancy recently acquired a 2,200 ha watershed on the Olympic peninsula of Washington state, USA. Because >95% of the watershed was

logged previously, our goal was to implement a long-term experimental study investigating how best to restore this landscape in a cost-effective manner. Success in designing and implementing an experimental approach to watershed-scale restoration has been challenging. We've found that to succeed in large scale experimental restoration, one must strive to not only restore habitat in a financially feasible manner, but to do it in a way that provides future restoration efforts with sound scientific milestones. Our findings suggest that this is best accomplished with an active adaptive management approach. In addition, projects will be most successful when resource management objectives are compatible between public and private landowners, and funding cycles encourage long-term experimentation and monitoring.

758. PREDICTING CHANGES IN DISTRIBUTION IN AVIAN DIVERSITY ACROSS AN ENDANGERED LANDSCAPE, THE PANAMA CANAL CORRIDOR. ROMPRE, GHISLAIN; Robinson, W. Douglas; Angehr, George; Desrochers, Andre. Centre de recherche en biologie forestière, Faculté de foresterie & géomatique, Université Laval, Quebec, Canada, G1K 7P4 (GR, AD), ghislain.rompre.1@ulaval.ca. Dept of Fisheries and Wildlife, And Oak Creek Lab of Biology, Oregon State University, Corvallis, OR, USA, 97331 (WDR), Smithsonian Tropical Research Institute, Unit 0948, APO AA 34002-0948 (G.A).

Local bird species richness is influenced by many biological and physical factors. Disruptions in the processes influencing richness will lead to degradation of diversity over time. Actual degradation occurring to natural habitat, similar to bird species richness, is not uniformly distributed. We studied the patterns of bird species richness distribution in the forest fragments in the canal corridor, Panama. Then we derived a series of habitat loss scenarios based on projections of human population growth. In order to predict bird species loss, we used a species-area relationship model that includes both richness distribution patterns and non-random human effects on habitat. Results show that bird species richness varies significantly across a regional rainfall gradient, fragment size, forest type, altitude and topography. Similarly, forest conversion to urban areas or agriculture is influenced by annual rainfall, topography, human population densities, growth rates, and near est distance to cities and major roads. In addition to reduced fragment size, isolation of the remaining patches exacerbates species loss. Pacific slope forests, which have lower bird diversity and are closest to the country's capital (Panama City), are at greater risk of deforestation if conservation actions are not taken.

759. UNIVERSITY-LANDOWNER PARTNERSHIPS IN SOUTH CENTRAL IDAHO: A STUDENT-DRIVEN, COLLABORATIVE APPROACH TO ENDANGERED SPECIES CONSERVATION. ROON, DAVID A.; Hinson, Joe; Soulen-Hinson, Margaret; Waits, Lisette P. College of Natural Resources, University of Idaho, P.O. Box 441136, Moscow, ID, 83843, USA, roon8505@uidaho.edu (DAR, LPW) 1824 Jones Road, Weiser, ID, 83672, USA (JH, MSH).

The Endangered Species Act (ESA), although a powerful tool for conservation in the USA, is often criticized for a perceived disproportionate financial burden on private landowners. Section 10 of the ESA allows private landowners to enter proactive conservation agreements with the US government. These agreements, such as Candidate Conservation Agreements (CCAs), give landowners some measure of protection from the ESA's more stringent proscriptions. In 2002 and 2003, we worked with Soulen Livestock, a prominent Idaho ranching corporation, to develop a multi-species CCA for a mixed area of private and federal lands in Southern Idaho's sage-steppe ecosystem. Students from a senior-level conservation biology class at the University of Idaho conducted literature surveys to identify habitat associations and landscape-level threats for 22 species-of-concern (identified through consult with US Fish and Wildlife and other agencies). Students with global information systems (GIS) experience used these data to build multivariate species habitat models, identifying regions of conservation priority. These models informed management objectives within the final Soulen CCA, currently in review. Our experience can serve as a model for university-landowner collaborations, for utilizing the skills of undergraduate students during conservation planning, and for cooperative, proactive conservation of endangered species on private lands in the USA.

760. THE USE OF DISTANCE MAP TO CALCULATE THE COST SURFACE INPUT FOR RESERVE SELECTION TOOLS. ROSA, M. R.; Scaramuzza, Carlos A. M.; Simões, L. L.; Accacio, G. de M.; Hercowitz, M.; Maltez, H. M.; Rodrigues, Sidney T.; Pinagé, E. R. ARCPLAN, Alameda Joaquim Eugênio de Lima, 881, Cj. 911, 01403-001, São Paulo, SP, Brazil (MRR) mrosa@arcplan.com.br. WWF-Brasil, SHIS EQ QL 6/8, conjunto E, 2º andar, 71620-430, Brasília, DF, Brazil (LSS, CAMS, HMM, STR, ERP). Verde Volta, Rua Deputado Laércio Corte 1430, Apto. 142AC, 05706-290, São Paulo, SP, Brazil (GMA). Estrela Consultoria, R. Original 172, ap.61, 05435-050, São Paulo, SP, Brazil (MH).

The reserve selection algorithms require a cost surface to define conservation priority areas. The usual procedure is to determine the cost of each planning unit based on the effect of some indicative variables (reserves, land uses, cities, etc) for conservation. The costs are weighted sums of intersection areas between a theme layer (e. g. pasture) and fixed size buffers around the planning units. In a systematic conservation plan for a Brazilian Ecoregion, we adopted a different approach based on distance maps. The assumption is that areas closer to the entities are more affected. Specific cost grid surfaces were created for each of the nine themes. For each cell of the grids, these values were summed to generate an integrated cost surface. The cost of each planning unit was calculated by an average of the cell costs inside it. This method adds more flexibility and precision to the cost analysis since the grids for each theme are calculated with specific buffer distances ins tead of a generalized buffer size. Besides this, the specific cost surfaces are useful data to refine the results of the reserve selection and to subsidize the elaboration of an action plan.

761. TEMPORAL TRENDS IN STAND CHARACTERISTICS AT THE FOREST EDGE OF THE FOREST-NONFOREST INTERFACE. ROSSON, JAMES F. JR. USDA Forest Service, Southern Research Station 4700 Old Kingston Pike, Knoxville, TN USA 37919 jrosson@fs.fed.us.

The edge-zone area in forest land has increased across the southern U. S. because of disturbance (cutting) and because of land transformation of forest to a nonforest status (roads, housing, etc.). Studies of edge-effect zones across large regions are lacking. I used continuous forest inventory data from the USDA Forest Service, Forest Inventory and Analysis (FIA) to study changes in forest stand characteristics of sample plots disturbed in the 1970's by forest to nonforest transformations in the immediate sample plot vicinity. These plots were remeasured in the 1980's and again in the 1990's. The study plot population consists of 132 sample plots in Arkansas and 200 sample plots in Mississippi. Average stand

basal area of these edge-zone plots increased from 22.9 (± 0.75 SEM) m 2 ha to 24.5 (± 1.07 SEM) m^2 ha between 1978 and 1995 in Arkansas and from 19.9 (± 0.74 SEM) m^2 ha to 26.2 (± 0.90 SEM) m^2 ha in Mississippi. The expected increase in understory density (trees > 2.54 but < 12.7 cm dbh) was not evident but instead decreased in both states; from 1346 (± 107 SEM) to 1170 (± 133 SEM) trees per hectare (tph) in Arkansas and from 1539 (± 96 SEM) to 1122 (± 126 SEM) tph in Mississippi. Tree mortality in these edge zones did increase in both states, going from 5.7 (± 1.11 SEM) to 9.5 (± 1.65 SEM) percent of stand basal area in Arkansas and 5.9 (± 1.23 SEM) to 9.1 (± 1.00 SEM) percent in Mississippi. Preliminary analysis shows diameter growth increasing, most likely from increased low angle light. However, the increase in mortality is higher than on other interior plots. These responses may be due to other microclimatic changes at the forest-edge interface such as higher diurnal temperatures, decreases in humidity, and wind disturbance.

762. DESIGNING LARGE-SCALE CONSERVATION CORRIDORS FOR PATTERN, PROCESS AND IMPLEMENTATION. ROUGET, MATHIEU; Cowling, Richard M.; Lombard, Amanda T.; Knight, Andrew T.; Kerley, Graham. Kirstenbosch Research Centre, South African National Biodiversity Institute, Claremont 7735, South Africa; rouget@sanbi.org (MR). Department of Botany, University of Cape Town, Rondebosch 7701, South Africa (MR). Department of Botany and Terrestrial Ecology Research Unit, University of Port Elizabeth, P.O. Box 1600, Port Elizabeth, 6000, South Africa (RMC, ATL, ATK). Terrestrial Ecology Research Unit and Department of Zoology, University of Port Elizabeth, PO Box 1600, Port Elizabeth, 6000, South Africa (GK).

A major challenge for conservation assessments is to identify priority areas that incorporate biological patterns and processes and consider implementation issues. Because large-scale processes are mostly oriented along environmental gradients, we propose to accommodate them by designing regional-scale corridors to capture these gradients. Based on systematic conservation planning principles, such as representation and persistence, we selected large tracts of untransformed land (i. e., conservation corridors) for conservation that would achieve biodiversity targets for pattern and process in the Subtropical Thicket Biome of South Africa. We combined least-cost path analysis with a target-driven algorithm to identify the best option for capturing key environmental gradients while considering bi odiversity targets and conservation opportunities and constraints. We designed seven conservation corridors on the basis of subtropical thicket representation, habitat transformation and degradation, wildlife suitability, irreplaceability of vegetation types, protected area networks, and future land-use pressures. These conservation corridors covered 24.9% of the planning and successfully achieved targets for biological processes and to a lesser extent for vegetation types. To ensure successful implementation, a land use management model was developed. By combining biodiversity pattern and processes as well as implementation opportunities and constraints, such design should ensure adequate conservation of the Thicket Biome.

763. THE DEVELOPMENT OF A POLICY AND PLANNING TOOL FOR THE SYSTEMATIC CONSERVATION OF SOUTH AFRICA'S FRESHWATER BIODIVERSITY. ROUX, DIRK J.; Nel, Jeanne L.; Maree, Gillian; Maze, Kristal; Pienaar, Harrison. CSIR Environmentek, P O Box 395, Pretoria, 0001, South Africa, droux@csir.co.za, +27 12 841 2695.

Trade-offs between achieving biodiversity conservation and achieving economic development are inevitable. There is a need for a framework that provides guidance regarding: a desirable proportion of rivers to be designated for biodiversity conservation; which rivers should be targeted to conserve a representative spectrum of biophysical river characteristics; and achieving horizontal coherence and coordination across sectors responsible for biodiversity, water resources and land management. A South African initiative has developed a freshwater planning tool incorporating a hierarchy of descriptors for generating physical "signatures of river heterogeneity", a framework for identifying and spatially represent aquatic ec osystem processes, and a step-wise planning process. Parallel to these developments, a set of policy principles and options were drafted to facilitate cross-sector coordination in managing freshwater biodiversity. The feasibility of setting quantitative targets at 10%, 20% and 50% of freshwater ecosystems is assessed. Similarly, different design options for achieving biodiversity representation as well as persistence are addressed, e. g. starting with priority estuaries and selecting their associated river systems versus selecting the most intact river systems first and then achieving connectivity between them. Policy options related to design efficiency and flexibility, administrative boundaries, and stakeholder engagement are also addressed.

764. BEHAVIOR IS A NECESSARY CONSIDERATION IN CONSERVATION: SEXUAL SEGREGATION AS AN EXAMPLE. RUBIN, ESTHER S. Conservation and Research for Endangered Species, Zoological Society of San Diego, 15600 San Pasqual Valley Road, Escondido, California, 92027, USA (erubin@sandiegozoo.org).

Sexual segregation is a behavioral phenomenon observed in many species; however, it is not known why males and females of many species live apart for much of the year. I will discuss why sexual segregation is a necessary consideration in conservation, and give examples of how disregard for this phenomenon could lead to misinterpretation of population surveys, health screening, and hinder habitat protection or sustainable harvest programs. I will also explain why the underlying cause of segregation should be considered, using bighorn sheep (*Ovis canadensis*) as an example. Two hypotheses have emerged as potential explanations for sexual segregation in this species. The "reproductive strategies hypothesis" proposes that sexual segregation is due to differential resourc e and habitat selection driven by reproductive strategies. The "activity budget hypothesis" suggests that sexual segregation is driven by sexual dimorphism in body size; in this case differential resource or habitat use need not occur. I tested these hypotheses in free-ranging bighorn sheep using GPS technology, behavioral observations, and habitat measures. The results reveal that the genders do select different habitat during segregation, consistent with the "reproductive strategies hypothesis". This has implications for conservation of bighorn sheep populations, many of which are listed as threatened or endangered.

765. PROVARZEA OVERVIEW. RUFFINO, MAURO LUIS. ProVárzea, Ibama, Rua Ministro João Gonçalves de Souza, s/nº - Distrito Industrial, Manaus, AM, 69.075-830, Brazil, ruffino@provarzea.ibama.gov.br.

The várzea is one of the richest ecosystems in the Amazonian Basin in terms of biological production, biodiversity and natural resources. Over 1.5 million people live in and depend upon the resources of the várzea which stretches out over 300 thousand km^2

along the Amazon River and its major tributaries. The ecosystem is considered one of the most vulnerable in the region. Noting its progressive degradation, the project ProVárzea/Ibama was funded to conserve the várzea through the participation of its traditional populations in the formulation of a sustainable development strategy. The project is implemented by the Brazilian Environmen t and Renewable Natural Resources Agency (Ibama) through the Pilot Programme of the G7. Since 2001, the project has contributed to the formulation of public policies and the conservation and management of the natural resources of the várzea through three lines of action: i) Strategic Studies - implementing scientific studies to identify and fill in gaps in knowledge and to increase the understanding of process within the várzea; ii) Promising Initiatives - technical and financial support to small innovative sustainable management projects within the várzea; iii) Command and Control - implementing co-management models with the intent of producing decentralized and participative management of natural resources.

766. CONSERVATION AREA DESIGN FOR THE GREAT BEAR RAINFOREST. RUMSEY, CHUCK. Round River Canada. 600 - 220 Cambie St., Vancouver, BC, V6B 2M9. Canada. crumsey@roundrivercanada.org.

The largest tract of intact, unprotected coastal temperate rainforest on Earth, known as the Great Bear Rainforest (GBR), is found along the central and north coast of British Columbia (BC). On April 4, 2001, environmental groups, logging companies, workers, coastal communities and many First Nations reached an historic consensus agreement to establish a new ecosystem-based approach to land-use management in the GBR and additionally proposed permanent protection of 20 intact rainforest valleys and moratoria on logging in 68 other valleys. This agreement was also a springboard to further negotiated settlements through a government-facilitated, multi-stakeholder process known as Land and Resource Management Plans (LRMP), that as of 2004, will see over a third of the GBR placed into protected status. Throughout this campaign and LRMP process, the science of Conservation Area Design (CAD) has played a critical role in the negotiations over what areas of the GBR should be a priority for protected areas designation. Sponsored originally by the environmental NGO community, and eventually supported directly by government and industry, the CAD approach of combining special elements data, focal species modeling, and freshwater, marine, and terrestrial ecosystem representation analysis was used to explore the conservation value of an ongoing set of negotiated options for the placement of protected areas. Along the way, many lessons were learned about strengths and weaknesses of the CAD approach, and its utility in informing highly politicized debates around conservation priorities, socio-economic trade-offs, and the debate around "how much is enough".

767. ISLAND INVASION AND REINVASION BY NORWAY RATS (*Rattus norvegicus*). RUSSELL, JAMES CHARLES; Fewster, R. M.; Clout, M. N.; Towns, D. R. School of Biological Sciences (JCR, MNC) and Department of Statistics (JCR, RMF), University of Auckland, Private Bag 92019, Auckland, New Zealand, j.russell@auckland.ac.nz. Science and Research Unit, Department of Conservation, Private Bag 68908, Auckland, New Zealand (DRT).

The introduced Norway rat (*Rattus norvegicus*) is a major threat to island conservation. In order to restore invaded islands eradication is necessary, however reinvasion poses a significant threat. The recent invasion of Frégate Island in the Seychelles highlights the need to better manage island invasions. Reinvasion can occur either by swimming from adjacent mainland or island sites, or by accidental shipping. The key to managing rat invasion of islands is to know how often reinvasions occur, where the sources are, and how reinvasion takes place. Using a combination of ecological, genetic and statistical approaches we investigate the dynamics of rodent movements (invasion and reinvasion) between and upon islands and the mainland. We illustrate our methods by characterizing the population on Moturemu Island (5ha), a small island 2.5km offshore recently reinvaded by Norway rats after their eradication 10 years earlier. We captured over 50% of the population, whose density was approximately 10/ha. There was a clear bottleneck signal following reinvasion, but surprisingly there was no sign of inbreeding (Hardy-Weinberg disequilibrium). Parentage results suggest prolific polygamy within the invading population. These results show that the Norway rats are highly suited and capable (re)invaders of islands.

768. MOUNTAIN FOREST LOSS IN RWANDA: EFFECT ON BIRD DIVERSITY. RUZIGANDEKWE, FIDELE. Rwanda Wildlife Agency / Rwanda Office for Tourism and National Park (ORTPN), 1 Boulevard de la Revolution, PoBox 905 Kigali, Rwanda.

The objective of the study was to (1) analyse the impact of demographic, socio economic and political factors on the loss of the Rwanda's mountain forests over the last century; (2) to track the concomittant change in avifaunal diversity following the habitat loss and degradation and to make predictions over the future conservation of these forests. Spatial and temporal patterns were determined though the analysis using GIS of historical maps, aerial photographs and satelite imagery as well as the existing ornithological data. The coverage of mountain forest in Rwanda has shrunk by 49,23% between 1934 and 2003. The main factor was the tree cutting for human resettlement and farming in order to accommodate a rapidly growing population. The lowest altitudinal levels were the most severely impacted (64.4% forest lost between 1600-1800m). A theoretical mesure of bird susceptibility to forest loss was developped that allowed the ranking of forest birds according to their vulnerability. Species were also ranked in a broader conservation framework based on the estimated proportion found in Rwanda. In total 12 forest bird species need particular conservation attention due to their restricted global range and their high susceptibility to forest loss. It was estimated that there will be no mountain forests remaining in Rwanda over the next 50 years, should the current rate of forest loss persist. The cost of such a situation would be very high for the Rwanda population because the overall economic cost of converting the remaining mountain forest into agricultural land far outweigh those for their conservation.

769. SOCIALLY DIRECTED DISEASE TRANSMISSION IN PRIMATES; A MODELING APPROACH. RYAN, SADIE J.; Nunn, Charles L.; Dobson, Andrew P. Department of Envi-

ronmental Science, Policy and Management, 137 Mulford Hall, University of California at Berkeley, Berkeley, CA, 94720-3114 USA and The Museum of Vertebrate Zoology, 3101 Valley Life Sciences Bldg., University of California at Berkeley, Berkeley, CA 94720 USA sjryan@nature.berkeley.edu. Department of Integrative Biology, University of California at Berkeley, Berkeley, CA 94720-3140 USA, cnunn@socrates.berkeley.edu Department of Ecology and Evolutionary Biology, Eno Hall, Princeton University, Princeton, NJ, 08544 USA, andy@eno.princeton.edu.

In this study, pathogen transmission among primates is examined in the context of social systems. We make use of underlying allometric scaling of primate life history parameters and correlate this with 5 idealized social system types. We find that this correlation implies an inherent trend for increased social complexity with increased scaling of reproductive parameters. We then constructed contact matrices based on the social systems for age-structured primate groups and for 5 modes of disease transmission. These matrices are used in conjunction with the allometric scaling to model disease transmission in primates. It is shown that intragroup contacts increase with social complexity, showing a corresponding increase in the pathogen transmission rate. The implications of this in an ecological and evolutionary context are examined and their utility in conservation applications is discussed.

770. BAT COMMUNITIES (MAMMALIA: CHIROPTERA) IN ATLANTIC RAIN FOREST FRAGMENTS OF NORTH-EAST BRAZIL. SÁ-NETO, RAYMUNDO J.; Mendes-Pontes, Antonio Rossano. Departamento de Ciências Naturais, Universidade Estadual do Sudoeste da Bahia, Estrada do Bem-Querer, Km 04, Vitória da Conquista - BA, 45083-900, Brazil, sa-neto@uesb.br (RSN). Departamento de Zoologia, Centro de Ciências Biológicas, Universidade Federal de Pernambuco, Rua Prof. Moraes Rego, S/N, Recife-PE, 50.670-901, Brazil, rossano@ufpe.br (ARMP).

The aim in this study was a better understanding of the effects of the fragmentation of the highly-threatened Atlantic forest of North-eastern Brazil upon the bat communities. Three forest fragments were chosen, including two small (c. a. 500 ha) and one large (3500 ha), located at Usina Serra Grande, in the State of Alagoas, Brazil. Bats were trapped from June to December 2002, through mist nets settled between 1700h and 2400h. The animals were identified, measured, and classified into feeding guilds. A total of 34 species and 734 individuals were registered. In the smaller fragments 21 species and 214 individuals were trapped, with a diversity of 2.84 bits/individual. In the larger fragment 23 species and 520 individuals were trapped, with a diversity of 2.24 bits/individual. There was 29.4% of similarity of species between smaller and larger fragments. A significant difference was registered between the fragments in the abundance of individuals per guild, but no differen ce was found regarding richness. Despite no decline being registered in the species richness in the smaller fragments, there was a change in the abundance of guilds and in the species composition between these fragments.

771. CONSILIENCE IN FISHERIES MANAGEMENT. SÁENZ-ARROYO, ANDREA; Roberts, Callum M. 1) Comunidad y Biodiversidad A.C. Bahía de Bacochibampo s/n Col. Lomas de Cortes. Guyamas, Sonora, Mexico. asaenz@cobi.org.mx 2) Environment Department. University of York. Heslington York, YO10 5DD.

The majority of fisheries sciences fails to maintain sustainable catches and preserve the life in the Oceans is increasingly broadly recognized. Some of the problems hidden behind these failures are that we have placed too much faith in recent empirical evidence or experimental data to assess marine species conservation status. However, being fisheries science, as any other branch of wildlife management, a discipline dealing with long-term human impacts and natural biodiversity dynamism, it needs also to apply the methods used by historians, trusting in them in the same way we do by the ones employed traditionally by fisheries scientist. Additionally, being fisheries science's main objectives advising decision-makers with optimal solution for exploiting populations, it also needs to address information coming from our modern understanding of the role of biodiversity in social welfare and the economic and ethic consequences of losing biodiversity. More than 50 years after the first decision-making tool to deal with overfishing problems was developed, we are ready to jump into another stage. Here we synthesize the type of information that could be harvested from different disciplines to establish suitable wildlife baselines, and some modern decision making tools that can help us to identify broadly the social costs of overexploiting species.

772. A COMPARISON OF THE BIODIVERSITY IN AGRICULTURAL LANDSCAPES AND PROTECTED AREAS IN CENTRAL AMERICA. SAENZ, JOEL C.; Harvey, Celia A.; Montero, Jorge; Medina, Arnulfo; Sánchez, Dalia; Vílchez, Sergio; Hernández, Blas; Taylor, Rachel; Carvajal, José. Programa Regional en Manejo de Vida Silvestre paraMesoamérica y el Caribe, Universidad Nacional, Heredia, Costa Rica, jsaenz@una.ac.cr (JS, JM, JC); Department of Agriculture and Agroforestry, CATIE, Apdo. 7170, Turrialba, Costa Rica (CH); Fundacion Cocibolca, Managua, Nicaragua, dsanchez@catie.ac.cr(AM, DS, SV, BH), and School of Agriculture and Forest Sciences, University of Wales, Bangor, Gwyneedd, LL57 SUW, UK (RT, FLS).

Efforts to conserve biodiversity have traditionally focused on retaining large tracts of intact habitat, establishing protected areas, and attempting to minimize human impact on these areas. In contrast, relatively little attention has been paid to the potential of agricultural landscapes to help maintain local and regional biodiversity, despite the fact that these human-modified landscapes cover most of the world's surface. We evaluated the importance of agricultural landscapes for biodiversity conservation by conducting detailed assessments of multiple taxa (trees, bird, bat, dung beetles, butterfly and mammal) in four sites in Central America and comparing their diversity to those of protected areas. Despite being highly deforested and impacted by cattle production, the four agricultural landscapes were much more diverse than expected and contained a high proportion of the biodiversity present in protected areas (56-91% of the bat species, 37-52% of the bird species, 60-74% of the dung beetle species, and 48% of the butterfly species). There were important differences in species composition across the agricultural and protected areas for some, but not all, of the taxa studied. We argue that agricultural landscapes hold considerable potential for biodiversity conservation and that additional attention should be paid to understanding their role in conservation strategies.

773. EFFECTS OF FOREST DISTURBANCE ON ANT COMMUNITY STRUCTURE AT SALAK MOUNTAIN, WEST JAVA, INDONESIA. SAHARI, BANDUNG; Zuyyana, Neny; Rizali, Akhamad; Tabadepu, Heri; Buchori, Damayanti. Center for Conservation and Insect Studies, Perum. Alam Sinar

Sari, Jl Kecipir I Blok A- 33, Cibeureum, Dramaga, Bogor, Indonesia, email: bandung_sahari@peka-indonesia.org; Department of Biology, University of Asyafiiyah; Bogor Agricultural University, Jl Kamper, Kampus IPB Darmaga, Bogor, Indonesia.

Effects of forest destruction on ant community structure in Salak Mountain were studied between March and September 2004. Ecological research was conducted at four different locations covering three different habitats: undisturbed secondary forest, disturbed secondary forest, and production forest. Ant communities were surveyed by conducting pitfall traps. We found 4477 individual belongs to 34 genus at Salak Mountain. Genus *Pheidole* was commonly found in all forest type and its abundance distributed equally in all forest type. Genus *Pheidologeton* dominated ant communities with its individual number covered more than 50% of all collected specimen. However number of individual of the genus was extremelly very low in forest experienced only minor disturbance compared with other forest types. The findings from different areas at Salak Mountain showed that species composition of ant communities significantly related to habitat type. Our analyses indicated that forest disturbance significantly affects the structure of ant communities in Salak Mountain. Community structure of ants extremely changed at different forest type. Several species can only be found in one forest type. Our data indicated that there is a site-specific species composition of ant communities and forest transformation that may contribute significantly to the presence of single species.

774. DEVELOPMENT OF AN ELECTRONIC FIELD GUIDE TO FACILITATE IDENTIFICATION OF MACROINVERTEBRATES FROM COSTA RICAN STREAMS. SAINTOURS, F.; Springer, M.; Santos, A.; Stevenson, Robert D. Dept. of Biology, Univ. of Massachusetts, Boston MA, USA (FSO, AS, RDS); Universidad de Costa Rica, San Pedro, Costa Rica (MS), robert.stevenson@umb.edu.

Rivers and streams are among the most threatened ecosystems throughout the world. Biologists have used a variety of biodiversity indices to quantify the environmental health of these systems using data from habitat surveys in which species are identified and counted. In addition to ecosystem health concerns, recent laws in Costa Rica require that environmental impact studies be performed on water bodies prior to any construction or water withdrawal, creating a demand for tools that can assure rapid and accurate identification of large amounts of collected material. To improve scientists' ability to identify species, we photographed aquatic specimens using a Nikon D1X and Coolpix digital cameras at 12 sites in Costa Rica over a three-year period. Images were taken of freshly captured specimens near the site, or of preserved specimens from the collection at the Universidad de Costa Rica. The 300+ images cover 110 genera, representing 70 families comprised from aquatic insects and crustaceans found in freshwater habitats throughout Central America. These images are now available as an Electronic Field Guide format at (http://bdei·cs·umb·edu:8080/ keys/ html/ index. html). Supported by NSF grant DBI-0111540.

775. STUDY ON BIRDS OF IUCN RED LIST AND IT'S DISTRIBUTION IN GUILAN PROVINCE, NORTH OF IRAN. SAKARI, MAHYAR; Hadipour, Ehsan; Alinejad, Hosein; Nezami, Shabanali. Tonekabon Islamic Azad University, Valiabad, Chalous Road, Tonekabon, Mazandaran, Iran, mahyarsakari@hotmail.com.

The birds of IUCN red list in Guilan province in north of Iran studied from 1990 to 2003. This province is well known destination for many of migratory birds groups for wintering. The study team used bird's census for 14 years of counting activities in 31 sites. The data entered into information sheets and analyzed by computer software of Excel. From 16 species of birds are in the list of Iran IUCN Red List, 9 have few data and information and rest has no records. These 3 species of 9, including, *Aythya nyroca*, *Phalacrocorax pygmeus*, and *Pelicanus crespus* show high population. Also, some habitats like Siahkeshim protected area; Sorkhankol wildlife refugee and Anzali Int'l Wetland etc. had more population. Deficient information, related to biological features of species was main gap of the study for better results. In other hand providing a list of Red species needs to more information. It seems the IUCN Red List, which prepared for Iran needs to receive more scientific survey by experts. It strongly suggest that for preparation of internationally important list which will make condition for decision making by different stakeholders, is essential to have up to date, legally and scientific information.

776. BIRD ASSEMBLAGES IN SLASH-AND-BURN SUCCESSIONAL FOREST OF THE YUCATAN PENINSULA, MEXICO. SALGADO-ORTIZ, JAVIER; Raleigh, J. Robertson. Dept. of Biology, Queen's University, K7L 3N6, Kingston, On. Canada.

Successional forest resulting from slash-and burn agriculture is becoming increasingly common throughout the Neotropics, still, its importance for biodiversity conservation remains underestimated. We used fixed radius point counts to sample the avifauna along a successional gradient at the Calakmul Biosphere Reserve, Campeche, Mexico to assess the value of secondary forest for conservation of the local avifauna. Mature forest had the highest species richness, but did not differ significantly from that of 20-30 years old secondary forest. Bird composition of early stages of succession differed significantly from older stages resulting in higher species richness along the successional gradient compared to mature forest alone. Close examination of distribution of individual species revealed that 42% of them are highly dependent on mature and older successional forest, thus are likely to decline in absence of these habitats. The results of our study indicate that regional bird diversity in human managed landscapes of the Yucatan Peninsula can be maximized through slash-and-burn agriculture. Allowing long fallow periods (>20 years) and the maintenance of a heterogeneous landscape that includes all stages of succession and mature forest is necessary to ensure the long-term conservation of the local avifauna.

777. *EX SITU* CONSERVATION TECHNIQUE FOR TWO ANACARDIACEAE TARGET SPECIES: *Astronium fraxinifolium* AND *Schinopsis brasiliensis*. SALOMÃO, ANTONIETA N.; Silva, José A.; Santos, Izulmé R. I.; Mundim, Rosângela C. Laboratório de Fisiologia de Sementes, Embrapa Recursos Genéticos e Biotecnologia, Brasília, DF, P.O. Box 02372, 70770-900 Brazil, antoniet@cenargen.embrapa.br. (ANS, JAS, IRIS).

Ex situ conservation techniques - seed gene bank- was adopted to safeguarding, disposing, for scientific purposes and degraded land reclamation the germplasm of the target species *Astronium fraxinifolium* and *Schinopsis brasiliensis*. The morphological seed characteristics (weight of 1000 seeds, length and width of seeds and seed coat's color) of 17 *A. fraxinifolium* progenies and 43 *S. brasiliensis* progenies from different provenances were evaluated. Physiological seed characteristics (moisture content and ger-

minability) before and after two years storage at -20º C were also evaluated. Almost all progenies of both species maintained their original germinability after two years storage at -20°C. The material is maintained at -20°C since 1997 without significant lost of viability. All progenies were also conserved in field gene bank that was set up at Sucupira Experimental Field Station in a 3 x 3m (*A. fraxinifolium*) and 5 x 5m (*S. brasiliensis*) spacing design, carrying six plants per progeny in two random blocks for which species. Replacement of dead plants in field gene bank has been carried out as necessary, during three years after it was set up.

778. CONSERVATION OF SEED GERMPLASM RESCUED FROM HYDROELECTRIC'S AREAS IN CERRADO BIOME. Salomão, Antonieta N.; Walter, Bruno M.T.; Cavalcanti, Taciana B.; Santos, Aécio A.; Santos, Glocimar P.; Mundim, Rosângela C.; Pereira, João B.; Rezende, João M.; Santos, Izulmé R. I.; Moreira, Gledison A.; BRILHANTE, MARCELO DE M. Laboratório de Fisiologia de Sementes, Herbário CEN, Embrapa Recursos Genéticos e Biotecnologia, Brasília, DF, P.O.Box 02372, 70770-900 Brazil, antoniet@cenargen.embrapa.br. (ANS, TBC).

The Cerrado biome is under constant disturbances because of different man activities. Recently, environmental disturbance in Cerrado is due to hydroelectric constructions. Embrapa Recursos Genéticos e Biotecnologia botanical and genetic conservation staff, since 1996 has been rescued seed germplasm from five hydroelectrics (Serra da Mesa, Corumbá I and IV, Cana Brava in the state of Goiás and Queimado in the state of Goiás, Minas Gerais and Distrito Federal). A total of 463 accessions of 100 species belonging to 29 botanical families have been collected and stored at -20°C, after seed desiccation and sensitivity to subzero tolerance were determined. The most representative families are Caesalpiniaceae (105 accessions), Fabaceae, (86 accessions), Mimosaceae (81 accessions), Bignoniaceae (32 accessions), Anacardiaceae (30 accessions), Combretaceae (23 accessions) and Sterculiaceae (22 accessions). Plants of all accessions were used to afforestation of the disturbed area surrounding the hydroelectrics.

779. SYNERGISTIC SERIAL DEPLETION OF NEAR SHORE BENTHIC INVERTEBRATES LEADS TO A RECENT DECLINE OF A KEYSTONE GRAZER AND THE ALTERATION OF A COASTAL ECOSYSTEM. SALOMON, ANNE K.; Tanape, Nick Sr.; Ruesink, Jennifer L.; Huntington, Henry P. University of Washington, Department of Biology, Box 351800, Seattle, WA, USA 98195-1800 salomon@u.washington.edu (AKS JLR). Nanwalek Native Village, Box 8003, Nanwalek, Alaska, USA 99603 (NT). Huntington Consulting, Box 773564, Eagle River, Alaska, USA 99577 (HPH).

We investigated the relative roles of natural factors and harvest leading to localized declines of the black chiton, *Katharina tunicata*. This chiton is a subsistence shellfish resource and recognized keystone grazer. Small-scale removal experiments and large-scale experimental harvests, in collaboration with village residents, revealed that the absence of this dominant consumer can increase primary production by two orders of magnitude and species diversity by 50% yet reduce the survival of other benthic grazers. Based on interviews with village elders, localized declines can be attributed to changes in social and biological dynamics. Historical subsistence harvest was less spatially concentrated because communities shifted among seasonal camps and diets included a wider range of invertebrates, such as crab, urchins, and clams. These resources are now scarce, due to intensified consumption by an increasing sea otter population and historical subsistence and commercial harvest. Sequential prey switching by both humans and sea otters and a resulting restriction in prey species breadth may have lead to intensified harvest of *K. tunicata*. Therefore, the recent localized depletion of this keystone grazerand its subsequent ecosystem-level effects may reflect a concentration in the spatial distribution of harvest pressure and the synergistic serial depletion of nearshore benthic invertebrates.

780. CONSERVATION OF ATLANTIC FOREST SPECIES IN THE CACAO PLANTATIONS OF SOUTHERN BAHIA, BRAZIL. SAMBUICHI, REGINA H. R.; Haridasan, Mundayatan. Departamento de Ciências Biológicas, Universidade Estadual de Santa Cruz, Ilhéus, BA, 45650-000, Brazil, sambuich@uesc.br (RHRS). Departamento de Ecologia, Instituto de Biologia, Universidade de Brasília, Brasília, DF, 70818-900, Brazil (MH).

The Atlantic Forests of southern Bahia, with its high plant biodiversity and a great degree of endemism, has suffered intense deforestation over the last four decades with less than 10% of its original area remaining today mostly in fragments. A large part of these forests was converted into cacao plantations beginning the nineteenth century. Forests were thinned and cacao planted under the shade of remaining trees. Such plantations, known as cabrucas, still conserve many of the native species. We surveyed the tree species in 3 ha each of five such cabrucas of different ages to determine the extent of conservation of the original forest species. A total of 293 species were encountered among the 2514 individuals surveyed in a total of 15 ha. The number of individuals varied from 142 to 355 and the number of species from 46 to 180 among the cabrucas, with the Shannon diversity index ranging from 3.31 to 4.22. The differences in species richness and plant diversity were influenced by tree density, management practices and the time of implantation of the cabrucas.

781. STRATEGIES FOR CONSERVATION OF THE TROPICAL CLOUD FOREST IN TAMAULIPAS, MEXICO. SANCHEZ-RAMOS, G.; García-García, A.; Lara-Villalón, M; Casas-González, S.L.; Martínez-Avalos, J.G. Instituto de Ecología y Alimentos, Universidad Autónoma de Tamaulipas. Mexico13. Blvd. Adolfo L. Mateos No. 928 CP 87040. Cd. Victoria, Tamaulipas, Mexico, gsanchez@uat.edu.mx.

The Mexican cloud forest has been endangered the last three decades for the human impact. In the state of Tamaulipas (North of Mexico), this ecosystem show the highest distribution for the American Continent. The principal strategies for the cloud forest conservation are by ecological studies as: diversity index (Shannon-Wiener H'), floristic studies (ecological importance value) and zoological studies (direct and indirect methods). Our results show the presence of four localities containing cloud forest as pricincipal kind of vegetation. These are: El Cielo, El Molino, Puerto Purificacion and San Carlos in the Tamaulipas state, Mexico. The diversity index show high levels for all the localities as follow: El Cielo (H'=0.93), El Molino (H'= 0.84), Puerto Purificacion (H'= 0.89) and San Carlos (H'= 0.90). However, the evenness or similarity index (Sorensen) show few levels among localities. These levels are less than ca. 40% (Cs= 0.39). This fact show the importance to stablish the most adequates strategies for conservation. Actually, we are traying to put together all the tools (scientific and legal strategies) for the future conservation of this important ecosystem.

782. STATUS AND CONSERVATION OF FRESHWATER FISHES OF THE MORACA RIVER SYSTEM, MONTENEGRO, SOUTH-EASTERN EUROPE. SANDA, RADEK; Vukic, Jasna; Bohlen, Joerg; Mrdak, Danilo. Department of Zoology, Charles University, Vinicna 7, 128 44 Prague 2, Czech Republic, rsanda@seznam.cz (RS). National Museum, V aclavske namesti 68, 115 79 Prague 1, Czech Republic (RS). Department of Ecology, Charles University, Vinicna 7, 128 44 Prague 2, Czech Republic (JV). Istitute of Animal Physiology and Genetics, Czech Academy of Sciences, Rumburska 89, 227 21 Libechov, Czech Republic (JB). University of Montenegro, Cetinjski put bb., 81 000 Podgorica, Montenegro, Serbia and Montenegro (DM).

This study reports up to date information about the distribution, taxonomy and conservation status of fish species in the Moraca River system (Montenegro, south-eastern Europe). This is an area with a high degree of endemism. Fish were collected by electrofishing at 20 localities in summer 2002 and 2003. We found altogether 28 species. Two of them, *Petromyzon marinus* and *Pseudorasbora parva*, have never been reported from the Moraca River system. Three species are new for the freshwaters of Montenegro: *Lethenteron zanandreai*, *Pomatoschistus canestrinii*, and *Knipowitschia croatica*. The present findings extend considerably their southward range. Six of the found species are listed in the IUCN Red Data List. In comparison to the situation in the Moraca in 1983-84, we have found less species. Alarming is a disappearance of *Salmo marmoratus* from the Moraca, where it had been quite common in its middle and lower parts. The range of distribution of several species has been considerably reduced. The decrease in species diversity is most probably a consequence of uncontrolled exploitation by illegal fishing, which currently represents a serious problem. It is necessary to incorporate conservation of fish species and their habitats in legislation and to create instruments for adhering the legislation.

783. A NEW ASSESSMENT OF CONSERVATION PRIORITIES FOR TIGERS. SANDERSON, ERIC W.; Ginsberg, Joshua R.; Dinerstein, Eric; Leimgruber, Peter; Seidensticker, John; Forrest, Jessica; Loucks, Colby; Heydlauff, Andrea. Wildlife Conservation Society, 2300 Southern Blvd., Bronx NY 10460 USA esanderson@wcs.org (ES, JG, JF, AH, TO, GB); World Wildlife Fund, 1250 24th Street, NW, Washington DC 20037 USA (ED, CL, SK); Center for Research and Conservation, Smithsonian Institution, 1500 Remount Road, Front Royal, VA 22630 USA (PL, MS); National Zoological Park, Smithsonian Institution, 3001 Connecticut Avenue NW, Washington, DC 20008 USA (JS).

Ten years ago it was feared that tigers would become extinct in the wild. Significant investment on the ground has stayed that course, yet the situation for tigers remains precarious in many areas. We recently assessed spatially-explicit priorities for tiger conservation across their historical range using (1) the past decade of field work, (2) improved understanding of tiger conservation biology, (3) modern satellite-derived land cover data, and (4) advances in conservation priority setting. Under our new assessment "Tiger Conservation Units" (TCUs) are defined as connected blocks of habitat, filtered by habitat-specific area thresholds, where tigers have been observed since 1995. Apparent habitat areas with high levels of human influence were excluded using a tiger-based analysis of the human footprint. A simple model of dispersal based on patch size and distance was applied. TCUs were prioritized into three levels within an ecogeographic framework defined by habitat type and bioregion. Our goal is to secure breeding tiger populations in all parts of the current tiger range and begin to reconnect them over the next ten years.

784. BIRD BANDING AND MONITORING AT THE SIERRA DE MANANTLÁN: CHALLENGES OF LONG-TERM POPULATION STUDIES IN THE NEOTROPICS. SANTANA C., EDUARDO; Contreras M., Sarahy. Instituto Manantlán de Ecología y Conservación de la Biodiversidad-DERN, Universidad de Guadalajara-CUCSUR, Ave. Independencia Nacional, 151, Autlán, Jalisco, México C.P. 48900. esantana@megared.net.mx.

The Sierra de Manantlán Biosphere Reserve in West Mexico is one of the 150 priority Important Bird Areas in North America. During the past 15 years the avian research program has amassed over 1,000 point-counts, 60,000 net/hours of sampling with mist-nets and more than 33,000 bird captures, making the site the most intensively sampled humid montane forest in the Neotropics. Information on the effects of forest succession on abundance, survival and breeding success of migratory and resident birds has been used to elaborate management plans and environmental impact statements. Continuity has been possible by coping with constantly changing conditions, where we have learned that the following themes should be explicitly addressed to assure long-term effectiveness: linking monitoring to management by defining who, when, where, and how the results will be used; assuring financial continuity; working maintaining skilled-trained field personnel as part of the natural project turnover process; assuring transportation and site logistics; identifying stability of land-use in study area; clear publication and data management arrangements; maintaining student-professional training component; and generating local support through outreach and environmental education activities. The project has served as a catalyst for initiating the National Bird Monitoring Program in the Natural Protected Areas of Mexico.

785. INDIGENOUS RIGHTS AND BIODIVERSITY IN BRAZIL. SANTILLI, MARCIO. Instituto Socioambiental, SCLN 210, Bloco C, sala 112, Brasilia, DF, 70862-530, Brazil, msantilli@socioambiental.org.br.

Indigenous reserves cover 12.5% of the territory of Brazil and 21% of the Brazilian Amazon. The size of Indian territories is almost double the size of all state and federal, use and non-use protected areas. Some indigenous areas encompass ecological transition zones that are known for their high biodiversity and dozens of locations within Indian reserves have been identified as priorities for biodiversity conservation. Indigenous territories located at the agricultural frontier along the "Arc of Deforestation" are acting as barriers to deforestation. There is no legislation for the management of biodiversity with Indian reserves but 13 million hectares of protected areas are superimposed upon Indian territories in Amazonia. However, these superimposed protected areas were created without consulting the local indigenous inhabitants and their regulation as protected areas (Unidades de Conservação) is incompatible with the constitutional usufruct rights of Amerindian peoples in Brazil. Indian reserves (Terras Indígenas) are a fundamental part of national strategy for biodiversity conservation not only for the purpose of protecting biodiversity itself, but also for protection of the traditional knowledge held by more than 220 Amerindian groups in Brazil. Amerindian territories as conservation strategy will require a leading role for the indigenous inhabitants and respect for their constitutional rights.

786. A COMPARISON OF MACROINVERTEBRATE DIVERSITY IN SMALL STREAMS OF VARYING FLOW PERMANENCE IN EASTERN MASSACHUSETTS, USA. SANTOS, ANNA N.; Stevenson, Robert D. Department of Biology, University of Massachusetts at Boston,100 Morrissey Blvd., Boston, MA 02125 USA, anna.santos73@gmail.com (AS).

Freshwater species are among the most threatened in the world and small streams and their inhabitants are among the most threatened in North America. Vernal Pools and rivers are protected in Massachusetts, but not intermittent streams. A study was conducted of ten streams varying in flow regime, in eastern Massachusetts to determine how macroinvertebrate richness and diversity differ relative to stream flow permanence. Time kicked samples were taken of macroinvertebrates in April 2002 following streambed drying the previous summer. Measures of stream discharge were conducted for one year and streams were classified as perennial (constant flow) intermittent (dry for 3 months or less) or episodic (dry for more than 3 months). The intermittent streams maintained similar or higher macroinvertebrate richness and diversity than the perennial streams. Despite the occurrence of one to three months of drought these intermittent streams harbor a unique community of lotic species adapted to drought including the state watch-list species *Cordulegaster obliqua* (Cordulegastridae, Odonata). The episodic streams of this study maintained low levels of biodiversity in comparison. These findings implicate that the conservation status of intermittent streams should be reevaluated in order to maintain the biodiversity of our running waters.

787. CREATION OF FOREST EDGES AND THE IMPOVERISHMENT OF FRAGMENTED LANDSCAPES IN THE BRAZILIAN ATLANTIC FOREST. SANTOS, BRÁULIO A.; Oliveira, Marcondes A.; Grillo, Alexandre S.; Tabarelli, Marcelo. Departamento de Botânica, Centro de Ciências Biológicas, Universidade Federal de Pernambuco, Recife, PE, 50670-901, Brazil, santosba@ufpe.br.

Edge effects change both the taxonomic and ecological composition of tree species assemblages in tropical forest edges and small fragments. Recent reviews have suggested that these habitats tend to be converted into “secondary forests” in the long term. In order to test this hypothesis, we sampled tree species (DBH > 10 cm) in three habitats of a 3,500-ha fragment in the Brazilian Atlantic forest: (1) forest edges, i. e. 0-100 m distant from fragment border and not previously submitted to agriculture; (2) forest interior, i. e. patches of mature forests > 200 m distant from fragment border; and (3) 4-65-yr old patches of secondary forest, which were regenerating after slash-and-burn agriculture promoted in the center of the fragment. Simple linear regression models indicated that forest edges are similar to 30-40-yr old forests in terms of tree species density and richness, a half of the observed in the forest interior. Moreover, forest edges were similar to 15-28-yr old forests in terms of the percentage of emergent, shade-tolerant and large-seeded trees. Creation of edges promotes the establishment of low diversity “early secondary forests” and because of this highly fragmented landscapes in the Atlantic forest tend to retain impoverished and biased samples from the original flora.

788. COUNTRYSIDE BIOGEOGRAPHY IN REPTILE AND AMPHIBIAN COMMUNITIES IN SOUTHERN COSTA RICA: CONSERVATION VALUE OF HUMAN DOMINATED LANDSCAPES. SANTOS, GEORGINA; Pacheco, Jesús; Ceballos, Gerardo; Mendoza-Quijano, Fernando; Daily, Gretchen; Ehrlich, Paul. Museo de Zoología, Facultad de Ciencias, A. P. 70-399 e Instituto de Ecología, A. P. 70-275, Universidad Nacional Autónoma de México, México D. F., 04510, México (GS, JP & GC) Instituto Tecnológico de Huejutla, Hidalgo (FMQ). Center for Conservation Biology, Stanford University, Stanford, CA, U. S. A. (GD & PE).

The future of biological diversity in the tropics depends largely on the conservation value of human-dominated lands. In this study we investigated the distribution of amphibians and reptiles in five habitats of southern Costa Rica: relatively extensive forest (227 ha), coffee plantation, pasture, coffee with adjacent forest remnant (<35 ha), and pasture with adjacent forest remnant (<35 ha). Species richness, composition, and abundance varied significantly with habitat type and distance from the extensive forest. Additionally, we recorded the local extinction of at least 5 species, likely as a result of human induced changes such as forest fragmentation, introduced diseases, and global warming. Of the 67 amphibian and reptile species recorded in our plots, most species (48, 68%) were found in forests and forest fragments, 36 (50%) in coffee plantations, and 38 (51%) in pastures. Additionally, 20 were recorded exclusively in extensive forest and forest fragments, 8 in coffee, and 8 in pastures. Our results were comparable to a similar study of mammals: relative continuous forest and small forest patches in combination with coffee plantations are important for the maintenance of the region´s biological diversity, despite large scale negative human activities.

789. NATURAL PROTECTED AREAS AND THE CONSERVATION OF AMPHIBIANS AND REPTILES IN MEXICO: PRIORIZING SPECIES AND AREAS FOR CONSERVATION STRATEGIES. Santos, Georgina; PACHECO, JESÚS; Ceballos, Gerardo. Museo de Zoología, Facultad de Ciencias, A. P. 70-399 (GS). Instituto de Ecología, Universidad Nacional Autónoma de México, México D. F. 04510. México.

Main goal in the establishment of natural protected areas (NPA) is to preserve ecosystems and biodiversity associated in order to perpetuate the natural evolutionary processes. Successful results can be attained identifying priority areas for conservation that best represent the biological diversity and can optimize resources. This study evaluates the efficiency of the NPA’s for the conservation of the Mexican amphibians and reptiles. These groups are highly diverse in Mexico, reaching 1164 species (360 amphibians and 804 reptiles) with high endemism (60%, 241, and 450 respectively). Thirty-four inventory lists of herpetofauna from Protected Areas were compiled and conservation status, geographic range, and endemism of the species were considered as the main features to build a hierarchical system resulting in the identification of priority species for conservation. The complimentary study of these NPA’s reveals that 56% of the Mexican herpetofauna are excluded from the NPA’s, being critical for amphibians, where only 38% have protected populations. The complimentary analysis reveals that 31 reserves are necessary to protect the herpetofauna included in the NPA’s. Efficient strategies for planning reserves are necessary to guarantee the preservation of the priority and non priority species of the Mexican herpetofauna

790. CONSERVATION OF ZIGOTIC EMBRYONIC AXES OF *Genipa americana* L. (RUBIACEAE) USING CRYOPRESERVATION IN LIQUID NITROGEN. SANTOS, IZULMÉ R. I.; Salomão, Antonieta N.; Mundim, Rosângela C. Laboratório de Criobiologia, Embrapa Recursos Genéticos

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Embryonic axes of *Genipa americana* L. were successfully cryopreserved in liquid nitrogen. *G. americana* is a Cerrado species that is undergoing genetic erosion due to predatory collection of fruits and destruction of their habitats. *G. americana* seeds show intermediate behaviour under storage conditions, that is, they tolerate partial reduction of their water content, but loose viability when exposed to subzero temperature. Therefore, conservation of *G. americana* seeds using the conventional methodology is not possible and alternative methods are necessary. The objective of this work was to develop a cryopreservation protocol for *G. americana* axes. Seeds were desiccated over silica gel and cryopreserved in liquid nitrogen. Seeds were thawed and axes were excised and cultivated *in vitro* to evaluate their viability. Germination of axes excised from fully hydrated seeds (52% moisture content) was 97,5%. Desiccation reduced axes' viability and axes excised from seeds containing 8% moisture content showed 44% germination. After cryopreservation, axes isolated from fully hydrated seeds (52% moisture content) presented only 30% viability and the highest viability (100% germination) was attained by axes isolated from seeds with 8.1% moisture content. In conclusion, embryonic axes of *G. americana* can be cryopreserved with success just by adjusting their water content.

791. INVENTORY OF THE FAUNA FOUND IN THE LEAF LITTER OF PSAMMOPHILOUS HERBACEOUS VEGETATION IN THE COASTAL SANDPLAIN (RESTINGA) IN ALAGAMAR BEACH (PONTA NEGRA, NATAL, RN) NORTHEAST BRAZIL. Santos, Roberto L.; Moreira, Ricardo José; Almeida, Maria das Graças; Araújo-de-Almeida, Elineí; Mendonça-Júnior, Jurandir R.; MAIOLINO, DANIEL. Departamento de Botânica, Ecologia e Zoologia, Centro de Biociências, Universidade Federal do Rio Grande do Norte, Natal, RN, 59072-970, Brazil, jurandir_net@hotmail.com.

An inventory of the fauna associated with the leaf litter of psammophilous herbaceous vegetation was carried out in the costal sandplain or restinga in Alagamar beach (Natal/RN), estearn coast of Rio Grande do Norte State, northeastern Brazil. A total of 109 samples were collected in three different vegetation types along the coastal dune system. The collected specimens ammounted to 2005 individuals belonging in the taxa Chelicerata (order Acari; order Pseudoscorpiones; order Aranae: families Lycosidae, Thomisidae and Salticidae), Hexapoda (order Blatariae: families Blatellidae and Bladeridae; order Coleoptera: families Scarabaeidae, Tenebrionidae, Carabidae, Elateridae, Bruchidae, Curculionidae; order Isoptera; order Embioptera, order Thysanura and order Hymenoptera: family Formicidae) and Mollusca (Gastropoda Pulmonata: families Subulinida de e Bulim ulidae). The order Acari was the most abundant with 65,13% of the collected specimens; the order Coleoptera was the second most abundant with 211,78%. The Coleoptera was the most diversified group, accounting for 72,41% of all taxa found in the leaf litter; Chelicerata accounted for 20,68% and Mollusca Gastropoda Pulmonata for 6,9%. A preliminary report on the conservation status of Alagamar beach is given, along with suggestions for the preservation of dune and restinga environments in Rio Grande do Norte State.

792. USING PHYLOGEOGRAPHY TO RECOGNIZE *Conopophaga lineata* (PASSERIFORMES) IMPORTANT POPULATIONS FOR CONSERVATION IN THE ATLANTIC FOREST. SARI, ELOISA H. R.; Pessoa, Rodrigo O.; Cabanne, Gustavo S.; Miyaki, Cristina Y.; Santos, Fabrício R. Departamento de Biologia Geral, Instituto de Ciências Biológicas, Universidade Federal de Minas Gerais, Av. Antônio Carlos, 6627, Pampulha, CP 486, Belo Horizonte, MG, 31.270-910, Brazil; eloisagene@yahoo.com.br (EHRS, FRS). Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, 277, São Paulo, SP, 05508-900, Brazil (ROP, GSC, CYM).

High levels of genetic variability are important for populations and species persistence in nature. Phylogeography allows evaluating the distribution of a species' genetic diversity in its geographical range and in an evolutionary time scale. Thus, it is useful to identify important populations for conservation. *Conopophaga lineata* presents remarkable geographical variation in song and plumage, although the distributional limits of these variations are still undefined. Currently three subspecies are recognized, but with largely indefensible range limits. With the aim to assess *C. lineata* genetic diversity and to recognize important populations for conservation we sequenced 1046bp of the mtDNA control region of 120 individuals from southeastern Brazil and Misiones (Argentina). We found high intraspecific genetic diversity (58 haplotypes; nucleotide diversity of 0.024). Median-joining network revealed the existence of three very distinct clades within the distribution areas of two subspecies. An abrupt separation between clades is observed in Paraíba do Sul Valley. Two clades are not geographically split and occur simpatrically in some populations of southern Minas Gerais State (MG). One of these clades is widespread in MG and the other one in northeastern São Paulo State. Hence, this region showed high levels of genetic diversity. (Financial support: CAPES, CN Pq, FAPESP, PELD, WWF)

793. MONITORING ELEPHANT CORRIDORS AND ELEPHANT - HUMAN CONFLICT: AN INSIGHT FROM THE PAKKE - KAMENG LANDSCAPE OF NORTHEAST INDIA. Sarkar, Parbal; Akhtar, Naim; VARMA, SURENDRA; Menon, Vivek. Wildlife Trust of India, A 220 New Friends Colony., New Delhi 110 065 India (PS, NA, VM). Asian Elephant Research and Conservation Centre (A division of Asian Nature Conservation Foundation), C/o Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560 012, India (SV). varma@ces.iisc.ernet.in.

Maintaining viable habitats and populations and mitigation of elephant human-conflict are key issues in the Asian elephant (*Elephas maximus*) management. However in most cases, contiguity of elephant habitat is retained through human settlements or croplands and these habitations attract elephants and may link populations. Given this, monitoring elephant corridors and elephant-human conflict, specifically rethinking conflict mitigation measures are indispensable. This new conservation concern motivated us to monitor elephant-human conflict in 12 (of 14) villages and use of 5 (of 6) corridors by elephants since 2002, in Pakke-Kameng landscape. Estimated crop damage by elephants for all study villages was 2 to 3% and on an average 5% and 2% of crops were damaged in corridor and non-corridor villages respectively. Encounter rates of elephant signs during conflict months (October - November) were 8.3/km and only 5.4km for non-conflict months (June - July). Encounter rates for habitat close to a) corridor villages were 9.3/km b) non-corridor villages were 4.8/km and c) set-

tlement where crop cultivation was abandoned due to severe damage by elephants was only 1.6km. The results reflect elephants' attraction and movement through corridor villages across habitats and any unplanned conflict mitigation measures may have a negative impact on these elephant populations.

794. LINKING FARMERS AND BIODIVERSITY: THE ROLE OF VULTURES AS NATURAL SCAVENGERS. SARRAZIN, FRANÇOIS; Bobbé, Sophie; Boumellassa, Houssein; Buronfosse, Thierry; Gault, Agnes. Laboratoire Conservation des Espèces, Restauration et Suivi des Populations, UMR 5173 MNHN-CNRS-UPMC, 61 rue Buffon, 75005 Paris, France, sarrazin@mnhn.fr (FS, AG). CETSAH, EHESS (ESA 8037 CNRS), 22 rue d'Athènes, 75009 Paris, France; and INRA, équipe STEPE 63-65, boulevard de Brandebourg, 94204 Ivry-sur-Seine, France (SB). UMR 210 Économie publique INRA-INA PG, INRA, Centre Versailles-Grignon, 78850 Thiverval-Grignon, France (HB). CNITV - Ecole Nationale Vétérinaire de Lyon -1, avenue Bourgelat - BP 83 - 69280 Marcy l'Étoile, France (TB).

The negative impact of agriculture on biodiversity is often discussed but counter examples can be identified, e. g. the restoration of Griffon Vultures populations in France largely relies on mortality in livestock. Due to veterinary legislation, leaving carrions in the wild was forbidden and only tolerated on 'feeding places' managed by conservationists or, more recently, by farmers. However, due to BSE and other diseases, carrion management became an important task at the European scale. In this context, we launched a multidisciplinary study to assess the efficiency and viability of the system, for both farmers and vultures. An ethnological approach of the role of scavengers as 'carrion managers' showed that the management of feeding places by farmers might reinforce the positive image of these birds. An economic approach assessed the costs and benefits of various strategies of carrion management for each partner. An ecotoxicological study focused on the possible impact of livestock treatments on scavenger populations. Finally, behavioural analyses showed that despite feeding places being easily found by vultures, they did not prevent them foraging on other resources. This program was thus useful to optimize both carrion destruction and vulture populations viability and provide management recommendations at regional and international scales.

795. EXISTING RESERVES IN BRAZILIAN VARZEA: BENEFITS & LIMITATIONS. SCARAMUZZA, CARLOS A. M.; Oviedo, Antonio; Albernaz, Ana Luisa; Pressey, Robert L. WWF-Brasil, SHIS EQ QL 6/8 conj E, Brasília, DF 71620-430, Brazil, +55 61 364-7467 scara@wwf.org.br, (CAMS; AO). Ciências da Terra e Ecologia, Museu Paraense Emilio Goeldi, Av. Perimetral 1901, Belém, PA 66077-530, Brazil (ALA). Department of Environment and Conservation, PO Box 402 Armidale NSW 2350 Australia (RLP).

We studied the protected area (PA) types present or potentially applicable to the Brazilian várzea. There are three basic groups of PA: sustainable use, strict use and indigenous reserves, each of wich can be subdivided into several categories. In a preliminary analysis of representativeness of PA in the várzea, we measured the coverage of 18 subecoregions by the 2003 federal PA system. This indicated an overall coverage of 11.9% by indigenous reserves, 5.7% by sustainable and 3.4% by strict use, with an unbalanced spatial distribution. We are analyzing both state and federal PAs in a different approach to evaluate representativeness using a set of environmental surrogates as features to be protected (e. g. longitudinal sub-regions, river confluences and barriers, upland-Varzea interactions, flood height categories, species distribution models). We are also reviewing the advantages and limitations of PA in terms of ease of management, socio-economic constraints, and biological effectiveness. Our special focus in on the six strict PAs, evaluating their implementation and importance for biodiversity conservation. The implementation of this kind of varzea PA is difficult due the easy access by water specially during the flood season, demanding higher targets for the conservation goals and focus on participatory management.

796. LINKING AMPHIBIAN ECOTOXICOLOGY AND CONSERVATION BIOLOGY: A GLOBAL SYNTHESIS. SCHIESARI, LUIS; Grillitsch, Heinz; Grillitsch, Britta. Environmental Management, University of São Paulo (EACH/USP-Leste), Av. Arlindo Bétio s/n, 03828-080, São Paulo, SP, Brazil, lschiesa@umich.edu (LS). Natural History Museum of Vienna, I. Department of Zoology, Burgring 7, A-1014, Vienna, Austria (HG). Aquatic Ecotoxicology, Department of Natural Sciences, University of Veterinary Medicine of Vienna, Josef Baumann-Gasse 1, A-1210, Vienna, Austria (BG).

Understanding the causes of amphibian population declines represents a major challenge in conservation biology. Pollution is an important cause, threatening one-fifth of amphibian species in the world. Our aims were to characterize the state of knowledge, verify trends and potential research biases, and objectively assess future directions in the study of pollution impacts on amphibians. We compiled a global database from the ecotoxicological literature employing a well-defined search strategy (4000+ publications; Biosis and Medline; 1966-2004). We extracted from each publication the key biological (e. g. taxon, biogeographic realm) and ecotoxicological variables (e. g. toxicants, exposure scenarios, effects), which were crossed with data from the Global Amphibian Assessment. Trends indicate deficiencies affecting causal explanation of declines and risk assessment. Biogeographical and taxonomic biases are strong with less than 5% of species studied, a single genus (*Rana*) accounting for one-fourth of all published papers, and less than 1% of neotropical species studied although eight of the top ten countries in threatened species are neotropical. Finally, although declines may have multiple causes, few studies tested interactions among different stressors. We conclude that research at the amphibian ecotoxicology-conservation biology interface should emphasize the interactive effects of pollutants and other abiotic and biotic stressors in threatened faunas.

797. THE FUTURE OF THE AMAZON TIMBER INDUSTRY. Schlesinger, Peter; MERRY, FRANK; Nepstad, Daniel; Lefebvre, Paul. The Woods Hole Research Center P.O. Box 296, Woods Hole, MA, USA 02543 fmerry@whrc.org.

Forest and conservation policies in the Amazon suffer from a lack of information about costs of implementation, and of the long-term impact on production. This lack of information makes decision-making, whether for conservation set-asides or timber concessions, essentially related to the best guess. And, while there is some good basic information available, there is neither a dynamic model nor a comprehensive basin-wide effort. In this research we outline the structure of a Pan-Amazon logging model that forecasts where logging will occur over a 30-year period. The model, based on secondary data from the IBGE and supplemented by data from a 527-mill survey, uses a residual cost analysis that allows firms to select the least cost harvest path in 590 Municipalities in the Brazilian Amazon. Once the harvest is selected, the cost- surface variables are reformatted and the model is rerun. Using this model

we simulate (1) the costs of protecting conservation areas from illegal logging and (2) how a timber concession program will affect the location of logging.

798. MICROSATELLITES AS INDICATORS OF DIVERSITY FOR GENETIC CONSERVATION OF *Araucaria angustifolia* (BERT.) O. KUNTZE. SCHMIDT, ANDRÉA B.; Ciampi, Ana Y.; Guerra, Miguel P.; Nodari, Rubens O. Programa de Pós-graduação em Recursos Genéticos Vegetais, PRGV, UFSC, Florianópolis, SC, Brazil (ABS, MPG, RON). Laboratório de Genética Vegetal Embrapa Recursos Genéticos e Biotecnologia, Brasília DF, Brazil (AYC).

Araucaria angustifolia is a diocious tree species that occurs in the southern part of Brazil. Because of the intense exploitation of the species, due to its valuable wood, only 2% of the original population still remains. Molecular markers based on microsatellite are an ideal tool for genetic studies of natural populations because of their high degree of polymorphism, co-dominant and multiallelism. The objectives of this study were to (1) develop microsatellite markers for *A. angustifolia*, and (2) evaluate levels of genetic diversity in natural populations of this species. Microsatellite-enriched libraries were constructed by initially digesting genomic DNA with an endonuclease (*Mse* I). Fragments ranging in size from 200 to 800 were isolated, ligated to adaptors and hybridized to biotinylated $(AG)_{13}$ and $(TC)_{13}$primers. Microsatellite primer pairs were designed for 29 loci and 9 of them were used to characterize diversity in 48 individuals from two distinct populations. Preliminary analysis reveals low levels of differentiation between the two populations (F_{st}=0,064), although one of them has been exploited. We plan to expand our analysis to other populations and use these data to assist germplasm collection, definition of areas for *in situ* conservation and management programs of this endangered and highly valuable species.

799. ETHNOBOTANY OF *Syngonanthus nitens* (ERIOCAULACEAE): A NON-TIMBER FOREST PRODUCT (NTFP) FROM THE BRAZILIAN CERRADO, AT JALAPÃO REGION, TOCANTINS. SCHMIDT, ISABEL B.; Figueiredo, Isabel B.; Scariot, Aldicir. Diretoria de Florestas, Ibama, Brasília, DF, 70.818-900, Brazil & PEQUI - Pesquisa e Conservação do Cerrado, Brasília, DF, 70763-520, Brazil, isabelbs@pequi.org.br (IBS). Programa de Pós-graduação em Ecologia, Universidade de Brasília, Brasília, DF, 70.919-900, Brazil (IBF). Embrapa/ Cenargen, Brasília, DF, 70770-900, Brazil & Programa das Nações para o Desenvolvimento, PNUD Brasil, Brasília, DF, 70712-901, Brazil (AS), scariot@cenargen.embrapa.br.

The handcrafts made from coils of "capim dourado" (golden grass) scapes that are sewn tightly together with buriti palm (*Mauritia flexuosa*) strips represent important source of income in Jalapão. Recently, the traditional handcrafts made by women from the Mumbuca Community started being commercialized in large Brazilian cities and European countries, increasing extraction rates. This study is aimed at characterizing the plant scapes extraction methods and the management techniques of humid grasslands areas, where the species occur. Harvest and handcraft activities occupy women, men and children from almost all rural communities in Jalapão. Scapes are collected from July to October. Harvesters believe that the humid grasslands should be burned every other year to stimulate production. The ideal period to harvest is variable among harvesters; knowledgeable harvesters tend to collect scapes later in the year. This practice allows seed maturation (early September) before the harvest, decreases plant mortality by uprooting plants with immature scapes and increases the brightness of the handcrafts. These information has been applied in experiments which were designed and fulfilled with harvester participation, to assess the effects of capim dourado's harvest in the region. The intention is to propose harvesting rules based on both scientific and traditional knowledge.

800. COMPARISON OF DIFFERENT METHODOLOGIES FOR DNA EXTRACTION FROM SCATS OF *Leopardus wieddi*. Schneider, Alexsandra; RORATTO, PAULA A.; Bitencourt, João V.T.; Bartholomei-Santos, Marlise L.; Santos, Sandro. Programa de Pós-Graduação em Biodiversidade Animal, Universidade Federal de Santa Maria, Santa Maria, RS, 97105-900, Brazil, p.angelica@mail.ufsm.br.

Leopardus wieddi is a felid species vulnerable to extinction. Due to the difficulties in collecting blood or tissue samples for conservation genetics purposes, DNA extraction from scats is a very useful method since it does not require the animal capture and it is non-invasive. The aim of this study was to compare different methodologies for DNA extraction from scats, in relation to DNA yield, molecular weight and suitability to downstream applications. Four protocols were tested: A) QIAmp DNA Mini Kit; two modified phenol-clorophorm techniques: B) lysis in buffer containing b-mercaptoethanol and proteinase-K for 2 hours and C) lysis in buffer containing b-mercaptoethanol for 16 hours; D) Sample homogenization in iced buffer and precipitation with potassium acetate and isopropanol. An aliquot of each sample was incubated with TaqI to observe the restriction pattern. All protocols produced DNA suitable to digestion. The protocol that produced DNA with high molecular weight and higher yield was the protocol D, which has been regularly used in our lab.

801. SUSTAINABLE FOREST MANAGEMENT IN CENTRAL AMAZONIAN WHITE-WATER FLOODPLAINS BASED ON TREE RING-DATA. SCHOENGART, JOCHEN. Max-Planck Institute for Limnology, INPA/Max-Planck Project, Av. André Araújo 2936, P.O. Box 478, 69011-970 Manaus/AM, Brazil, jschoen@gwdg.de.

The nutrient rich white-water floodplain forests along the Amazon River are endangered due to conversion into areas for agriculture and an expanding timber industry. In a reserve at the middle Solimões River the Institute Mamirauá develops in co-operation with the local inhabitants management plans for sustainable use of the natural resources and concepts for the protection of rare animal and plant species. One important part is the plan for sustainable forest management. This includes the investigation of growth behaviour of timber species by means of tree ring analysis. The modelled growth patterns show a high variation in diameter and volume increment. The model indicates an optimal period for logging between the peaks of current and mean volume increment. The cutting cycle in the reserve is presently limited to 25 years for all species. Our results shows that the cycles must be adapted specifically to avoid overexploitation of the slow growing and to allow economical use of faster growing tree species. The investigation can be used as a model for the estimation of sustainable wood growth in other tropical forest ecosystems.

802. EXPERT SCORING TO ASSESS CHANGE - THE BIODIVERSITY INTACTNESS INDEX. SCHOLES, ROBERT J.; Biggs, Reinette. CSIR Environmentek, PO Box 395, Pretoria

0001, South Africa, bscholes@csir.co.za.

For the foreseeable future, quantitative knowledge about changes in the abundance of species populations will be too patchy for widespread use in systematic, broad-based indicators. Expert judgement can bridge this gap. We have proposed and tested a method for integrating information on ecosytem distribution, land use, species richness and changes in abundance, in which the latter can be supplied by expert judgement if necessary. The approach is relatively simple and quick, even in places with sparse information, and seems to be reproduceable, unbiased and scaleable.

803. EVAPOTRANSPIRATION IN FOREST AND PASTURE IN EASTERN AMAZONIA: EVALUATING SOIL MOISTURE RESTRICTION TO SURFACE CONDUCTANCE. SCHULER, AZENETH MARYSOL E.; Moraes, Jorge M.; Dunne, Thommas; Victoria, Reynaldo L. IPAM - Av. Nazaré, 669 - Belém, PA, 66035-170, Brazil, marysol@ipam.org.br (AMES) CENA/ USP - Av. Centenário, 303 - Piracicaba, SP,13400-961, Brazil (JMM, RLV) Bren School Envir. Sci. & Manag./ UCSB - Univ. of California, Santa Barbara, CA, USA (TD).

This study evaluates the role of stomatal conductance and soil moisture to evapotranspiration (ET) estimates at two sites in Paragominas, Eastern Amazonia (2° 57' S latitude), one covered by pasture and other by forest. Evapotranspiration daily values were calculated using Penman-Monteith equation coupled to a water balance bucket model. Canopy conductance was estimated by a Jarvis-type model (g_c=maxg_{min}, L*$g_{smax}$$f_2$(D) f_3(T) f_4(R) f_5(q)), using stomatal conductance minimum and maximum values (g_{min}, g_{smax}), climate variables (R=radiation, T=temperature, D=specific humidity deficit) and soil moisture estimates (q) from the balance equation. In bucket model calibration, observed soil moisture values (TDR measurements) were compared to model estimates. Climate variables were not effective in model sensitivity analysis, since they do not vary meaningfully along the year. In the other hand, daily soil moisture showed a markedly seasonality due to precipitation and model responses were sensitive to soil parameter. Model simulations analysis showed that changes in effective soil depth affects total amount of plant available water, influencing stomatal conductance and ET. A deeper root zone available to water uptake causes higher conductance values and evapotranspiration. Hence, it is important to consider soil impeding layers constraining root zone depth, when modeling land use change effects on hydrological fluxes.

804. CO-MANAGEMENT OPPORTUNITIES AND CHALLENGES AT THE UBATUMIRIM BAY, UBATUBA, BRAZIL. SEIXAS, CRISTIANA S.; Futemma, Célia T. NEPAM, State University at Campinas (UNICAMP), Brazil. csseixas@hotmail.com (CSS). Centro Universitário SENAC - Faculdade de Ciência Ambiental (CF).

This paper examines aspects of fisheries co-management at the Ubatumirim bay, Ubatuba, Brazil. Fishers from two major communities, Ubatumirim and Almada, use this area to practice small-scale multi-gear fisheries with paddle canoes and/or small motorboats. The bay - a recognized shrimp nursery area - is also used by outside fishers for shrimp trawling. In order to conserve shrimp and other species within the context of Integrated Coastal Zone Management, the state and municipal governments and the Fishers Grassroots Organization were proposing access restriction to trawls within this bay. We interviewed 17 fishers from Almada, four government agents and the head of Fishers Organization to understand their views about this issue. We also used ethnomapping to identify the areas where trawling restriction were proposed by both the government and fishers. Despite only one fisher from Almada practices shrimp trawling in the bay, the large majority of fishers declared against this access restriction. Most of them agreed that the restriction could benefit shrimp population and fisheries in the long run. However, they are afraid that the government will impose further restriction to small-scale fisheries as has happened before in two nearby islands. Fishers' mistrust towards government agencies seems to be hampering co-management agreements.

805. IMPACTS OF BIRDWATCHING ON HUMAN AND AVIAN COMMUNITIES. SEKERCIOGLU, CAGAN H. Stanford University Center for Conservation Biology Department of Biological Sciences 371 Serra Mall Stanford CA 94305-5020, USA.

Ecotourism can be a vehicle for community-based conservation if it is conducted with an emphasis on the well-being of local ecosystems and human communities. Birdwatchers form the largest group of ecotourists, and are, on average, well-educated, wealthy and committed. This makes them ideal ecotourists for community-based conservation. Therefore, there is a need for a comprehensive review of birdwatching from a conservation biology perspective. Specific objectives here are: (1) to review the economic potential of non-residential birdwatching for community-based conservation; (2) to outline the potential benefits and problems associated with this activity; and (3) to provide suggestions for improving the conservation value of birdwatching. Birdwatching tourism has a high potential to improve the financial and environmental well-being of local communities, educate locals about the value of biodiversity and create local and national incentives for successful protection and preservation of natural areas. However, there needs to be more research on the economical and environmental impacts of this hobby, birdwatching-related disturbance needs to be reduced, and much has to be done to increase the financial contribution of birdwatching to local communities.

806. COMMUNITY DEFINITIONS OF SUCCESS; DEMONSTRATING THE CONTRIBUTION OF BIODIVERSITY CONSERVATION ON LOCAL LIVELIHOODS ON THE ISLAND OF OMETEPE, NICARAGUA. SEPÚLVEDA, NORVIN. Fauna & Flora International, km12 ½, carretera Norte, Marena contiguo al Corredor Biológico Mesoamericano, Managua, Nicaragua, norvin.sepulveda@fauna-flora.org.

It is important to demonstrate that conservation measures can contribute positively to the livelihoods of local resource users. Over the past 18 months FFI have facilitated an initiative to promote biodiversity conservation and develop community based ecotourism on the freshwater island of Ometepe in Lake Nicaragua. Ometepe is comprised of two volcanoes connected by a wetland isthmus and its exceptional biodiversity and archaeological wealth attracts increasing numbers of tourists. Working with the indigenous communities and local partners, FFI have applied an integrated approach to conservation through local development directed at resource management, ecotourism, legislation, community organization and capacity building for conservation management. An integral component of this model is the development of a monitoring and evaluation system that combines scientific criteria with local perceptions in order to create an instrument to evaluate the process' impact. These "community definitions of success" (CDS) already indicate the positive impacts of this initiative on

local livelihoods, by defining property ownership and indigenous rights, through capacity training, in developing basic ecotourism infrastructure and by consolidating the communities' internal organization and external alliances.

807. PEOPLE, POLICIES AND CONSERVING BIODIVERSITY IN THE LA SELVA BIOLOGICAL CORRIDOR; AN INTEGRATED LAND CHANGE ASSESSMENT OF COSTA RICA'S ENVIRONMENTAL SERVICE PAYMENTS. SESNIE, STEVEN E.; Morse, Wayde C.; Finegan, Bryan; Harvey, Celia A.; Gessler, Paul E.; Hollenhorst, Steve. University of Idaho College of Natural Resources, Department of Forest Resources, Moscow, Idaho 83844, USA, sesesnie@lycos.com and El Centro Agronomico Tropical de Educación y Enseñanza (CATIE) Escuela de Postgrado Sede Central 7170, Turrialba, Costa Rica.

Land change remains a persistent threat to retaining forest habitats important to biodiversity. Costa Rica's Environmental Service Payments (ESP) to private land owners aims to protect watersheds, biodiversity, sequester carbon and maintain aesthetic values. Land owners have received >US$50 million to establish and maintain forest on >250,000 hectares since 1996. Incentives are coupled with policies prohibiting forest conversion to other land uses. Our case study in an 8,000 km^2 biological corridor evaluated ESP effectiveness at maintaining forest cover. Landsat TM images were used to compare land cover changes before and after ESP. A biophysical model of tropical forest types from 144 forest plots was integrated with image analysis to enhance change detection among habitats. Multistage interviews with ESP participants, non-participants, and regional experts were used to ascertain socioeconomic and policy factors influencing land use decisions and ESP program participation. Preliminary assessments show fragmentation greatest within forest types associated with high soil fertility and low topography, but has decreased significantly overall since 1996. Forest area increases were mainly through recruitment of exotic tree plantations with implications for the changing character of forest habitat in the corridor. Interviews suggest that forest establishment and retention were positively influenced by ESP and negatively by agricultural export price increases.

808. BEE AGGRESSIVE BEHAVIOR AFFECTS THE HUMMINGBIRD LEGITIMATES VISITS ON *Ananas ananassoides* (BROMELIACEAE)? SFAIR, JULIA C. Departamento de Botânica, Instituto de Biologia, Universidade Estadual de Campinas, Campinas, SP, 13.083-971, Brazil, juliacaram@gmail.com (JCS).

Studies involving flower resource-robbers usually approach the indirect effects and rarely point out the direct effects on pollination. The aim of this survey was to examine if the robbing bee *Scaptotrigona postica* changes directly the number if authentic visits by the hummingbird *Hylocharis chrysura* on the cerrado Bromeliaceae *Ananas ananassoides*. This bee has an aggressive behavior, flying around the intruder, and remains at the inflorescence almost all day long. Adjacent inflorescences with and without *S. postica* were observed in a cerrado fragment in the city of Itirapina (State of São Paulo). The hummingbirds preferred inflorescences without bees (X^2=80,66; p=0,000). When they visited inflorescences with robbers, the number of hesitations was higher than when they visited ones without bees (X^2=80,66; p=0,000). The direct effects also influence the legitimate visits, since *A. ananassoides* with bees is an expensive resouce because of the aggressive behavior of *S. postica*. Therefore the consequences for pollination and *A. ananassoides* fitness must be investigated, since this direct effect on pollination by *S. postica* probably has consequences in the genetic, spatial and temporal population ecology of this plant.

809. IMPLICATIONS OF HUMAN CULTURES ON BIODIVERSITY ACROSS THE ISRAELI-JORDANIAN BORDER. SHANAS, U.; AbuGalyun, Y.; AlShamlih, M.; Cnaani, J.; Khoury, F.; Mitler, S.; Nassar, K.; Shapira, I.; Sultan, H.; Topel, E.; Ucitel, D.; Ziv, Y. Department of Evolutionary and Environmental Biology, University of Haifa, Israel (US, SM, IS), Department of Biology, University of Haifa-Oranim, Israel (US), Hashemite University, Zarka, Jordan (YA, FK, MA), Friends of the Earth Middle East, Jordan (KN, HS). Department of Biology, Ben Gurion University, Beer Sheva, Israel (ET, YZ), Arava Institute for Environmental Studies, Kibbutz Ketura, Israel (US, JC, DU). (shanas@research.haifa.ac.il).

The Arava rift valley presents an ideal set-up where the impact of different human societies on the diversity of organisms can be studied. The political border and the hostility between Israel and Jordan has divided the region into a land that is heavily settled with agricultural farms, and a land that is sparsely settled, mainly by a traditional and pastoral culture. Now, the peace treaty signed by Israel and Jordan has opened a temporal opportunity to study this differential impact. The diversity of rodents, birds, reptiles, beetles, spiders, and antlions, across different landscape units was studied in plots adjacent and far away from agricultural farms at different seasons, in both Israel and Jordan, over a period of two years. So far analysis for rodents, reptiles and antlions suggest remarkable differences across the border. Further experiments on rodents imply that some of the observed differences are caused by differences in rodent behaviours across the border. The intensive agricultural farming in Israel eradicated many of the rodents sandy habitats, and support large populations of predators that cause behavioural shifts in rodents. The Jordanian side, in contrast, suffers from pressure on reptiles and large mammals, caused by flocks of goats, and by unregulated hunting and gathering.

810. THE INFLUENCE OF SEXUAL DIMORPHISM ON FORAGING BEHAVIOUR BY THE AFRICAN ELEPHANT IN FENCED RESERVES. SHANNON, GRAEME; Slotow, Rob; Page, Bruce; Duffy, Kevin;. School of Biological and Conservation Sciences, University of KwaZulu-Natal, Durban, 4041, South Africa 202527107@ukzn.ac.za (GS, RS, BP). Durban institute of Technology, Durban, South Africa (KD).

South Africa has a well managed protected area network, however population pressure and conversion of natural habitats has led to the predominance of relatively small (<1000 km^2), fenced reserves. These reserves are susceptible to a number of perturbations, not least over-utilisation by herbivores such as elephant. Confining elephant has potential costs to the diversity of a reserve and the aesthetics. This remains a contentious issue and greater understanding is required with regards to the spatial and foraging ecology of elephant. Comprehensive behavioural and location data from the Pongola Game Reserve was analysed to investigate the importance of sexual dimorphism in understanding the foraging behaviour and utilisation of elephant in fenced reserves. Adult females exhibit defined home ranges that are strongly seasonal even in this spatially restricted reserve whilst males tended to have larger ranges. Both sexes show seasonal habitat selection which appears strongly correlated to food availability. Females target smaller classes of trees (average: 3.8m compared to 4.7m for males) during feeding bouts and display significantly less destructive behaviour (13% of all observations compared with 36%

for males). This study highlights that population structure as well as population size is an important consideration for the management of small fenced reserves.

811. SPRING STOPOVER AND RESOURCE ACQUISITION BY MIGRANT SONGBIRDS IN THE LOS TUXTLAS MOUNTAINS, VERACRUZ, MEXICO. SHAW, DAVID W.; Winker, Kevin. Ornithology Dept., University of Alaska Museum of the North, 907 Yukon Drive, Fairbanks, AK, 99775 USA, ftdws@uaf.edu.

The narrowing of the North American continent at the Isthmus of Tehuantepec creates the final geographic bottleneck for songbirds on their northward spring migrations. The resulting concentration of birds should result in a strong demand on available resources. Our field site in the Sierra de Los Tuxtlas, in the northeastern portion of the Isthmus, provides an ideal location from which to address questions of resource use and fat acquisition during migration. Of the 14 species examined in this study, 6 showed significant diurnal increases in body condition. A comparison with autumn migration at this site indicates seasonal differences within and between species. There appears to be no relationship between mainland vs. trans-gulf migration and increase in body condition. This study of resource use and fat acquisition is the first to address spring songbird stopover within the Neotropics. Results indicate a need for a reassessment of migration routes and concepts of resource use in passage.

812. IMPACTS OF CATTLE AND WATER BUFFALO RANCHING ON FLOODPLAIN FORESTS OF THE LOWER AMAZON, BRAZIL. SHEIKH, PERVAZE A.; Lucas, Christine. Congressional Research Service, 101 Independence Ave. SE, Washington, DC, USA, 20540, psheikh@crs.loc.gov; Wildlife Ecology and Conservation Department, University of Florida, 303 Newins-Ziegler Hall, P.O. Box 110430, Gainesville, Florida, USA, 32611-0430, chlucas@ufl.edu.

Cattle and water buffalo herds roam freely through floodplain forests and grasslands in the Lower Amazon. This activity may cause changes in forest structure and species composition. We studied 23 floodplain forests to see if livestock activity was related to forest structure, tree species composition, and soil properties. We classified each site by its level of livestock activity (light, moderate, or heavy). We randomly established three 1000-m^2 plots in each forest and surveyed tree stems, saplings, and seedlings. We also measured soil compaction and light penetration. Forests with heavy livestock activity had significantly fewer seedlings and saplings, and a lower basal area in comparison to forests with light activity. Species richness and seedling density were significantly higher in forests with moderate livestock activity than those with heavy activity. We observed a positive relationship between livestock activity and soil compaction as well as soil bulk density. These results suggest that heavy livestock activity may reduce regeneration potential and species richness in floodplain forests. This may lead to increased light penetration and forest conversion to grassland. A second inventory is underway to measure changes over time. Improving livestock management will contribute towards the conservation of floodplain forests in the Lower Amazon.

813. REPTILE ROAD MORTALITY AROUND AN OASIS IN THE ILLINOIS CORN DESERT, WITH EMPHASIS ON THE ENDANGERED EASTERN MASSASAUGA (*Sistrurus c. catenatus*). SHEPARD, DONALD B.; Dreslik, Michael J.; Jellen, Benjamin C.; Phillips, Christopher A. Illinois Natural History Survey, Center for Biodiversity, 607 East Peabody Drive, Champaign, Illinois, USA (DBS, MJD, BCJ, CAP). Sam Noble Oklahoma Museum of Natural History and Department of Zoology, University of Oklahoma, Norman, Oklahoma, USA, dshepard@ou.edu (DBS).

Roads have numerous negative ecological effects on terrestrial fauna and vehicular traffic mortality can have significant demographic consequences in some species. We studied road mortality of reptiles around Carlyle Lake, Illinois, to assess the extent of the impact of vehicular traffic. Carlyle Lake, a popular tourism/recreation area, is situated in a larger agricultural landscape and is home to the largest Illinois population of the endangered Eastern Massasauga (*Sistrurus c. catenatus*). From April 2000 through November 2002, as part of a study on the Massasauga, we drove a ~26 km stretch of road around Carlyle Lake daily. We documented 321 cases of reptile road mortality (84 individuals of 6 turtle species and 237 individuals of 9 snake species). Overall, road mortality was highest in the spring and late summer/early fall. We recorded 42 cases of Massasauga road mortality with the highest number occurring in August. Road mortality was biased toward adult males whose movement patterns showed an increase in August that corresponded with the peak of the mating season. Based on our study on the ecology of this species, we are able to make recommendations to reduce road mortality that should aid in the conservation of the Carlyle Lake population.

814. APPLIED ETHNOECOLOGY AS A TOOL IN THE PARTICIPATORY MANAGEMENT OF INDIGENOUS RESERVES: CASE STUDIES FROM PERU AND BRAZIL. SHEPARD JR., GLENN. School of Biological Sciences, University of East Anglia, UK; Instituto Nacional de Pesquisas da Amazonia, Manaus, Brazil, GShepardJr@aol.com.

Whether hard-core preservationists like it or not, indigenous areas account for more than half of Amazonian reserves by acreage. Indigenous societies are thus literally stewards of half or more of the Amazon's protected biodiversity. Nonetheless, many indigenous reserves in the Amazon face immediate or impending crises in resource availability. It is time to move beyond "noble savage" debates and begin thinking seriously about how indigenous communities can better participate in and benefit from conservation policies and projects for their lands. Indigenous and folk knowledge about the environment represents a vast and underutilized database about habitat diversity, species distributions, ecological interactions among organisms, economically important species, and sustainable management practices. Participatory ethnoecological research methods are especially appropriate for carrying out rapid ecological evaluations and implementing local resource management strategies. Ethnoecological research can serve to build bridges of mutual understanding and respect between local people and Western scientists and conservationists, and may prove crucial in advancing international conservation goals. This presentation will provide case studies of applied ethnoecological research in conjunction with local conservation and resource management strategies in indigenous territories of Peru and Brazil.

815. SUSTAINABLE UTILIZATION OF MOIST TEMPERATE HIMALAYAN MEDICINAL PLANTS IN PAKISTAN. SHINWARI, MUHAMMAD IBRAR; Shinwari, Maryum Ibrar. Pakistan Museum of Natural History, Garden Avenue, Islamabad, Pakistan drmishinwari@yahoo.com.

The moist temperate Himalayas, as one of the major ecological zones of Pakistan, deserves specific attention to the conservation of environment and the sustainable development of natural resources. During the last hundred years, the area has been subjected to major structural changes leading to a decrease of about fifty per cent of the potential forest area. The study was aimed to analyze traditional knowledge and diversity of the medicinal plants of the area. Traditional knowledge about 117 indigenous medicinal plants (including 8 cultivated ones) have been collected from 140 informants. Women, followed by children, have been identified as the principle gatherers of medicinal plants. About 44 species were found to be market oriented. The field surveys were conducted by adopting predefined questionnaires through guided and transect walks. The market oriented indigenous species have been subjected through IUCN criterion for evaluation of their conservation status. It has been concluded that in upland Himalayas where availability of cultivated land is less, the establishment of botanical gardens, home gardens or kitchen gardens may be the best ex-situ conservation strategy, which can be adopted for sustainable utilization of medicinal plants. While clearly defined land tenure system and community participation in park management will be the best in-situ conservation measure. Medicinal plants as crop substitutes can bring better results in low land Himalayas.

816. FOREST CONFLICT, CONSERVATION, AND GOVERNANCE IN LIBERIA. SIAKOR, SILAS; Blundell, Arthur G.; Mascia, Michael B. Sustainable Development Institute, Monrovia, Liberia (sdi_liberia@yahoo.com) (SS). UN Panel of Experts on Liberia, 122 Haida Trail, Nanaimo, BC, Canada, V9S 3G1 (AGB). World Wildlife Fund, 1840 California St. NW #13; Washington, DC 20009 (MBM).

Forests are vital to Liberia 's economy, however, logging has been a source of instability; timber revenue paid for arms, and companies employed militias for security. In the past, it was dangerous to protest human rights abuses related to logging, but less risky to publicize the environmental damage they caused. We discuss the important role civil society, both international and local, played in prompting the UN Security Council in 2003 to sanction timber exports from Liberia. To that end, the UN demanded reform so that timber no longer contributes to violence and is used only for the legitimate development of Liberia. Instead of demanding specific reforms that may not have been locally appropriate, the UN experts recommended that all reform be consistent with principles of 'good governance': transparency, accountability, participation, effectiveness, enforcement, and rule of law. Although reform remains far from complete, this approach has served to: a) ensure a consistent set of 'goalposts'; b) focus international assistance (technical and financial); and c) focus the Liberian government's reform. This has further permitted Liberian civil society a voice in protecting the environment, and ultimately, the Liberian people.

817. COMMUNITY-BASED MANAGEMENT OF FISHERIES IN AMAZONIA. SILVA-FORSBERG, M. C. Gerencia dos Estudo Estratégicos, Provarzea-Ibama, Rua Min. João G. de Souza, Distrito Industrial. 69075-830- Manaus- AM- Brasil.

Communities are managing local fisheries such as lakes on the Amazon River through fishing accords which restrict access to users from outside of the community. In recent decades with increasing population pressure and commercialization, conflicts between local and non-locals have arisen. Since no users have the right to restrict access, the Brazilian Government found a way to solve the conflicts and to conserve the fish species by legalizing the involvement of communities in the management of resources through fishing accords (Portarias) taking advantage of their existing management practices and knowledge. To formulate and implement the Portarias, however, communities need some technical, economical and institutional support. In this paper we present the results of some promising initiatives in community fisheries management supported by ProVarzea/Ibama (Project Management of the Natural Resources of the Várzea). In Silves, for example, in the state of Amazonas, 19 communities (548 families and 2700 people) implemented fishing accords which resulted in the increase of fishing stocks, wild animals and the productivity of subsistence fishing. Thus, an effective way to make conservation work is by supporting local communities in their effort to elaborate, establish and implement management practices of wetland resources.

818. RECORD OF JAGUAR AND PUMA IN THE STATE OF MINAS GERAIS, BRAZIL OVER A 10 YEAR PERIOD. SILVA, JUNIO A. S.; Oliveira, Leonardo; Viana, Leonardo R. Núcleo de Fauna Silvestre - Divisão de Uso e Conservação dos Recursos Naturais, IBAMA/MG, Av. Contorno, 8121, Cidade Jardim, 30110-120 Belo Horizonte, MG, Brazil, junio.silva@ibama.gov.br (JASS). Museu de Ciências Naturais da PUC-Minas, Rua Dom José Gaspar 500, Coração Eucarístico, 30535-610. Belo Horizonte, Minas Gerais, Brazil. (LO). Laboratório de Mastozoologia e Manejo de Fauna, DBG, ICB, Universidade Federal de Minas Gerais, 30161-970, Belo Horizonte, MG, Brazil. (LRV).

One barrier to mammal conservation is that there still exist many gaps in the geographical distribution of several species. Large felids, as top predators, play an important role in the structuring of ecological communities. Yet, due to their secretive nature, assessing the geographical distribution of these large predators is difficult. One initial way to arrive at these distribution patterns is to compile a list of recorded occurrences within an area. In this study we compiled records for jaguar (*Panthera onca*) and puma (*Puma concolor*) occurrences within the state of Minas Gerais. Records were comprised of predation accounts on domestic animals as well as other witnessed accounts over a 10 year period (1992-2002). In total we registered 88 occurrences of both *P. onca and P. concolor* (31 and 57, respectively), throughout the state. These results are extremely important because they provide needed data on the geographical distribution of two important predators in the state. Our results show that these occurrences happened mainly in highly fragmented areas, which suggests the capability of these two species to persist in such a highly fragmented landscape. Also this data will, undoubtedly, aid in future cat research and conservation within the state.

819. THE NEED FOR OFF-RESERVE MANAGEMENT IN THE AMAZON FLOODPLAINS. SILVA-JÚNIOR, URBANO L. WWF-Brasil, SHIS EQ-QL 6/8 Conj. E, Brasília, DF, 71620-430, Brazil, ulsilvajr@yahoo.com.br.

The natural resources management of Amazon floodplains implies a complex challenge at ecological, social, economic and institutional levels. The reserves establishment simplifies institutional level and promotes the pressure decrease over natural resources. But often this process implies the exclusion of some stakeholders

from the area that may cause a pressure increase over the resources in the neighborhood. While the reserves are important and necessary instrument for floodplains conservation they cannot be the only one since the several activities which currently take place on *varzeas* (fishery, agriculture, forestry, cattle ranching, etc) are very important to the regional economy. Those activities when planned to be executed in an integrated fashion, are capable to take advantage from the whole ecological productivity potential, taking into account the interests of all stakeholders. This implies in a multi-institutional or participatory approach for management. Beside the reserves establishment, as an important instrument for biodiversity conservation, it is necessary to develop strategies for off-reserve management in order to promote the social and economic sustainability of the region. Those strategies are related to create institutional boundary conditions which promote cooperative solutions among stakeholders, accordingly the Nash-equilibrium in game theory.

820. URBAN EXPANSION AND ECOLOGICAL PLANNING: AN ATTEMPT AT INTEGRATING AMPHIBIANS TO URBAN ENVIRONMENTS. SILVANO, DÉBORA L.; Leite, Felipe S. F.; Cienfuegos, Camilo; Resende, Saulo R. O. Sete Soluções e Tecnologia Ambiental, Av. Getúlio Vargas 1420, 16º andar, Savassi 30112-021 Belo Horizonte MG Brazil (DLS, CC, SROR), sete@sete-sta.com.br; Laboratório de Ecologia Evolutiva de Anfíbios e Répteis, Mestrado em Zoologia de Vertebrados, PUC-Minas, Belo Horizonte, 30.535-610, MG, Brazil (FSFL) pjandaia@yahoo.com.br.

The southern portion of the Metropolitan Area of Belo Horizonte, MG, Brazil, is under enormous strain deriving from urban expansion and consequent land speculation. The real Estate development, Vale dos Cristais, is located at an ecotone between the Cerrado and the Atlantic Forest biomes that was considered as a priority area for amphibian conservation in the State. In the aim of sustainable local use and occupation, multidisciplinary studies guided its ecological-urban planning. For amphibian studies we used direct search and complementary pitfall traps to better inventory the area that showed nineteen species; two of these species being regional endemic and eight known as typical forest species. The presence of these species support a civic scheme from anurofauna's optics and make the implementation of a monitoring program necessary. In terms of the land development, the urban planning restricted the use of some areas not recommended for occupation, as well guaranteed the preservation of ca 250 hectars area, where a private reserve will be created. These actions are considered essential to maintain natural ecosystems and fauna corridors, assuring then the survival of the diverse amphibian species within this urban project.

821. CURRENT JAGUAR AND PUMA DISTRIBUTION IN CONSERVATION UNITS OF THE CERRADO AND PANTANAL. Silveira, Leandro; Jácomo, Anah T. A.; Moreira, Renato A.; Kashivakura, Cyntia K.; Ferro, Claudia; Furtado, Mariana M.; TÔRRES, NATÁLIA M. Jaguar Conservation Fund, Caixa Postal 193, Mineiros, GO, 75.830-000, Brazil, jaguar@jaguar.org.br; Oreádes Núcleo de Geoprocessamento, Rua Nego Amâncio, Mineiros, GO, Brazil.

The different forms of human use in the Cerrado and Pantanal biomes are reflected in distinct degrees of threat to the jaguars (*Panthera onca*) and pumas (*Puma concolor*). This study made a diagnosis of the conservation status of both species in the Conservation Units of these Biomes, using direct data, interviews and literature. A total of 37 Conservation Units greater than 10,000 hectares are distributed in the Cerrado, and of these, 49% protect jaguars and 78% protect puma. In the Pantanal, all of the seven Conservation Units larger than 10,000 hectares protect both species, with the jaguar being found in lower humid and forested areas, and the puma found in higher dry areas. No Conservation Unit, in the Cerrado and Pantanal, comprise large enough areas to sustain resident genetically viable populations of jaguars and pumas in a long term perspective. Therefore, new conservation strategies for the Conservation Units System by the Brazilian government are necessary, involving the surrounding areas and the natural connections between these Units, extrapolating their actions to a regional ecosystem scale in a metapopulation design.

822. JAGUAR/RANCHER CONFLICTS IN THE PANTANAL: DO COMPENSATION PROGRAMS WORK? Silveira, Leandro; Jácomo, Anah T. A.; Ferro, Claudia; Kashivakura, Cyntia K.; Furtado, Mariana M.; TÔRRES, NATÁLIA M. Jaguar Conservation Fund, Caixa Postal 193, Mineiros, GO, 75.830-000, Brazil, jaguar@jaguar.org.br.

Attacks by jaguars and pumas on domestic livestock and consequent retaliation by cattle ranchers is an historical problem in the Pantanal. When the conflict between humans/livestock/predators exists, it is necessary to add human intervention in order to reduce losses on both parties. This project intended to diagnose the impact of jaguar and puma predation on the domestic livestock and use a financial compensation program to prevent retaliation upon the predators by ranchers. Eleven ranches in the surroundings of the Rio Negro State Park-MS were partners of this initiative for an 18 month period. A total of 74 predation records associated to jaguars on cattle were confirmed in five properties. Jaguars were responsible for 73% of the registered attacks, of these 98% happened on a single property. In an attempt to involve the local community in the conservation of the species, besides the financial compensation to the ranchers, three social campaigns were conducted for the residents of the participating ranchers, where the farm hands and their families received free medical and dental care. In this study we evaluate the real impact of predation and a compensation program as a potential model to solve or minimize jaguar-rancher conflicts in strategic conservation areas.

823. THE "UNIVERSITY OF THE FOREST" IN BRAZILIAN AMAZONIA: SOCIAL COMMITMENT AND APPLIED RESEARCH. SILVEIRA, MARCOS. Post-graduate Program on Ecology and Management of Natural Resources and Nature Sciences Department, Federal University of Acre, BR 364, km 04, Rio Branco, AC 69915-900, Brazil - Email: silveira.marcos@uol.com.br.

Southwestern Amazonia is the focus of new paradigms and demands related to the confluence of development, conservation, and education. Mega investment projects and changes in regional land and forest use are accelerating with little information available for decision-makers and regional societies. Ecological-economic participatory planning requires integrative research, allied with basic education, a collaborative program involving the best research centers and a new model for universities. This will require decentralization of science and technology institutions both in the country and in the region, transforming this socio-biodiversity hotspot into a core region for social and environmental studies. Goals include protecting the intellectual property rights of traditional and indigenous peoples, building a new generation to assume leadership of the development process, and promoting a higher quality of

life for regional societies. This process is occurring in Acre State, involves integrating formal and informal education, and aims to empower local communities through inclusive scientific and social programs. It is based on three pillars: new undergraduate courses, a vocational technological center and an institute of biodiversity and traditional communities. This project is supported by the Ministries of Education, Science & Technology, and Environment and is considered to be an important social experiment for transforming the university model for the 21st Century.

824. A BIODIVERSITY CONSERVATION VISION FOR SERRA DO MAR ECOREGION IN THE ATLANTIC FOREST GLOBAL BIODIVERSITY HOTSPOT. SIMÕES, L. L.; Scaramuzza, Carlos A. M.; Accacio, G. de M.; Rosa, M. R.; Hercowitz, M.; Maltez, H. M.; Rodrigues, Sidney T.; Pinagé, E. R. WWF-Brasil, SHIS EQ QL 6/8, conjunto E, 2º andar, 71620-430, Brasília, DF, Brazil lucianasimoes@wwf.org.br (LSS, CAMS, HMM, STR, ERP). Verde Volta, Rua Deputado Laércio Corte 1430, Apto. 142AC, 05706-290, São Paulo, SP, Brazil (GMA). ARCPLAN, Alameda Joaquim Eugênio de Lima, 881, Cj. 911, 01403-001, São Paulo, SP, Brazil (MRR). Estrela Consultoria, R. Original 172, ap.61, 05435-050, São Paulo, SP, Brazil (MH).

Atlantic forest is the fifth hotspot in the world ranking out of 25. 70% of Brazilian population lives in the forest's former domain and less than 10% of the pristine vegetation is left. Hill chains and coastal plains of the "Serra do Mar" Ecoregion in South and Southeastern Brazil bear the largest forest fragments, many endemic species and the last viable populations of jaguars, golden lion tamarins, wooly spider monkeys and black-fronted piping guans. Considering the lack of biological knowledge and the opportunistic creation of protected areas, we produced a conservation plan based on targets for biodiversity distribution patterns and ecological process. We combined a biodiversity distribution surrogate based on vegetation and geomorphologic mapping, species-distribution modeling (primates, birds, butterflies and amphibians), spatial surrogate for altitudinal animal movement, C-Plan and Marxan decision-support tools and a cost analysis in order to make a gap analysis and to establish medium term conservation strategies for the Ecoregion. The preliminary results indicate that 34% of the selected targets are unprotected under the actual reserve system, 45% partially protected and 21% protected. The identified conservation priorities are integrated in conservation scenarios and the action plans are developed in a joint effort with different stakeholders.

825. DEAD-LIVE FIDELITY OF BRACHIOPOD ASSEMBLAGES FROM A SUBTROPICAL SHELF (SOUTHERN BRAZIL): IMPLICATIONS FOR PALEOECOLOGY AND CONSERVATION PALEOBIOLOGY. SIMÕES, MARCELLO G.; Rodrigues, Sabrina C.; Kowalewski, Michal. Departamento de Zoologia, Instituto de Biociências, UNESP, campus de Botucatu, Botucatu, 18.618-000, Brasil, btsimoes@ibb.unesp.br (MGS). Programa de Pós-graduação em Geologia Sedimentar, Instituto de Geociências, USP, São Paulo, 05508-900, Brasil (SCR); Department of Geological Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061, USA (MK).

Live-dead comparisons provide insights into potential taphonomic biases affecting fossil assemblages and may also aid us in detecting natural or human-induced population changes. This case study exemplifies utility of such live-dead comparisons for the endemic brachiopod *Bouchardia rosea* from the nearshore (< 45m) environments of the southern Brazilian shelf. Sampling program (2000-2003) comprised 29 stations, including Ubatuba (13 sites) and Picinguaba (16 sites) bays. Surficial sediments were sampled using Van Veen grabs (1/40 m^2) and dredges. Out of 29 stations, 21 yielded brachiopod shells. In total, 4629 shells were recovered from Ubatuba (72.1%) and Picinguaba (27.9%) bays. However, 4623 of those specimens were dead empty shells and only 6 (0.1%) represented brachiopods collected alive (all from Picinguaba). The striking discordance between the abundant occurrences of dead *B. rosea* shells and extreme scarcity of live individuals indicates a remarkably poor fidelity of brachiopod assemblages. Clearly, extant populations of *B. rosea* are patchily distributed and drastically diminished, when compared to abundant and widespread past populations documented by ubiquitous brachiopod shells. Several lines of evidence indicate that changes in substrate type, current configuration, water temperature, nutrient availability, and population history all may have conspired to trigger the late Holocene decline of *B. rosea* populations.

826. THE EXPANSION OF AGRICULTURE IN THE BRAZILIAN AMAZON. SIMON, MARCELO F.; Garagorry, Fernando L. Secretaria de Gestão e Estratégia, Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA), Parque Estação Biológica s/n, Brasília, DF, 70770-901, Brazil.

Recent increase in deforestation rate in the Brazilian Amazon has inflamed discussion about the causes of forest loss, with a special focus on agriculture. We studied the expansion of agriculture in the Brazilian Amazon from 1976 to 2001 based on the eight most important items: cattle, bananas, beans, cassava, coffee, maize, rice and soybeans. A biological delimitation for the Amazon based on the map of Brazil's biomes was used, in order to avoid inclusion of non-forested areas in the analysis. Intense spatial changes in Brazilian agriculture have occurred, with the emergence of new production centers located nearby or inside the Amazon's limits. Livestock and soybean cropping in Brazil are consistently moving north. The contribution of the Amazon to Brazilian agriculture rose significantly during the last decades, reaching 28.8% of cassava, 20.2% of banana, 14.2% of rice and 20.0% of cattle production in Brazil in 2001 (three-year average). Cropped area and production in the Amazon have grown at higher annual rates than in the rest of the country for almost all items analyzed, supporting the view that the region is a new frontier of Brazilian agriculture. Stronger conservation measures are needed in order to slow down agricultural expansion in the Amazon.

827. THE INTERDISCIPLINARY PROGRAM FOR BIODIVERSITY STUDIES: VISION, EXPERIENCES TO DATE AND CHALLENGES. SIMONETTI, JAVIER A. Departamento de Ciencias, Ecológicas, Facultad de Ciencias, Universidad de Chile, Casilla 653, Santiago, Chile.

Lack of human resources is regarded as crucial problem to effectively conserve the highly endemic and threatened biodiversity of Chile. At Universidad de Chile, theses in conservation biology are being published at an increasing rate. Over 50% of them were published in the last decade, 85% of them by undergraduate students. Topics focus on the ecology of forests and endangered species, but few of social issues. Graduate students engaged in conservation biology are a recent phenomenon, mostly in ecological issues. More than 130 faculty members from 15 out of 18 Faculties and Institutes are engaged as theses chairs. Despite this capacity, Universidad de Chile does not have a formal graduate program in conservation biology. Faculty members have largely worked in isolation. The recent "Programa Interdisciplinario de Estudios en

Biodiversidad", ought to enhance capacity building for research and conservation of biological diversity. To do so, it must foster academic cooperation, overcoming ghosts of isolation past, facilitating faculty members to join an interdisciplinary graduate program in conservation biology.

828. HABITAT SUITABILITY MODEL DEVELOPMENT: REFINING A GREAT IDEA. SIMONS, V. BROCK. #3041-2424 Main Mall Faculty of Forest Sciences University of British Columbia Vancouver, B.C. Canada.

Ecological systems are structured through interactions that are, for all practical purposes, of infinite dimension. As a complex system, ecosystems demonstrate interactions across scales, nonlinearity, self organization, emergent properties, and overall unpredictability. Understanding and problem solving for biological conservation requires a sophisticated approach, as decisions based on experience and educated guesses are bound to be oversimplified. The process of mathematical modelling provides a logical procedure for simplification that can incorporate and quantify greater complexity than the human mind. An effective model is priceless for its ability to inform and refine alternative management-related hypotheses. Single species habitat suitability models have a long history of use, with mixed success. Still, management strategies developed using such a model will likely be superior to educated guesses, and conservation decisions must be made. I will review the benefits and limitations of habitat suitability modelling for conservation planning, as well as the best method currently available for robust model development, based on Chamberlin's theory of multiple working hypotheses and Akaike's information criterion (AIC). Due to the complexity of ecosystems, the urgency of conservation, and the usefulness of models, it is a technique that every conservation planner should be familiar with.

829. THE CONSERVATION OF THE RED-TAILED AMAZON PARROT (*Amazona brasiliensis*) IN THE STATE OF PARANÁ - BRAZIL. SIPINSKI, ELENISE A. B.; Bóçon, Roberto. SPVS - Sociedade de Pesquisa em Vida Selvagem e Educação Ambiental, Rua Gutemberg, 296, Curitiba, PR, CEP 80420-030, Brazil, papagaio@spvs.org.br.

This project began in 1997 with environmental education actions in the municipality of Guaraqueçaba, in the northern coast of Paraná, an occurrence area of 70% of this species' population. They focused on promoting awareness within the local community and environmental agencies, informing them about the Atlantic Forest biodiversity, the threats to this specie this endemicity, and the illegal trade of wildlife. In 1998, the project was expanded with research and management actions. Since then the following results have been obtained. In the main reproduction site, the monitoring of 173 nests with an average 30% of breeding success, indicated the need of actions focusing on the protection of natural nests throught nest management, achieved by the placing of protective signs and artificial nests. The telemetric system indicated the species land requirements and movements. The census attested to a population of 4900 individuals in the State of Paraná. In 2003/2004, the project carried out a capacity-building programme for 22 local inhabitants of a neighbouring area community of the Superagüi National Park, promoting community-based tourism in the region. The actions have contributed to the protection of the biggest remnant of the Brazilian Atlantic Forest.

830. MODELING THE IMPACT OF POACHING TO SUMATRAN ELEPHANT (*Elephas maximus sumatranus*) POPULATION IN WAY KAMBAS NATIONAL PARK, SUMATRA. SITOMPUL, ARNOLD F.; Hedges, Simon; Tyson, Martin J.; Carroll, John P.; Peterson, James T. Wildlife Conservation Society, 2300 Southern Boulevard., Bronx, NY 10460 USA (AFS, SH, MJT), Daniel B. Warnell School of Forest Resources, University of Georgia, Athens, GA 30602 USA(JPC, JTP).

Poaching of Asian elephants is believed to have increased rapidly since CITES approved the resumption of ivory trade for five African countries. Evidence suggests that poaching for Sumatran elephant also has increased during the last few years; however accurate data on poaching is very difficult to obtain. To understand the effect of poaching to the Sumatran elephant population, we developed a population model, and investigated the population trajectory under three different poaching scenarios (control, low and high poaching). We use a Leslie Matrix to develop an population model for Sumatran elephant and use poaching scenarios as function of population size. We used linear, exponential and logistic functions of population size and calculated the population trend for 50 years. The population models suggested that in 'control' and low poaching scenarios, elephant population would not decline in the next 50 years. However with high poaching scenarios with logistic and constant poaching function, elephant population will be extinct in less than 50 years. Logistic poaching function was identified as the most sensitive parameter. We recommend routine population assessment and intensive poaching monitoring should be a priority in the management.

831. INCORPORATING POTENTIAL INCOME FROM GAME RANCHING INTO A SYSTEMATIC CONSERVATION PLANNING EXERCISE FOR MAPUTALAND, SOUTH AFRICA. SMITH, ROBERT J.; Easton, Julian J.; Goodman, Peter S.; Matthews, Wayne S.; Mulqueeny, Craig; Leader-Williams, Nigel. Durrell Institute of Conservation & Ecology, University of Kent, Canterbury, Kent CT2 7NS, UK, r.j.smith@kent.ac.uk (RJS, JJE, NLW). Ezemvelo KwaZulu-Natal Wildlife, P.O. Box 13053, Cascades, 3202, South Africa (PSG, WSM, CM).

The sustainable use of wildlife can provide positive incentives for landowners to manage their land in ways that conserve biodiversity. Incorporating information on such land-use options into conservation planning systems increases their relevance and so we included data on potential game ranching revenue as part of a planning exercise for Maputaland, South Africa. We focused on communally owned land, which has an area of 6350 km^2, and used data collected in three neighbouring protected areas to calculate the density of 25 medium and large herbivore species in 34 landcover types. We then divided Maputaland into a series of 0.25 km^2 planning units and used data on landcover, herbivore life-histories and game ranching income to calculate potential revenues for each unit. Finally, we used the MARXAN and CLUZ computer programmes to identify portfolios of planning units that met connectivity and biodiversity representation targets, whilst maximising potential revenues from game ranching. We found that a strategy of designating 25% of the unprotected natural vegetation on communal land as game ranches could generate up to US$5.5 million per annum. Based on this, we suggest that community-based game ranching should play an important role in present conservation efforts in this important region.

832. PERMACULTURE AS A STRATEGY FOR CONSERVATION AND RECOVERY OF NATURAL SYSTEMS IN THE BRAZILIAN CERRADO. SOARES, ANDRE. Instituto de Permacultura e Ecovilas do Cerrado, Km 03 Rodovia GO 225 Pirenópolis, Goiás, Brazil, andre@ecocentro.org.

Permaculture is defined by Mollison (1988) as a design system for sustainable human communities that emulates the resilience and diversity of natural systems. In 1999 a parcel of land was acquired to develop a reference centre in the Brazilian Cerrado to demonstrate the viability of Permaculture as a solution to revitalize rural communities suffering from the effects of excessive use of pastures and economic depression. Ecocentre IPEC has been working with a local community of 200 families developing technologies of organic and permanent food production, water care, renewable energy, reforestation and sustainable housing models. After 5 years of work in an abandoned pasture of 2 hectares, the effects of permaculture as a community development strategy for restoration of natural cycles and the revitalization of the local economy can be noticed from several viewpoints. Several technologies have been implemented by the community, including annual replanting of forests, ecological toilets, rain water collection for human consumption, housing from natural and local materials and the rescuing of traditional methods of land and water care. The technologies and participatory methods of Ecocentre IPEC are now in demand for reproduction in several developing countries including Ethiopia, Haiti and Mexico. Ecocentro IPEC has won several awards for sustainability and is one of the leading ecocentres in the world.

833. SCENARIOS FOR THE AMAZON. SOARES-FILHO, BRITALDO; Nepstad, Daniel; Curran, Lisa M.; Cerqueira, Gustavo; Garcia, Ricardo; Ramos, Claudia; Voll, Eliane; McDonald, Alice; Lefebvre, Paul. Centro de Sensoriamento Remoto; Centro de Desenvolvimento e Planejamento Regional, Universidade Federal de Minas Gerais. Av. Antônio Carlos 6627, Belo Horizonte, 31270-901, MG, Brazil, britaldo@csr.ufmg.br.

The Amazon is entering an era of rapid change as new transportation corridors traverse the region, stimulating the expansion of logging and agricultural frontiers. The declining cost of transportation has important implications for biodiversity, greenhouse gas emissions, and the long-term prosperity of the Amazon society. To analyze this context, we have developed an empirically-based, policy-sensitive model of deforestation for the Amazon basin. Model output for the worst-case (business-as-usual) scenario shows that, by 2050, projected deforestation trends will eliminate 40% of the current 5.4 million km^2 of Amazon forests, releasing approximately 16 Pg (10^9 tons) of carbon to the atmosphere. Conversely, under a governance scenario, 4.5 million km^2 of forest would remain in 2050, which is 83% of the current extent. Results from intermediate-case scenarios indicate that, although an expanded and enforced network of protected areas could avoid as much as one third of projected forest losses, other conservation measures are still required to maintain the ecological integrity of Amazon landscapes and watersheds. Current experiments in forest conservation on private properties, markets for ecosystem services, and agro-ecological zoning must be refined and implemented to achieve comprehensive conservation.

834. BIG BRAINS, ENHANCED COGNITION AND RESPONSE OF BIRDS TO NOVEL ENVIRONMENTS. SOL, DANIEL; Duncan, Richard; Blackburn, Tim; Cassey, Phillip; Lefebvre, Louis. Centre de Recerca Ecologica i Aplicacions Forestals, Universitat Autonoma de Barcelona, E-08193 Bellaterra, Catalonia, Spain.

The widely held hypothesis that enlarged brains have evolved as an adaptation to cope with novel or altered environmental conditions lacks firm empirical support. Here, we test this hypothesis for a major animal group (birds) by examining whether large-brained species show higher fitness than small-brained species when introduced to non-native locations. Using a global database documenting the outcome of 647 introductions of 196 avian species to new locations, we confirm that avian species with larger brains, relative to their body mass, tend to be more successful at establishing themselves in novel environments. Moreover, we provide new evidence that the propensity for innovative feeding behaviors, a recently proposed measure of cognitive ability, is also positively associated with establishment success. The role of cognition in mediating the relationship between brain size and fitness in novel environments is further supported by a path analysis. This analysis suggests that larger brains help birds respond to novel conditions by enhancing their innovation propensity rather than indirectly through non-cognitive mechanisms. Overall, our results provide strong evidence for the hypothesis that enlarged brains function, and hence may have evolved, to deal with uncertainties in the environment.

835. ECOLOGICAL FACTORS AFFECT THE SUSTANAINABLE PRODUCTION OF *Chamaedorea elegans* LEAVES IN NATURAL CONDITIONS. SOL-SANCHEZ, ANGEL; Campos, Jose-Joaquin; Current, Dean; Stoian, Dietmar. Tropical Agricultural Research and Higher Educationl Center (CATIE). Turrialba, 7170. Costa Rica, asol@catie.ac.cr.

Chamaedorea elegans leaves are widely known around the world; however the followed process for producing those leaves is unknown for many people. It Include gathering, local transport, leaves selection, middlemen, and sale. A comparative study was carried out in Peten, Guatemala, along a year in natural populations of xate (*Chamaedorea elegans*), nine sampling plots with 45 repetition unities were established. Light, type of shade, growing and type of management were evaluated. Plots with sunlight under 52% were the worse conditions for those plants because they were burnt and did not show growth. Also, no one new plant was born there. Similarly, plots with shade over 86% showed negative effects on the population, 32% of the new plants died by fungal attacks, and 22% of old plants showed the same effect. The best results were gotten in those plots with a shade from 64% to 73% of shade, but it was those with 68% which showed the optimum characteristic for producing plants with commercial characteristic like size and color. Likewise around a year there were 29% of new plants for natural restoration. More than 600 plants were evaluated monthly.

836. TORTOISE AND FRESHWATER TURTLE CONSERVATION IN CARDAMOM MOUNTAINS, CAMBODIA. SOM, SITHA; Emmett, David; Koulang, Chey; Yoeun, Sun. Cambodian Turtle Conservation Project, Cambodia, No. 29, St. 294, Sangkat Tonle Basac, Khan Chamkar Morn, Phnom Penh, Cambodia, (SS) (sithasom@yahoo.com).

Cambodia forms part of the Indo-Burma Hotspot and the Cardamom Mountains represent the hotspot's last finest wilderness. Previous surveys by Fauna and Flora International, Wild Aid, and Conservation International showed that this area has high potential for conserving globally threatened wildlife. The goal of this

student-led project was to find out the distribution, species abundance and composition, current threats, habitat occurrence, and conservation priority of tortoise and turtle species in the areas and to raise awareness of local people. The project had two phases: 1.) community surveys using questionnaires and turtle photo sheet, and 2.) biodiversity surveys using turtle traps and doing timed searches by team members using trained hunting dogs. Interviews indicated that more than nine species of tortoises and freshwater turtles survive in the mountain range and that they are threatened by hunting. We found 88 turtle and tortoise shells and government rangers confiscated many sacks of shells and live turtles. The surveys found seven different species of turtle and tortoise, of which six are globally threatened, and one that has never been recorded in Cambodia. The species include: *Indotestudo elongata, Manouria impressa, Heosemys grandis, Siebenrockiella crassicollis, Cuora amboinensis, Amyda cartilaginea,* and *Cyclemys dentata.*

837. WHALE COMMUNICATION AND BOAT NOISE: POTENTIAL CONFLICT IN A BRAZILIAN NATIONAL MARINE PARK. SOUSA-LIMA, RENATA S.; Clark, Christopher W. Department of Natural Resources, Fernow Hall, Cornell University, Ithaca, NY, 14853, USA, rsl32@cornell.edu (RSSL). Bioacoustics Research Program, Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, NY, 14850, USA, cwc2@cornell.edu (CWC, RSSL).

Male song is an important element in the reproductive behavior of humpback whales, *Megaptera novaeangliae*. Males are most vocal on their breeding grounds, and boat traffic in such areas is a pressing conservation issue. Our goal is to monitor the temporal variation of singing behavior in relation to boat presence using passive acoustics. An array of four recording devices was deployed in the Abrolhos National Marine Park and programmed to record continuously (2kHz sampling frequency) from 21 July to 18 August 2003. Results indicate a decrease in singing activity after a sharp increase in boat-generated acoustic events. Direct disturbance of vocal activity and/or masking are likely explanations for our results. Receivers (presumably females, and/or other males) may be having difficulty detecting and locating particular singing males in a similar way as our system did. The results suggest the potential for a communication breakdown as a result of intense boat traffic. Supported by: Brazilian Government (RSSL CAPES PhD scholarship), The Canon National Parks Science Scholars Program, Instituto Baleia Jubarte, Conservation International-Brazil, Cetacean Behavior and Conservation Award (Animal Behaviour Society), NY Fish & Wildlife Cooperative Unit, The Cornell Graduate School, and Cornell International Students and Scholars Office

838. CONSERVATION OF GENETIC RESOURCES IN SOUTH AMERICAN TEMPERATE FORESTS: THE PROTEACEAE *Embothrium coccineum* AS KEYSTONE SPECIES. SOUTO, CINTIA; Premoli, Andrea Cecilia. Laboratorio Ecotono, Universidad Nacional del Comahue, CRUB, Quintral 1250, San Carlos de Bariloche, Río Negro, Argentina.

One goal of biodiversity conservation is to preserve variation patterns at intraspecific level. Widespread species showed complex genotypic and phenotypic structure in response to environmental variables. *Embothrium coccineum* inhabits radically different environments. We predict that morphological and genetic traits variation patterns are associated along its wide geographic range (18 degrees of Latitude). We genetically characterized using isozymes, and morphologically through leaf size and shape each of 34 populations along specie's range. Nine isozyme markers that coded for 19 putative loci showed that *E. coccineum* populations are highly polymorphic (*P* 92%), and heterogeneous among each other regarding their allelic frequencies, showing high levels of inbreeding and restricted interpopulation gene flow ($Nm < 1$). The NA is higher in austral populations, but% P is higher in northern ones, probably as consequence of specie's biogeographyc history. *E. coccineum* is highly variable also morphologically, possibly in response to favourable conditions of temperature and humidity. Multivariate discriminant analysis combining genetic and morphological variables grouped populations according to its geographic location. This study highlights the importance of preserving genotypic and phenotypic variation in habitats occupied by a keystone species belonging to a monotypic genus that inhabits all National Parks, and unprotected areas in Patagonia.

839. IMPACT OF A DRY YEAR AND MONKEY PREDATION PRESSURE ON THE DEMOGRAPHY OF THE CLONAL PALM *Geonoma brevispatha* IN AN ISOLATED FOREST FRAGMENT. SOUZA, ALEXANDRE F.; Martins, Fernando R. Programa de Pós-Graduação em Ecologia, Instituto de Biologia, Universidade Estadual de Campinas, Caixa Postal 6109, Campinas 13083-970, SP, Brazil. Present address: Universidade do Vale do Rio dos Sinos, Centro de Ciências da Saúde, Av. Unisinos, 950 - Caixa Postal 275 - CEP 93022-000 São Leopoldo - RS - Brazil.

We carried out a three-year demographic study on the forest understorey clonal palm *Geonoma brevispatha* in a disturbed wamp forest in southeastern Brazil. In the second of two study years, there was a marked reduction in the survivorship of reproducer ramets, largely attributable to increased predation pressure by *Cebus apella nigritus* monkeys. Matrix models predicted that the growth rate of the overall ramet population was significantly greater than unity in the first study year, but it was significantly smaller than 1.0 in the next. Massive predation by monkeys on the crowns of reproductive ramets and prolonged dry season were probably responsible for population decrease. Periodic and stochastic simulations indicated that long sequences of unfavourable years would be necessary to reduce population growth rates. Disturbed forest conditions in the study site seems to be favourable to *G. brevispatha*, while clonal growth spreads mortality risk in the genet among ramets, and provides support to increased predation pressure episodes. However, frequent elevated predation pressure by food-limited vertebrate predators may threaten the persistence of clonal palms in tropical understoreys.

840. THE REGIONAL DEVELOPMENT AND CONSERVATION PLAN OF THE TRANSAMAZON HIGHWAY. SOUZA, ANA PAULA SANTOS. Fundacao Viver, Produzir, Preservar, Altamira, Para, Brazil.

The Transamazon Highway is an incomplete colonization project, abandoned by the military government. A development and conservation plan began in mid-1980s as the reaction of organized civil society to this abandonment. The regional social movement that is leading this plan is comprised of smallholders, folk populations, rural and urban worker unions, researchers, religious organizations, associations, and cooperatives; it also engages government. The goal is to join forces for the strengthening of the smallholder culture in the region. The plan involves proposals for infra-structure investments and for land tenure security - a key issue for protecting family farms against disappropriation and land conflict. Natural resource utilization planning goes beyond extrac-

tivism to propose the integrated management of farm resources, including the needs of future generations. It is integrated with similar regional development processes, such as those along the BR-163 highway and in the Xingu headwaters, and was constructed through local and regional seminars, workshops, research, and political activism. It has prioritized the dissemination of information and the training of rural youth. The plan has yielded several agreements with governments, the creation of new protected areas, and the strengthening of social movements in the formulation of public policies.

841. SEQUENTIAL SELECTION OF LINKED NATURE RESERVE SITES. SPRING, DANIEL; Mac Nally, Ralph; Sabbadin, Regis. Australian Centre for Biodiversity; School of Biological Sciences, PO Box 18 Monash University, Victoria 3800 Australia (DS, RM) (Daniel.Spring@sci.monash.edu.au) INRA de Toulouse, Unite de Biometrie et Intelligence Artificielle, BP 27 - 31326, Castanet-Tolosan cedex - France.

When reserve networks are established over time, there is a risk that sites planned for future reservation will be developed beforehand, reducing the long-term ecological effectiveness of the reserve network. High land prices in accessible forests reduce the rate at which reserves can be expanded there, yet deforestation rates are highest in such forests. The present study poses the problem of whether to acquire forests in accessible regions before doing so in remote regions likely to become accessible in the future, when land prices and deforestation rates increase with forest accessibility. The objective is to maximize the resulting expected number of species surviving to the end of the planning horizon. Dynamic programming is used to solve the problem. In a broad range of cases, acquiring the least threatened sites first is the most effective conservation strategy. Future changes in forest accessibility, and their impact on land prices and deforestation rates, should be considered when making nature reserve selection decisions.

842. EFFECT OF HUNTING, SELECTIVE LOGGING AND PALM HARVESTING ON THE RICHNESS OF GAME BIRDS AND MAMMALS IN THE ATLANTIC FOREST. STEFFLER, CARLA E.; Rubim, Paulo; Galetti, Mauro. Laboratório de Biologia da Conservação, Departamento de Ecologia, Universidade Estadual Paulista (UNESP), Caixa Postal 199, 13506-900 Rio Claro, São Paulo, Brasil, mgaletti@rc.unesp.br, Instituto de Biologia da Conservação (IBC), Av. P-13, 293, Vila Paulista, Rio Claro, SP, Brasil.

Medium and large animals are sensitive to fragmentation, poaching and modification of the structure of the vegetation. Few studies have been carried through in non-fragmented areas of the Atlantic forest concerning the habitat use, abundance and population size of game birds and mammals. The Parque Estadual do Jurupará, with 26250 ha of Atlantic forest is located between the Serra de Paranapiacaba and Serra do Mar and comprise an important corridor for vertebrates, however little we know on the effectiveness of protection of this protected area. This work analyzed the habitat use, population status of game birds and mammals through line-transect and traps of footprints. Species richness and abundance of game birds and mammals was higher in the logged forest than in the palmito harvested forest. From 17 game species found in Jurupará, three increased their abundance in the logged forest, six decreased and seven did not occur at the logged forest (Binomial test, F=0.99, P=0.002). Hunting pressure was high in both areas. This Protected Area works as a sink (or as a death corridor) for the game population between Serra do Mar and Paranapiacaba.

843. A SPATIAL INFORMATION SYSTEM FOR CONTINENTAL SCALE RIVER AND STREAM CONSERVATION PLANNING IN AUSTRALIA. STEIN, JANET; Stein, John; Hutchinson, Michael; Nix, Henry. Centre for Resource and Environmental Studies, Building 43, Australian National University, Canberra, ACT, 0200, Australia, jls@cres.anu.edu.au.

A continental framework enables comprehensive assessment of conservation priorities and ensures conservation actions are coordinated across jurisdictional boundaries. However, there has been little nationally coordinated conservation activity for rivers in Australia. Development of a spatial information system will assist the application of a more systematic, coordinated approach to conservation planning across the continent. A new stream and catchment delineation, comprising uniquely numbered stream segments and their associated direct contributing area, linked within a nested set of successively larger catchments provides the spatial framework and a mechanism for data sharing and communication across jurisdictional borders. These spatial units support an ecosystem classification based on the shared similarities of those variables (eg. climate, topography, geology, catchment water balance) that exert primary control on aquatic ecosystem patterns and processes at landscape scales. Indices of disturbance, reflecting the extent and intensity of human activities known to impact on river condition, provide an indicator of potential naturalness. Once established, this continental information system will enable us to begin the task of assessing the adequacy of existing protected areas and identifying priorities for conservation action while setting the context for more detailed studies at local, regional or catchment scales.

844. REMOTE SENSING AND THE CONVENTION ON BIOLOGICAL DIVERSITY: POTENTIAL FOR INTEGRATION INTO REGULAR, GLOBAL ASSESSMENTS. STEININGER, MARC; NASA-NGO group. Conservation International, 1919 M St., NW, Suite 600, Washington, DC, 20036, USA, m.steininger@conservation.org.

The Convention on Biological Diversity (CBD) of the United Nations (UN) has set a goal of reducing the rate of loss of the components of global biodiversity by 2010. The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) was created for technical oversight and in order to assess progress towards reaching that goal, SBSTTA has created the Ad Hoc Technical Expert Group (AHTEG) on indicators. In decision VII/30, the Conference of the Parties identified "trends in the extent of selected biomes, ecosystems and habitats" as an indicator of the 2010 goal. Subsequently, the AHTEG identified remote sensing as a means for measuring biome, ecosystem and habitat trends (AHTEG, October 2004). While biological diversity cannot be directly monitored from space, maps of land cover change from satellite data can approximate rates of habitat loss and/or conversion from which species loss can be inferred. A judicious combination of remotely sensed data, ground sampling, expert knowledge of species trends and species use of habitats form a solid basis for assessing biodiversity. Nations are encouraged to conduct their own independent monitoring. However there will also be global analyses necessary to assess progress. The NASA-NGO group consists of members from 10 Conservation NGOs.

845. ASSESSING THE IMPACT OF WINDFARMS ON BIRD POPULATIONS USING SYSTEMATIC REVIEW METHODOLOGY. STEWART, GAVIN B.; Pullin, Andrew S. Centre for Evidence-Based Conservation, School of Biosciences, The University of Birmingham, Birmingham B15 2TT, UK (GBS, ASP), g.b.stewart@bham.ac.uk.

We utilised an evidence-based framework for systematic review and dissemination of evidence on the effects of windfarms on bird species. A systematic review was conducted by searching a range of electronic databases using a repeatable methodology and consulting experts in the field of applied avian research. Over 2845 articles were initially screened. Of these, 20 were of sufficient quality and relevance to meet the inclusion criteria. Meta-analytical synthesis of available evidence indicates that windfarms can, but do not necessarily, significantly reduce bird abundance. Meta-regression indicates that Anseriformes are significantly more vulnerable than other taxa and declines in bird abundance become significantly more pronounced the longer windfarms are in operation. Other variables, including turbine number and power, do not significantly influence the impact of windfarms on birds. The extent of evidence available for review indicates that more well replicated, balanced randomized monitoring designs, incorporating independent controls and long term monitoring are necessary to provide robust evidence. There is a lack of information regarding offshore windfarms. Application of the evidence-based framework to a conservation problem provides an effective means of objectively evaluating, synthesising and disseminating information to support formation of conservation policy toward windfarm developments.

846. ALTERNATIVE LANDSCAPES ALONG THE AMAZON'S AGRICULTURAL FRONTIER: LAND USE POLICY SCENARIOS FOR THE XINGU RIVER HEADWATERS REGION. STICKLER, CLAUDIA M.; Alencar, Ane; Almeida, Oriana T. University of Florida, PO Box 110760, Gainesville, FL 32611-0760 USA, cstickle@ufl.edu (CMS). Instituto de Pesquisa Ambiental da Amazônia, Avenida Nazaré 669, 66.035-170, Belém, PA, Brazil (AA, OTA).

Along the Amazon's agricultural frontier in Brazil, environmental legislation designed to regulate the impact of explosive growth in the agro-industrial sector has met with limited success. To begin identifying regulatory schemes that better accomodate both economic and environmental goals, we developed alternative scenarios describing future landscape trajectories for the Xingu River headwaters region (northeastern Mato Grosso state) in response to proposed changes to current Brazilian land use legislation. The scenarios were developed by constructing a transition probability model derived from satellite image-based land cover classifications and data related to the location and neighborhood context of land use classes. Static (e. g., soils, slope) and dynamic (e. g., distance to paved roads) spatial data layers were input to the transition matrix to generate future land cover maps. The maps were used to compare the ecological and economic tradeoffs of adopting regulatory changes by evaluating each scenario's impact on ecological (e. g., habitat fragmentation, water quality) and economic (e. g., rent) indicators. Finally, we also assess the value of policy-sensitive simulation models to enhance regional planning processes, describing techniques for incorporating stakeholder goals into scenario development and modification.

847. ASSESSING THE IMPACT OF THE BP CONSERVATION PROGRAMME ON CAPACITY DEVELOPMENT OF YOUNG CONSERVATIONISTS. STOKES, KATE; Dunn, Marianne; Dalzen, Robyn. BP Conservation Programme, BirdLife International, Wellbrook Court, Girton Road, Cambridge, CB3 0NA, UK (KS, MD), stokkl@bp.com. BP Conservation Programme, CELB, Conservation International, 1919 M St. NW, Suite 600, Washington DC, 20036, USA (RD).

It has been well published that aspiring conservationists are not receiving enough, or the right sort of, training to become effective conservation practitioners. At the same time, measuring the success of efforts which provide the necessary practical skills is rarely done. The BP Conservation Programme (BPCP) provides multidisciplinary training and supports practical experience through assisting student-led priority local conservation projects across the world. Last year the Programme set out to make an assessment of the impact that it has had on capacity development of young conservationists since it's formation in 1990. The study looked at the career paths of BPCP award winners, the proportion of team members still working in a conservation-related field, and considered awardees significant conservation achievements. Results showed that in all teams, the majority of team members have remained working in conservation and that approximately half of those individuals have continued to work in the region or with the species or habitat their project studied. Sustainable conservation activities and achievements, ranging from on-going local monitoring programmes, NGO creation and protected area designation, have been widely realised, thus proving that facilitating practical opportunities and training can lead to long term capacity development and conservation benefit.

848. SURVIVAL, FLOWERING, AND SEED PRODUCTION OF *Clitoria fragrans* RELATIVE TO FIRE HISTORY. STOUT, I. JACK; Lewis, Michelle N. Department of Biology, P. O. Box 162368, University of Central Florida, Orlando, FL, 32816-2368, USA, (jstout@pegasus.cc.ucf.edu).

Clitoria fragrans is a threatened herbaceous plant listed under the US Endangered Species Act. Our study provides the first quantitative data on its life history. We have studied the demography and local distribution of the species on public land in south-central Florida for 3 years. We have found the plant to be restricted to 4 soil types. Uniquely marked plants on 7 permanent transects on 2 soil types are examined weekly from March until September or October. Most transects have been burned once and twice in one case. Flowering phenology, seed production and predation, and survival of individuals varies with the season of fire events. Chasmogamous flowers appear following fire, but clistogamous flowers are more numerous over the annual flowering cycle. Long unburned plants may only rarely produce clistogamous flowers. Legumes of both flower types are subjected to seed predation. Our survival data support the observation that *C. fragrans* is a long-lived perennial with modest levels of recruitment. We have no evidence to suggest the species has a seed bank. Germination appears to follow dispersal events. Management of the species should include prescribed fire during the growing season at intervals of 1-5 years.

849. ECOLOGICAL COMPONENTS OF ENDANGERED FORESTS: PEER REVIEW PROCESS AND FINAL DRAFT. STRITTHOLT, JIM. 260 SW Madison Ave., Suite 106. Corvallis, Oregon, PC 97333, USA.

The Wye River Group for defining Endangered Forests first met in 1999 to draw up definitions of Endangered Forests. These definitions are necessary for the implementation of commitments by major buyers of wood and paper products to guide their purchases and phase out of purchases of products originating in forests with significant biodiversity and wilderness values. The first draft was released for comment in 2001. In 2003 a second draft was circulated and a peer review process designed that incorporated views of a balanced group of independent scientists recommended by non-governmental organizations and forest products companies. This talk will present the resulting paper "Ecological Components of Endangered Forests.

850. PREDICTIVE MODELING OF TREE SPECIES OCCURRENCE IN CENTRAL AMAZONIA. STROPP, JULIANA; Venticinque, Eduardo M. Departamento de Ecologia, Instituto Nacional de Pesquisas da Amazonia, Manaus, AM, 69011-970, Brazil, justropp@inpa.gov.br Wildlife Conservation Society, Andes Amazon Conservation Program, Rua dos Jatobás 274, Coroado III, Manaus, Amazonas, 69085-380, Brazil.

Knowledge of the factors structuring plant population distribution can help establish forest management planning. Here we elaborate and validate predictive models of the following tree species occurrence: *Aniba rosaeodora, Cariniana micrantha, Caryocar villosum, Dinizia excelsa, Dipteryx odorata, Goupia glabra, Manilkara bidentata, Manilkara huberi, Parkia multijuga, Parkia pendula, Peltogyne paniculata* and *Pseudopiptadenia psilostachia* as a function of topographic variables. The tree data was yielded by Mil Madeireira Itacoatiara Ltda., located at Central Amazonia and topographic information was derived from Shuttle Radar Topographic Mission (SRTM). These 12 tree species had their probability of occurrence estimated from multiple logistic regression. The estimated parameters were incorporated in a GIS and the spatial representation of the occurrence in relation to topography for 10 species. The models correctly estimated the occurrence of nine species. In the plots where the model was suitable, there was an overlap between the observed and estimated distribution for the nine species mentioned before. However, there was a large variation in the accuracy of the model. This study indicated that predictive models of tree species distribution can correctly predict the species occurrence in an area, but extrapolation to larger areas should consider other factors besides topography.

851. GIS AS A TOOL TO ASSESS THE EFFECTS OF URBANIZATION ON BIRD DIVERSITY IN PUERTO RICO. SUAREZ-RUBIO, MARCELA; Thomlinson, John R. Institute for Tropical Ecosystem Studies, University of Puerto Rico, PO Box 21910, San Juan, PR 00931-1910, USA, xilecram@yahoo.com.

Human population growth and expansion and intensification of human land use have resulted in fragmentation of natural habitats through conversion of native vegetation into pastures, agriculture and urban development. Urbanization may have greatest local effect on wildlife due to its persistence on the landscape and its dissimilarity to natural land cover. An accelerating pattern of rural development and deforestation is one of the most important factors affecting bird populations in Puerto Rico. Only 1.2% of lowland moist seasonal evergreen forests are protected. Generally, these forests occur at lower elevations where rates of land-cover conversion to urban and developed areas are highest. Therefore, Puerto Rico offers a unique opportunity to assess how spatial arrangement of remnant forest patches influences the bird community in an urbanized landscape. The urban landscape is a complex mosaic of biological and physical patches within a matrix of infrastructure. GIS enables us to manage large quantities of spatial and non-spatial data and analyze, measure, and plan for future monitoring, and provides another perspective on the data, integrating information in spatial overlays. GIS is a profitable tool to assess extent of changes and predict future conditions of bird communities as protected areas increase or decrease over time

852. THE INDIAN EXPERIENCE IN TRAINING PROFESSIONALS IN CONSERVATION BIOLOGY. SUKUMAR, RAMAN. Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560012, India; rsuku@ces.iisc.ernet.in; Fax: +91-80-23602280.

India has a long tradition in studies on natural history and conservation, and consequently some form of training in these subjects. Such training was provided primarily by NGOs such as the Bombay Natural History Society and government agencies such as the state forest departments involved in wildlife conservation projects (e. g. Project Tiger). During the early 1980s institutions such as the Indian Institute of Science and the Wildlife Institute of India began more formal academic training in ecology and conservation biology, the former producing graduates with a doctoral degree and the latter graduates with a Master's degree or a Diploma in wildlife management. Since then several universities and smaller institutions have also begun programs in conservation science. This presentation will take a critical look at the needs of the country for conservation professionals and evaluate available programs for training. I examine the training opportunities in terms of subject areas covered, numbers and types of professionals trained, academic rigor, relevance of training to field conservation and the future needs of the country. My conclusions are that, although India has a core team of highly qualified professionals in this field, a country of its size needs many more professionals trained in conservation biology.

853. LEGAL ASPECTS OF VÁRZEA CONSERVATION: OPPORTUNITIES & CONSTRAINTS. SURGIK, ANA CAROLINA. National Institute of Amazonian Research (INPA), CP 478, Manaus, AM 69060-020 Brasil carolina-surgik@hotmail.com.

The várzea management must take into account its legal aspects, as: definition, legal constitution, domain and jurisdiction. In Brazil, there are few legal determinations for várzea and these have not been efficient in its conservation. For the várzea concept, it has only a generic definition of areas subject to flooding, ignoring the ecological differences of its diverse types. It can makes management difficult. It is not appropriate to define várzea in legal terms; however, it is appropriate to legally define its environmental uses. About the legal constitution, the Law does not recognize the hybrid characteristic of várzea, and tries to encase it in the permanent preservation area concept or water concept, depending on the period of the year. To insert várzea in non-hybrid systems hinders its adequate management. The domain of várzea of the Amazonas/Solimões main channel is federal because it is flooded by federal water. It is key in the regulation of its use. However, várzea's management is still difficult because there are other legal codes that ignore its hybrid nature (e. g. marine land - "terrenos de marinha"). The jurisdiction also is federal, through the Union Patrimonial Service (SPU) and National Institute of Colonization and Agrarian Reform (INCRA).

854. CONSERVATION OF SOIL FERTILITY AND COWPEA PRODUCTIVITY ENHANCEMENT GO HAND IN HAND. SUSHAMA, N. P. KUMARI; Nazreen Hassan, S.; Bhaskaran, C. Associate Professor, Dept. of Agrl. Extension, College of Agriculture, Kerala Agricultural University, Vellayani. Thiruvananthapuram -695 522 Kerala, India (drsushama@rediffmail.com) (NPKS); Research Fellow, Dept. of Agrl. Extension, College of Agriculture, Kerala Agricultural University, Vellayani. Thiruvananthapuram -695 522 Kerala, India (najuhassan@yahoo.co.in) (SNH); Dept. of Agrl. Extension, College of Agriculture, Kerala Agricultural University, Vellayani. Thiruvananthapuram -695 522 Kerala, India (drbhaskaranc@rediffmail.com) (CBH).

The environmental, economic and social benefits have captured the attention of many countries, presenting both challenges and opportunities caused by modern ventures. To be eco-friendly is to be economically viable also. Organic farming has a legitimate role to play to attain this goal. A gradual transition to organic farming can be achieved through Integrated Nutrient Management (INM). It is the optimal input usage, utilizing the local resources by reducing inorganic inputs and totally avoiding chemical protection measures in the production process. This paper describes about an attempt made by Kerala Agricultural University in conducting an action research on INM in vegetable cowpea involving the farmers in the study area. The project was launched to study and promote organic vegetable production in Thiruvananthapuram district of Kerala. The work included research in four locations with 16 treatments. The crop production and organic protection methods followed is also explained in detail. It also reveals the better yield and quality produced from the increased organically treated plots. It points out the better B:C ratio originated in organic rich plots in comparison to the others, which further signifies, the relevance of the study.

855. THE EVIDENCE REVOLUTION IN CONSERVATION BIOLOGY. SUTHERLAND, WILLIAM J. Centre for Ecology, Evolution and Conservation, School of Biological Sciences, University of East Anglia, Norwich NR4 7TJ, UK w.sutherland@uea.ac.uk.

Although in theory conservation is based upon science, surveys of practitioners shows that most conservation decisions are not based upon evidence but on personal experience and learning from others. Does this matter? I will review evidence that shows that while many conservation recommendations are very sensible, others are wrong. I will then provide conservative calculations to estimate that over $100 million is spent each year on conservation actions that do not work. There is a clear need to make conservation more effective. Over the last few decades evidence-based medicine has revolutionised the effectiveness of medical practice, which provides a useful model. I will outline a programme for evidence-based conservation. This entails (1) a means of collating the experience of practicing conservation biologists, (2) systematic reviews of papers, reports and unpublished information to determine conservat ion effectiveness (3) a means of disseminating the review results back to practitioners. Major steps have been taken in each of these three stages over the last year to make this plan happen. I will describe how each of the three stages operates, review the progress and outline the main constraints. If this programme is successful then it will fundamentally change global conservation practice.

856. EMERGING INFECTIOUS DISEASES, BIODIVERSITY, AND HUMAN HEALTH: EXPERIMENTAL EVIDENCE OF MAMMAL COMMUNITIES' PROVISION OF NATURE SERVICES. SUZAN, GERARDO; Marce, Erika; Mills, James; Giermakowski, Tomasz; Parmenter, Robert; Armien, Blas; Pascale, Juan; Ceballos, Gerardo; Salazar, Jorge; Yates, Terry. Museum of Southwestern Biology and Department of Biology, University of New Mexico. Albuquerque, NM, USA 87131-0001, gsuzan@unm.edu (GS, EM, TG, RP, TY). Center for Disease Control and Prevention, Atlanta, GA, USA 30333 (JM). Instituto Conmemorativo Gorgas, Av. Justo Arosemena y Calle 35, PO Box 6991, Zona 5, Ciudad de Panamá, Panamá (BA, JP). Instituto de Ecología, Universidad Nacional Autónoma de México, Apartado Postal 70-275, Ciudad Universitaria CP. 04510, México DF, México (GC). Department of Biological Sciences, Texas Tech University, Lubbock, TX 79409-3131, USA (JS).

Biodiversity loss and habitat fragmentation have a profound effect on species distribution and abundance, but ecological, epidemiological, and social consequences are still unpredictable. We present evidence that a high species diversity community of rodents reduces hantavirus infection prevalence. A species removal experiment was conducted in a hantavirus (*Calabazo virus*) endemic area at the peninsula de Azuero, Panama in 2003. We removed alternative host species (low reservoir competence) and non-host species in 16 experimental plots in edges of small forest fragments, and we compared them with 8 control plots with similar conditions. Abundance of the competent reservoir species was positively affected by the removal of the alternative host and non-hantavirus host species. After removal, hantavirus infection was amplified in competent reservoir when species diversity was reduced. Of the 24 individuals seroconverted (i. e. animals that were seronegative and became seropositive) more than 98% belonged to experimental sites. Control sites showed stable infection prevalence during sampling periods. It is known that nature services play a crucial role in human societies; this study shows a direct benefit of high biodiversity in reducing risks of directly transmitted infectious diseases. Implications of our results for conservation biology, public health, and disease management are vast.

857. CONSERVATION STATUS OF THE DESERT IRONWOOD AND ASSOCIATED SPECIES IN THE SONORAN DESERT. SUZÁN, HUMBERTO; Hernández, Luis; Martínez, Mahinda; López, Carlos; Zuñiga, Bertha; Malagón, Ismael; Domínguez, Alejandro; Sayago, Iván; Silva. Escuela de Biología, Universidad Autónoma de Querétaro. Cerro de las Campanas s/n. C.P. 76010, Querétaro, QRO. México.

Ironwood (*Olneya tesota)* is a keystone or engineer species in the Sonoran Desert that provides permanent shade and buffers extreme microclimatic conditions for many associated species. Since 1992 we conducted a series of surveys monitoring the effects of ironwood extraction on the populations and associated communities. For the Mexican mainland we did not find differences in percentage of dead or damaged individuals P(F=1.508/ 6,87)=0.186 or in damaged basal area P(F=1.062/ 6,211)=0.3863. Only in Baja California did we detect viable populations with substantial number of juveniles. However, genetic diversity remains high with 19% of observed heterozygous, a genetic differentiation coefficient of 0.40 and a genetic flow of 0.32. We estimated a total of at least 500 vascular plant species associated to ironwood with at least 130 dependent species mainly in the families Fabaceae, Cactaceae, Asteraceae, Poaceae and Solanaceae. In the ironwood rhizosphere we determined 26 microbiological taxa, in contrast to

16 under mesquite and 7 in open areas. With animals a total of 39 mammalian species were associated with ironwood, especially the small mammal community that presents a higher diversity in areas under ironwood trees. However, there is a reduction of small mammal abundance as ironwood tree canopy increases.

858. THE EFFECTS OF ROAD DECOMMISSIONING ON BULL TROUT HABITAT RESTORATION ON THE FLATHEAD NATIONAL FOREST, MONTANA. SWITALSKI, T. ADAM; Eby, Lisa; McCaffery, Magnus. Wildlands CPR,126 E. Broadway, Suite 25, Missoula, MT 59802, USA (AS), adam@wildlandscpr.org. Department of Ecosystem and Conservation Sciences, The University of Montana, Missoula, MT 59812 USA (LE, MM). (adam@wildlandscpr.org).

The Flathead National Forest (MT) has decommissioned more than 300 miles of roads due to a 1994 lawsuit mandating grizzly bear habitat security. Presumably, this decommissioning also benefits the threatened bull trout (*Salvelinus confluentus*). Previous research demonstrates negative impacts of roads on bull trout populations, however, it is unknown if road decommissioning reverses these impacts. We sampled 12 streams with four different watershed types (1) wilderness, (2) roads in use, (3) exclusively decommissioned roads, and (4) a mix of decommissioned and open roads. We performed habitat surveys, Wolman pebble counts, visual embeddedness estimates, substrate coring, and macroinvertebrate sampling in 2004. There was high variability across streams regardless of treatment. We found no differences in habitat measures between treatments, but there were differences in sedimentation. Watersheds with more roads in use had significantly ($p < 0.05$) higher percentages of sediment that was < 6.5 mm than all other treatments. Additionally, suspended sediments in core samples appeared much higher in piecemeal decommissionings than when entire watersheds were decommissioned. If we are strategic in our application of mandated road removal, we may be able to restore trout habitat while securing grizzly bear habitat.

859. SIMULATING THE EFFECTS OF FREQUENT FIRE ON THE DISTRIBUTION OF DOMINANT PLANT FUNCTIONAL TYPES IN SOUTHERN CALIFORNIA SHRUBLANDS. SYPHARD, ALEXANDRA D.; Franklin, Janet. Department of Geography, San Diego State University, 5500 Campanile Drive, San Diego, CA, 92182-4493 USA, asyphard@yahoo.com (ADS). Department of Biology, San Diego State University, 5500 Campanile Drive, San Diego, CA 92182-4614 USA (JF).

Fire disturbance is a primary agent of change in the Mediterranean-climate chaparral shrublands of southern California. However, fire frequency has been steadily increasing in coastal regions due to ignitions at the growing wildland urban interface. Although chaparral is resilient to a range of fire frequencies, successively short intervals between fires can threaten the persistence of some species, and the effects may differ according to plant functional type. California shrublands support high levels of biological diversity, including many endangered and endemic species; therefore, it is important to understand the long-term effects of altered fire regimes on these communities. A spatially explicit simulation model of landscape disturbance and succession (LANDIS) was used to predict the effects of frequent fire on the recovery of dominant plant functional types in a study area administered by the National Park Service. Shrubs dependent on fire-cued seed germination were most sensitive to frequent fire and lost proportionately more cover to other physiognomic types, including coastal sage scrub and nonnative annual grasses. Shrubs that resprout were favored by higher fire frequencies and gained in extent under these scenarios. Due to this potential for vegetation change, caution is advised against the use of prescribed fire in the region.

860. INCIDENTAL CAPTURE OF SEABIRDS SURVEY IN ARGENTINEAN COASTAL FISHERIES. TAMINI, LEANDRO L.; Coconier, Eugenio G.; Perez, Jorge E.; Barreira, Ana S.; Sidders, Matías; Habegger, M. Laura. División Ictiología. Museo Argentino de Ciencias Naturales. Angel Gallardo 470, C1405DJR. Buenos Aires, Argentina. leotamini@macn.gov.ar (LLT, JEP, ASB, MS, MLH). Aves Argentinas - AOP. 25 de Mayo 749 2°6. Buenos Aires, Argentina (EGC).

More than 80% of the coastal Argentine fleets operate at Buenos Aires Province. To establish which fleets are involved with some kind interaction with seabirds, we performed 71 skills to fishermen (32, 9% of the total) at six ports and twelve small fishing camps. With this information an onboard observers program was established on bottom trawlers in three localities. A total of eighteen species were identified and between 8 and 11 were recorded depending on the period. The daily maximum media of seabirds in the flocks fluctuated between 102 ± 60,1 and 503,3 ± 343 individuals/haul and the most abundant species were Black-browed Albatross , White-chinned Petrel , Great Shearwater and Kelp Gull. Likewise the incidental capture of two species was recorded (*Puffinus gravis* and *Spheniscus magellanicus*). The Buenos Aires province emerges like an important feeding area for some seabirds populations due to the quantities of seabirds implicated and the large number of fishing vessels in the zone. The education and diffusion of this problematic also formed a part of the project. A workshop for teachers and community leaders, talks with fishermen, presentations in scientific encounters, interviews in TV and articles in local papers were performed.

861. EFFECTS OF COMMERCIAL LOGGING ON FOOD DISTRIBUTION AND RANGING BEHAVIOR OF SICHUAN SNUB-NOSED MONKEYS. Tan, Chia L.; GUO, SONGTAO; Li, Baoguo. Conservation and Research for Endangered Species, Zoological Society of San Diego, 15600 San Pasqual Valley Road, Escondido, CA 92027, USA (CLT), ctan@sandiegozoo.org. College of Life Sciences, Northwest University, Xi'an 710069, China (SG, BL).

Rhinopithecus roxellana is one of the three species of snub-nosed monkeys endemic to China. With a wild population estimated at around 22,000, *R. roxellana* is listed as "vulnerable" by the IUCN Red List criteria. Habitat disturbance and hunting continue to pose serious threats to the survival of this species. We studied the effects of commercial logging activities on food distribution and ranging behavior of a troop of *R. roxellana* in Zhouzhi National Nature Reserve in Shaanxi Province between November 2002 and October 2003. By sampling the vegetation in the monkeys' habitat, we determined various disturbance levels due to logging. Particularly, the disturbance level was inversely related to the distance from logging roads. Habitat utilization by the monkeys was strongly affected by logging. The monkeys rarely used the clear-cut and heavily logged areas where the density and diversity of trees were low. The monkeys frequently used selectively logged areas, which contained food tree species similar to un-logged areas. Other forms of habitat disturbance, such as collection of herbal medicine and grazing, did not seem to influence the monkeys' ranging behavior. Solutions to remedy the negative

effects of logging activities should be considered a priority in reserve management schemes.

862. COMMUNITY BASED, DESIGN AND DEVELOPMENT OF ETHNIC CONSERVATION AREAS (ECAS) IN CURARE-LOS INGLESES NEAR THE LOWER CAQUETA RIVER IN COLOMBIA. TANIMUCA, LUZ EDNA. Conservation International - Colombia (CI) Carrera 13 No. 71-41 Santa Fe de Bogota, Colombia.

The highly biodiverse lower Caquetá River, faces growing pressures on biodiversity, because population growth, migration, and weak governance of local people. Two highly committed indigenous reserves, and 3 non-indigenous communities from Puré Park buffer, living below the poverty line, and having no alternative livelihoods other than fishing and hunting, seek to implement management plans in the lands they inhabit. For these initiatives to succeed and consolidate the environmental zoning of the region, we need to solve, 1) resource-use conflicts, 2) lack of non-indigenous people land rights, 3) weak governance of indigenous lands, 4) lack of incentives for local conservation initiatives, 4) no government support, and 5) lack of sustainable production projects aiming alimentary security of local communities, and decreasing impact on forest resources.

863. THE IMPACT OF TRAFFIC FATALITIES ON LAVA LIZARD POPULATIONS (*Microlophus albemarlensis*) IN SANTA CRUZ, GALÁPAGOS. TANNER, DAWN; Perry, James A. Conservation Biology Graduate Program, University of Minnesota, 200 Hodson Hall, 1980 Folwell Avenue, St. Paul, Minnesota, 55108-6124, USA, tann0042@umn.edu.

Vehicle collisions with wildlife impact species everywhere roads divide and transect natural habitats. This study addresses the impact of traffic fatalities on lava lizards, *Microlophus albemarlensis*, on the island of Santa Cruz, Galápagos. The main road bisecting the island north to south was a new addition to the island, begun in 1974 but not completed with asphalt until 2000. We assessed impacts occurring due to an increase in traffic and speed of travel on the island. Using Poisson Regression to analyze transect data at incremental positions from the road, we found a 30% increase in lizard abundance per 100 meters distant from the road, with significant results also between natural vegetation zones with little human impact and highly impacted areas with invasive species. By traveling the length of the 40-kilometer road, we were able to identify hot spots for fatalities, which will be used to target areas for future management efforts. We used incidence of tail loss to quantify additional energetic costs. The results of this were striking: 29% on the road, 10% adjacent to the road, with numbers quickly reduced, arriving at 1% at 400 meters distant. These results will be used to direct and focus future management efforts.

864. NEGOTIATING FOR CHANGE: THE CASE OF THE AFRICAN GRASSROOTS INNOVATION FOR LIVELIHOOD AND ENVIRONMENT (AGILE) CONCEPT IN UGANDA. TANUI, JOSEPH; Russell, Diane; Stroud, Ann. Landcare coordinator African Highland initiative P.O.BOX 26416 Kampala Uganda Email: j.tanui@cgiar.org (JT); Theme Leader Trees and Markets, World Agroforestry Centre P.O.BOX 30677, Nairobi, Kenya (DR); Program Coordinator African Highland Initiative P.O.BOX 26416, Kampala, Uganda (AS).

Initiatives towards the improvement of conservation and sustainable use of natural resources in Sub-Saharan Africa have illuminated weak institutions and inadequate institutional arrangements. The paper describes the Conservation and livelihood initiatives in Kapchorwa district, on the slopes of Mount Elgon Uganda. In this area, land degradation is evidenced by soil erosion, declining soil fertility, low yields and landslides. Factors for the degradation include poor farming methods, cultivation on steep slopes, and deforestation. Land fragmentation, increasing population further exacerbate natural resource exploitation. Lack of a responsive policy formulation culture, national and local level policy mismatch and policies that disregard special interest groups create a culture of exploitation. The paper describes the case of the "Bennet" forest dwellers pushed out of ancestral domain, at logger heads with their northern pastoral neighbours, and those in the downstream watershed. Through the AGILE concept a stakeholder analysis was done and an agenda setting exercise initiated. Members underwent an appreciative enquiry process, priorities identified and partners engaged. The planning process was collaborative and a local level "reflect cycle" learning process initiated. The outcome is holistic, inclusive, and community groupings lobby for policy change. The process created champions of environmental conservation, and the initiative is community owned.

865. THE EFFECTIVENESS OF THE ENDANGERED SPECIES ACT: A QUANTITATIVE ANALYSIS. Taylor, Martin; Suckling, Kieran F.; Rachlinski, Jeffrey; GREENWALD, D. NOAH. Center for Biological Diversity, PO Box 710, Tucson, AZ 85702 USA (MT, KFS). Cornell Law School, Ithaca, NY 14853-4901 USA (JR). Center for Biological Diversity, 917 SW Oak St. Suite 413, Portland, OR 97205, USA (DNG), ngreenwald@biologicaldiversity.org.

The effectiveness of listing of species as threatened or endangered, designation of critical habitat, and development of recovery plans under the U. S. Endangered Species Act was assessed by comparing the population trends of 1095 species with the length of time they were listed, and presence or absence of critical habitat and recovery plans. Species with critical habitat for two or more years were over twice as likely to be improving in the late 1990s and over twofold less likely to be declining in the early 1990s, than species without. Species with dedicated recovery plans for two or more years were significantly more likely to be improving and less likely to be declining than species without. The proportion of species improving increased and proportion declining decreased with increasing time listed throughout the 1990s, irrespective of critical habitat and recovery plans. To elucidate the mechanisms by which critical habitat facilitates the stabilization and recovery of species, we identified 13 case studies in which critical habitat resulted in direct protection of species' habitat. On the basis of these results, increased funding for earlier listing of imperiled species and prompt provision of critical habitat and recovery plans is recommended.

866. SUCCESSFUL ISLAND REINTRODUCTIONS OF NEW ZEALAND ROBINS AND SADDLEBACKS WITH SMALL NUMBERS OF FOUNDERS. TAYLOR, SABRINA S.; Jamieson, Ian; Armstrong, Doug P. Department of Zoology, University of Otago, PO Box 56, Dunedin, New Zealand, sstaylor@wildmail.com (SST, IGJ). Wildlife Ecology Group, Massey University, Private Bag 11222, Palmerston North, New Zealand (DPA).

Populations established with a small number of founders are thought to have a high risk of extinction due to Allee effects, demographic stochasticity, inbreeding and reduced genetic vari-

ation. We tested whether the initial number of birds released was related to persistence in reintroductions of saddlebacks (*Philesturnus carunculatus*) and robins (*Petroica australis*) to New Zealand offshore islands. Data were analyzed for 31 populations that had been observed for at least three years since reintroductions. The numbers released ranged from 5-188. Most of the populations (26) survived and grew, including 5 from less than 15 founders, and four of the five extinctions were attributable to introduced mammalian predators. The number of individuals released did not significantly affect extinction probability. The ability of these small releases to establish populations can be attributed to the closed nature of the islands, allowing birds to find mates, low mortality rates following release, and high growth rates at low density. Stochastic simulation models based on data from two reintroduced populations suggested that populations with four founders (two male, two female) would have a negligible chance of extinction through demographic stochasticity, and would be able to grow even if there were high rates of egg failure through inbreeding.

867. "FISHES" AND "STONES" TO IMPLEMENT FISHERY CO-MANAGEMENT IN THE UPPER SÃO FRANCISCO RIVER, MINAS GERAIS, BRAZIL. THÉ, ANA PAULA GLINFSKOI; Mancuso, Maria Inês; Cerdeira, Regina; Santos, Gilvandra Silva; Apel, Marcelo; Madeira, Thaís; Macnaughton, Alison. Universidade Federal de São Carlos, Departamento de Ciências Sociais, Rod. Washington Luiz, Km 235, 13560-000, São Carlos, SP, Brazil, anathecomanej@yahoo.com.br.

This paper describes participatory research which is being carried out since 2004 by the Instituto Amazônico de Manejo dos Recursos Ambientais (IARA) and the Federal University of São Carlos (UFSCar), with collaboration of other partners of the Project "Fish, People and Water." The work is facilitating the establishment of fishery co-management with the professional artisanal fishermen in the São Francisco River in Minas Gerais state, bringing the experience from Amazon region of fishery agreements ("acordos de pesca") to the São Francisco region. Six towns are in the pilot study, ranging from Três Marias to just north of Pirapora. This involves four fisheries "colônias" and represents about 450 fishing families. Seven activities were carried out to promote community empowerment and governmental decentralization in the management of fishery resources. The dialogue between community and governmental agencies was established and legal instruments for co-management now exist. Considerable progress has been made towards strengthening the fisheries organizations and their expression, but considerable more work is still needed to bring concrete and sustainable returns to the community, and it is still unclear what form of fisheries co-management will eventually be established.

868. THE INFLUENCE OF FOREST MANAGEMENT ON CLICK BEETLE (COLEOPTERA: ELATERIDAE) COMMUNITIES INHABITING FOREST SOILS IN MAINE, USA. THOMAS, SHELLY L.; Halteman, William A.; White, Alan S.; Woods, Stephen A. Departments of Biological Sciences (SLT, SAW), Mathematics and Statistics (WAH), Forest Ecosystem Sciences (ASW). University of Maine, Orono, Maine, USA. shelly.thomas@umit.maine.edu.

Although insects are a valuable component of forest ecosystems, there is currently an inadequate understanding of the influence of forest management on insect communities. To address some of these deficiencies we contrasted click beetle (Coleoptera: Elateridae) communities from a variety of managed forests in Maine. Selected stands were dominated by either quaking aspen, red maple, red oak, eastern hemlock, white pine, or red spruce/balsam fir. We used emergence traps during the summers of 2001 and 2002 to capture adult click beetles as they emerged from the soil within the stands. Forty-two species were collected, the majority of which were quite rare. Canononical Correspondence Analysis was used to evaluate differences in preference for the most abundant beetle species. Most species demonstrated a preference for either softwood or hardwood-dominated forests. Tree basal area, a measurement frequently used by forest managers, explained approximately 30% of the variation in the click beetle communities. However, measuring both basal area and understory vegetation increased the amount of variation explained by 10-15%. This study lays the groundwork for successful conservation by furthering our understanding of how changes in the abiotic and biotic environments through harvest practices affect the habitat suitability for a diverse group of forest invertebrates.

869. BAT CONSERVATION IN VIETNAM (REVIEW). THONG, VU DINH. Institute for Ecology and Biological Resources; Vietnamese Academy of Science and Technology; 18 Hoang Quoc Viet Road, Cau Giay District, Hanoi, Vietnam; vdthong1605@netnam.vn.

The earliest information of bats in Vietnam appears to be a discovery of *Pteropus hypomelanus* made in 1869 at Con Son Island, Vung Tau province. Since then, approximately 107 bat species arranged in 31 genera and 7 families have been recorded within the national territory. Faunal surveys continue to uncover new records for the country, and, in some cases, new taxa to science, such as the recent discovery of *Hipposideros scutinares* in 2003. In addition to new discoveries, threats to bat populations have also been mentioned from the surveys. Bat life is disturbed by human activities due to their lack of knowledge of bats' roles in the ecosystem. Bats are even overexploited for food in some areas. Many bat species have been threatened and several species may become extinct in the near future unless efficient conservation activities are urgently undertaken. This review gives up-to-date information of bats in Vietnam drawn from a large number of surveys. A list of all known bat species in Vietnam, including details of their distribution, is included. The review also highlights priority areas where conservation action should be done at national, regional or global levels.

870. APPLYING THE EXPERIENCE OF THE OPEN SOURCE SOFTWARE MOVEMENT TO CONSERVING BIODIVERSITY. TIEMANN, MICHAEL; Souza, Bruno. Red Hat, NC State University Centennial Campus, 1801 Varsity Drive, Raleigh, NC, 27606 USA.

The open source software movement has been very successful in ensuring a free exchange of information and intellectual creations. Recent developments to patent and restrict biodiversity information led scientists and conservationists to face similar problems, battles and cultural hurdles to those I saw when I founded Cygnus, the world's first company based exclusively on free software. Although the analogies of my experiences are helpful, a second factor is even more important: open source innovation has led to products and technologies that can give scientists efficiencies and abilities unavailable under a proprietary IP regime. Put another way, open source could be both the fulcrum and the lever that scientists could use to "move the world" out of the rut of excessive IP fragmentation and back onto the road to enlightenment. Whatever

technologies or applications that open source lack, scientists can provide if the right partnerships are in place. This is exactly the kind of cross-pollination that stimulates new, unexpected innovation.

871. VARIATION ON THE COMPOSITION OF ARTHROPODS COMMUNITIES FOUND WITHIN THE LEAF LITTER IN A FRAGMENTED LANDSCAPE IN THE STATE OF BAHIA - BRAZIL. TINÔCO, MOACIR S.; Rocha, Pedro L. B. Centro de Ecologia e Conservação Animal - ECOA- Instituto de Ciências Biológicas, Universidade Católica do Salvador, Salvador, BA, 40.710-000, Brazil, moacirst@ucsal.br (MST). Laboratório de Vertebrados Terrestres, Instituto de Biologia, Universidade Federal da Bahia, Salvador, BA, 40.170-000, Brazil (PLBR).

This study intended to detect the variation in the composition of arthropod community and associate it with variation in environmental factors. We analyzed 3 landscape components: reference forest (M); forest remnant (R); and eucalypt monoculture (E), and used, in order to estimate composition, captures from two methods. Sampling was performed in four spatial replicates per component (January 2003 and February 2004). We obtained 8,233 individuals belonging to 27 arthropod categories. The composition and the environmental variables were compared among components based on permutation procedure. Then we generated one axis of direct ordination for the communities from the 12 replicates using NMDS and tested the hypothesis that it depends on the PCA of environmental variables using a multiple regression test. We found a significant difference in the composition and in environmental variables of M and R compared to E, but no difference among the first two. There was significant regression between PCA1 of the environmental variables and the NMDS axis of community composition. An autocorrelation test found no significant association between distance among unities and their differences in composition. Orders Coleoptera, Isoptera, Acari and Hymenoptera seemed associated mainly to M, whereas Isopoda, Opiliones, Araneae, Lepidoptera and Chilopoda were related to E.

872. STABLE ISOTOPE VARIATION IN BLACK MUREX SHELLS, GULF OF CALIFORNIA, MEXICO: RAPID ASSESSMENT OF GROWTH RATES FOR COMMUNITY-BASED FISHERY MANAGEMENT. TODD-PEARSON, SHERRY-ANN; Flessa, Karl W.; Cudney-Bueno, Richard; Dettman, David L.; Rowell, Kirsten. Department of Geosciences, University of Arizona, Tucson, Arizona, 85721, USA, toddpear@email.arizona.edu (STP, KWF, DLD, KR). School of Natural Resources, University of Arizona, Tucson, Arizona 85721, USA (RCB).

Artisanal fishing of the black murex snail (*Hexaplex nigritus*) is important to the economy of the northern Gulf of California. Ongoing community-based management efforts need basic information on the life history and ecology of the species but few studies have taken place. We determined growth rates and temperature tolerances by using isotopic analysis of $\delta^{18}O$ in the snail's calcareous shell. We analyzed the $\delta^{18}O$ content of carbonate samples taken at varying distances from the growing edge of specimens from Bahía la Choya, Sonora, Mexico. Temperature-driven variation in $\delta^{18}O$ provides both an internal growth calendar and benchmarks for estimates of growth rates and tolerances. Estimated average growth rates range from 37.9 mm/yr to 66.3 mm/yr. The average rate of growth in the final two years of life of one specimen was 21.3 mm/yr. Growth in the black murex stops when temperatures rise above 30.7°C or fall below 15.9°C. This study demonstrates that stable isotope analysis can provide a quick and cost-effective way of estimating growth rates and temperature tolerances when laboratory or field studies are impractical.

873. CONTEMPORARY GENE FLOW OF *Hymenea courbaril* IN A FRAGMENTED LANDSCAPE FROM SÃO PAULO STATE, BRAZIL. TOLEDO, RENATO; Kageyama, Paulo. LARGEA, Escola Superior de Agricultura Luiz de Queiroz, Piracicaba, SP, 13400-970, Brazil, rmtoledo@esalq.usp.br.

Conservationist interventions based on general and uniform prescriptions loss effectiveness by being incapable to incorporate the particularities of each ecosystem and the regional characteristics of the human activity. This research intends to develop a methodology that incorporates the spatial evaluation of the contemporary gene flow of plants to the territorial planning of tropical agroecossystems with pasture matrix. We adopted the Jatoba (*Hymenea courbaril*) as the target umbrella species. Located in the West of São Paulo State (Brazil), the sampling site has 49 km^2 that shelters seven subpopulations of Jatoba and four forest patches. We did a census for adult trees and regular sampling of seedlings. We found 359 individuals, all had been georeferencered by GPS and genotyped by SSR. Analyzing three locus of genomic DNA and one of c-DNA, we applied a maternity test, 34 young plants had its mothers identified. The distribution of identified dispersal distances indicates that the isolation for recolonization among subpopulations occurs in distances longer than 1600m. We located 19 habitat patches in this region that would remain in isolation condition, even after the restoration of the protected areas, this work regards the increase of connectivity of these patches as a priority for the regional management planning.

874. THE APPLICATION OF ETHNOECOLOGICAL RESEARCH FOR IMPROVED CONSERVATION: A CASE STUDY FROM THE TRANSFLY REGION OF NEW GUINEA. TOMASEK, ADAM J. World Wildlife Fund; 1250 24th St., NW, Washington, DC 20037, USA.

The Transfly ecoregion traverses the southern savannas and wetlands of Papua New Guinea and Papua, Indonesia. Located in the heart of the TransFly is Papua New Guinea's largest protected area, the Tonda Wildlife Management Area. Land conversion for agriculture, indiscriminate logging, cross border trade and water extraction are the major threats to biodiversity in Tonda. To date, spatial and thematic priorities for biodiversity conservation have been defined mostly through expert-driven processes and academic research. They often do not incorporate indigenous or traditional knowledge of biota, ecology and natural systems. A systematic rapid assessment of local knowledge and management issues in three villages. The underlying values and perceptions of landscapes and species for local communities were identified and combined with expert-defined, scientifically-based priorities for conservation in the TransFly as decision-making factors for reserve selection and resource management policies. Totemic species and their relationship to local people's contemporary life were defined. New records for certain bird and reptile species were also documented. This investigation has resulted in the creation of new customary conservation zones. The project has revealed that ecological and customary knowledge had become highly fragmentary. Local people are having increasing difficulty finding a balance between conservation and development as the pressure of modern life increases. This study suggests that conservation planning in

areas under customary tenure regimes are likely to be more successful if they incorporate local knowledge and values of landscapes.

875. THE USE OF INFORMATION ON GENETIC DIVERSITY AND ITS DISTRIBUTION IN CONSERVATION OF WOOD STORK POPULATIONS ALONG AMERICAN CONTINENT. Tomasulo Seccomandi, A. M.; Lopes, Iara F.; Rocha, C. D; DEL LAMA, SILVIA N. Departamento de Genética e Evolução, Universidade Federal de São Carlos, São, Carlos, SP, 13565-905, Brazil, dsdl@power.ufscar.br.

Significant conservation questions arise for waterbird species with broad breeding ranges and varying population status among geopolitical entities. The status of Wood Stork (*Mycteria americana*) populations vary widely in wetlands areas of the American continent. North American population (NA) has been classified as endangered while Central and South American populations apparently have remained stable. To characterize the amount of intraspecific variation we used nine allozyme and four microsatellite loci, previously described, and ten new microsatellite loci. Nine NA and eleven Pantanal subpopulations showed similar levels of genetic variability. Therefore, no severe loss of genetic diversity resulting from the crash in the North American population size. Low genetic differentiation was observed among NA (F_{st} = 0.035) and between NA and Pantanal populations (F_{st} = 0.011 - 0.051). No genetic differentiation was detected among Pantanal subpopulations (F_{st} = -0.001). Recent NA population fragmentation was supposed, a single interbreeding population that now resemble a series of genetically distinct subpopulations. As all populations are genetically uniform, substantial gene flow is probably occurring or has recently occurred. Therefore, the loss of NA population will be probably recoverable because the total gene pool had not eroded, and the site can be recolonised naturally or artificially.

876. TESTING KEY BIODIVERSITY AREA THRESHOLDS. TORDOFF, ANDREW. BirdLife International Asia Division, 4 Lane 209, Doi Can, Hanoi, Vietnam jackbirdlife@hotmail.com.

The Key Biodiversity Areas (KBAs) process aims to identify networks of sites critical for the conservation of global biodiversity through the application of quantitative criteria. In order that these criteria can be easily and consistently applied across all biogeographic regions and taxonomic groups, it is necessary to set appropriate thresholds for their application. These thresholds must be applicable in both data-rich and data-poor environments. Moreover, they should be applicable through bottom-up processes, involving local stakeholders, to maximise the usefulness and ownership of the resulting KBA networks. Real datasets from preliminary KBA identification exercises and other related programmes, most notably the Important Bird Areas programme of BirdLife International, were used to test provisional thresholds for KBA identification. The provisional thresholds selected for testing were informed by those used by these programmes to date. Appropriate thresholds should ensure that the KBA criteria are only triggered by species populations that are: (a) of global conservation significance; and (b) viable. Following these two principles, the provisional thresholds were evaluated on the degree to which they minimized both commission errors (inclusion of sites that do not support viable populations of global conservation significance) and omission errors (exclusion of sites that do support such populations). The results show that, through a process of iterative testing, it is possible to set appropriate threshold(s) for each KBA criterion.

877. ABUNDANCE, SIZE AND OVERALL BODY CONDITIONS OF JUVENILE GREEN TURTLES (*Chelonia mydas*) IN THE EFFLUENT DISCHARGE CHANNEL OF TUBARÃO STEEL COMPANY, ESPÍRITO SANTO, BRAZIL. TOREZANI, EVELISE; Baptistotte, Cecília; Coelho, Bruno B. Projeto TAMAR-IBAMA, Avenida Paulino Muller, 1111, Vitória, Espírito Santo, 29042-571, Brazil, (cecília@tamar.org.br).

Juvenile and adult green sea turtles (*Chelonia mydas*) are found in feeding areas along most of the Brazilian coast, however, information about this species is scanty. The study is located at the effluent discharge channel of the Tubarão Steel Company, where there are a significant number of green sea turtles with and without fibropapillomatosis that utilize the area for feeding and growth. In the world, a lot of turtles are threatened by this disease. Abundance, seasonality, size classes, residency, growth, and corporal conditions of sea turtles were investigated from August 2000 to August 2003. A total of 354 green turtles were captured, tagged, measured, weighed, and the presence of tumors assessed visually. One hundred sixty eight animals were observed, with 37,5% presenting fibropapillomatosis. Seventy were captured two or more times with a mean interval from first to last capture of 203 days and ninety eight were captured just once. The curved carapace length ranged from 28,0 to 56,7cm. The growth rate of tumored turtles was 2,19 cm/year and non-tumored turtles 3,47 cm/year. Catch-per-unit-effort was not correlated with water temperature, but there are indicatives that were positively related to the presence of food.

878. HELPING SCIENTIFIC COLLECTIONS SHARE THEIR INFORMATION ONLINE. Torres, Beatriz; CANHOS, DORA A. L. Global Biodiversity Information Facility, Universitetsparken 15, DK-2100 Copenhagen, Denmark (BT). Centro de Referência em Informação Ambiental, CRIA, Av. Romeu Tórtima, 388, Barão Geraldo, 13084-791 Campinas SP Brazil (DALC).

The establishment of policies and strategies to promote scientific, social and economic development depend on timely and accurate information to answer questions on conservation, planning of protected areas, recovery of disturbed areas, management and containment of invasive species, prevention of spread and control of diseases and pests, biosafety issues, and many others. Natural history collections (zoological, botanical, microbial) are the main repositories of species data, however, digital access to these resources has lagged. The Global Biodiversity Information Facility was established to promote and facilitate the digitization and global dissemination of primary biodiversity data. One of the main tools for this is the establishment of a network that links the major scientific collections in the world and searches and serves their data by means of an internet interface. The targets for December 2006 are to serve up to 200 million specimen/observation records, with information on at least 50% of of all species known to science available through the GBIF Catalogue. In Brazil, the speciesLink network provides an interface for online data access to over 30 scientific collections in São Paulo state, comprising distributed and heterogeneous databases. These achievements demonstrate the successes of partnership-based cooperative models for free exchange of data, information and knowledge.

879. A CRITICAL APPROACH TO THREATENED SPECIES OF THE MEXICAN STATES TAMAULIPAS AND NUEVO LEON. Torres, Maribel; CANTÚ, CÉSAR. Facultad de Ciencias Forestales, UANL Km 145 Carr. Nacional # 85 Linares, N.L. CP 67700 México.

The federal Mexican regulation for threatened species, known as NOM-059-SEMARNAT-2001, includes 2,583 species of which at least, 393 (15%) are distributed in Tamaulipas and Nuevo Leon, Mexico. 320 of these species (81.4%) are present in Tamaulipas and 284 species (72.3%) in Nuevo Leon, while 211 taxa occur in both States. The World Conservation Union (IUCN 2000) considers only 68 taxa in the Red List of Threatened Species, while the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 2003) includes only 142 of the 393 threatened species of Nuevo Leon and Tamaulipas. According to CONABIO (National Commission for Knowledge and Use of Biodiversity) and the management plans of nature reserves, the current nature reserves of Tamaulipas capture 73 species (23%) of its 313 taxa under conservation status, while in Nuevo Leon 51% (140 species) of its 275 threatened species are in protected areas.

880. RESTORATION OF THE PALO VERDE MARSH (COSTA RICA): RESPONSES OF PLANT COMMUNITIES TO *Typha domingensis* CONTROL. TRAMA, FLORENCIA; Rizo-Patrón, Federico; González, Eugenio. Programa Regional en Manejo de Vida Silvestre, Universidad Nacional. Apartado 1350-3000. Heredia, Costa Rica, ftrama@jabiru.ots.ac.cr(FT); Organización para Estudios Tropicales. De la UNED, Carretera a Sabanilla, 50 Este, 100 Sur. Ciudad de la Investigación UCR, último edificio, P.O Box 676-2050, San Pedro, Costa Rica (EG). Instituto Regional de Estudios en Sustancias Toxicas, Universidad Nacional, Apdo 86-3000. Heredia, Costa Rica (FRP).

We assessed aquatic plant communities responses to restoration activities carried out at Palo Verde wetland (1207 ha), Costa Rica. By 1980 and due to changes in traditional management activities and hydrological alterations, this wetland was invaded by cattails (*Typha domingensis*). As a result, habitat quality decreased and fauna and flora diversity declined. In 2002 management activities started to reduce cattails by *fangueo* (crushing cattails under water with paddling wheels). From August 2003 to July 2004 we evaluated the response of aquatic plants to the restoration activities in three plots (80 ha each one), two under different restoration intensities and a control plot. Species richness and vegetation cover were measured using transects. We registered 61 plant species in treated plots and only 20 species in the control plot. The number of plant species was higher in plots under restoration than in the control plot ($F=104$; $gl=2,195$; $P < 0.0001$). Linear regression analysis showed a negative relationship between cattail cover and plant species richness ($F=268.65$; $gl=1,112$; $r^2=60.1$; $P < 0.0001$). Plant species cover increased in plots with *fangueo* actions. Restoration activities have improved plant species habitat by decreasing cattails competition, and creating a habitat mosaic more suitable for waterbirds and other wildlife.

881. EFFECTS OF CHANGES IN LAND-USE PATTERNS ON THE POLLINATION ECOLOGY AND CONSERVATION OF A LAKESHORE PLANT SPECIES AT RISK IN NOVA SCOTIA, CANADA. TRANT, ANDREW; Good-Avila, Sara; Herman, Thomas. Department of Biology, Acadia University, Wolfville, Nova Scotia, Canada B4P 2R6 (andrew.trant@acadiau.ca).

Increased cottage development of shoreline habitat is thought to be the greatest threat to many globally endangered wetland plants in the Tusket River watershed, Nova Scotia Canada. Our study examines the pollination ecology of Plymouth Gentian (*Sabatia kennedyana* Fern.), a hermaphroditic, insect-pollinated species at risk, to explore the effects of changes in land-use patterns on the maintenance of ecological processes. Nine sites on three lakes consisting of large (>150 flowering plants), small (< 50 flowering plants) and disturbed (< 50 m from a shoreline development) populations of *S. kennedyana* were observed for pollinator movements, behaviour, and diversity for 156 hours. Ecological and physical factors associated with pollination and changes in land-use patterns were modeled using ANOVA and GLM. Results showed that pollinator visitation rates are lowest in sites located near shoreline developments but that visitation rates are similar between different lakes and different population types (large, small, disturbed). The literature suggests that decreased pollinator visitation rates have been suggested in the literature to negatively affect pollination processes by promoting localized mating and reducing overall gene flow. Our results suggest that increased modification of shoreline habitat will impede recovery efforts and illustrates the importance of stewardship in successful conservation initiatives.

882. BUILDING CAPACITY AND MEASURING IMPACTS - THE TBA'S EXPERIENCE IN AFRICA AND MADAGASCAR. TREVELYAN, ROSIE. Tropical Biology Association, Department of Zoology, Cambridge, CB2 3EJ, U.K.

The Tropical Biology Association (TBA) is building capacity at the individual and institutional level for conservation research and training in Africa. TBA has run 35 training courses over the past 10 years and counts 800 as alumni from over 37 countries. TBA's unique model of field training brings together Africans and Europeans in equal numbers. This provides a valuable forum where different nationalities can learn from each other's experiences, and creates a network for future collaborative activities. To maximise impact, all trainees are then enrolled in a programme of follow-up support so that they can put their new skills and contacts into practise when they return to their home institutions. TBA has recently conducted a needs assessment of the training capacity of African institutions, and as a result is initiating a new programme focusing on developing staff skills in fund-raising, project management, and publishing results. The challenges of assessing the impact of capacity building activities and the methods that the TBA uses will be discussed. There are limitations of short-term compared with long-term assessments, and it is difficult and costly to instigate controls, and long term impacts may only be apparent after a funding cycle has concluded.

883. BUILDING A CRITICAL MASS FOR CONSERVATION: THE TROPICAL BIOLOGY ASSOCIATION. TREVELYAN, ROSIE. Tropical Biology Association, Department of Zoology, Cambridge, CB2 3EJ, U. K.

Biodiversity conservation requires skilled people coupled with the political and institutional support necessary to operate effectively. This in the broadest sense of the term is capacity, and there is world-wide concern that lack of national capacity is preventing countries from meeting their conservation goals. The Tropical Biology Association is addressing this need by building expertise and creating national and international links for conservation biologists and their institutions. The TBA's field courses are unique since they bring African and European biologists together in equal numbers, providing a valuable forum for sharing ideas and mak-

ing contacts. Building on its field course experience, the TBA is now working with institutions to provide training to trainers to ensure our activities are sustainable in the longer term. The returns of investing in people are often seen several years down the line, so how do we know we are making an impact? A recent survey showed that over 90% of TBA's 380 African trainees are now employed in conservation biology, both in non-governmental organisations and national government. This resource of well-trained, motivated and committed biologists is uniquely placed to pass on their skills and make significant contributions to biodiversity conservation in the longer term.

884. IMPACT OF HYDROELECTRIC POWER PLANT UPON SMALL CARNIVORES. TROVATI, ROBERTO G.; Brito, Bernardo A.; Duarte, José M. B. Departamento de Zootecnia, FCAV/UNESP, Jaboticabal SP, 14884-900, Brazil, guilhermetrov@hotmail.com (RGT, JMBD). Departamento de Criação de Unidades de Conservação/IBAMA, Brasília, DF, Brazil (BAB).

Hydroelectric power plants may be a great conquest of the engineering, but there are still serious failures in the environmental field because the irreversible impacts they cause on it. In this study we measured the effects of the hydroelectric power plant Luis Eduardo Magalhães - Lajeado (TO) upon a small carnivorous community. The evaluation was taken for five species: *Cerdocyon thous* (n=3), *Nasua nasua* (n=3), *Leopardus tigrinus* (n=2), *Herpailurus yagouaoroundi* (n=2) and *Leopardus pardalis* (n=1). Animals were marked with radio collars and tracked before, during and after the flooding process. All the studied animals left their use area after flooding and moved to secure ones, establishing new areas at the reservoir margin. They presented tolerance to the severe impact caused by partial or almost complete inundation of their habitat, especially those animals that didn't have their core area inundated by the reservoir formation. The felids were the most sensitive among the carnivorous regarding the transformation of their habitat.

885. THE PENINSULA EFFECT ON BIRD SPECIES IN NATIVE EUCALYPT FORESTS IN A WOOD PRODUCTION LANDSCAPE IN AUSTRALIA. TUBELIS, DARIUS; Lindenmayer, David; Cowling, Ann. Centre for Resource and Environmental Studies, The Australian National University, Canberra, ACT 0200, Australia, dtubelis@yahoo.com. Statistical Consulting Unit, The Australian National University, Canberra, ACT 0200, Australia (AC).

The peninsula effect - a decrease in species richness from the base to the top of a peninsula - has been tested at continental scales. We investigated the peninsula effect at a local scale by examining bird occurrence in riparian strips (peninsulas) of native eucalypt forest within a Radiata pine plantation in Australia. We surveyed birds at three distances from a core area of eucalypt forest. Bird occurrence was examined using generalised linear mixed models. A decrease in bird species richness from the base toward the top of peninsulas was observed. Such pattern also occurred with the abundance of some species. The proportion of large bird species recorded per quadrat showed declined from the base toward the top of the peninsulas. This pattern was not observed for small birds. The peninsula effect can occur locally in landscape mosaics. In our microscale study, foraging incursions of individual birds from the core area of native forest through peninsulas were a major factor giving rise to higher bird species richness in the more basal portions of peninsulas. This study suggests that assessments evaluating the conservation value of remnants for bird species should consider the potential influence of proximity to extensive protected areas on results.

886. INTERETHNIC ALLIANCES FOR CONSERVATION AND LOCALLY BASED DEVELOPMENT IN THE XINGU. TURNER, TERENCE. Department of Anthropology, Cornell University, 261 McGraw Hall, Ithaca, NY, 14853, USA, tst3@cornell.edu.

In November 2003, a meeting of the indigenous peoples of the Xingú was held at the Kayapó village of Piaraçú with financial provided by conservation NGO's. With this aid, more than 200 members of 14 of the 24 indigenous peoples of the Xingú valley were able to attend. They pledged their communities to a mutual effort to stop the construction of hydroelectric dams on the Xingu. They also supported one another's struggles to stop the deforestation and pollution of the headwaters, and to secure the demarcation of the Kayapo area of Kapotnhinore on the Middle Xingu. The chiefs of the Upper Xinguano communities formally promised to cease making sorcery against the Kayapo, who in turn foreswore any intention to raid the Xinguanos. Meanwhile, Brazilian activists of the Lower Xingu, through their organization, the Fundação Viver, Produzir, Preservar, initiated direct contacts with the Kayapo, and now speak of an alliance of "the peoples of the Xingú" including the indigenous peoples of the area as well as themselves. A possible future action of this interethnic alliance is the holding of a joint rally against the dams at Altamira, reminiscent of the successful rally of 1989.

887. ACCOUNTABILITY IN CONSERVATION: A NEW APPROACH TO ASSESSING CONSERVATION PROGRESS IN PROTECTING BIODIVERSITY "HOTSPOTS.". Turner, Will; WILCOVE, DAVID S. Woodrow Wilson School, Princeton University, Princeton, NJ 08544, USA, dwilcove@princeton.edu.

The ability to measure progress (or the lack thereof) in meeting conservation goals is essential when resources are limited and time is crucial. This is especially true in the case of hotspots where numerous imperiled or endemic species co-occur. We have developed a set of continuous, quantitative Protection Indices that measure the degree to which conservation efforts reduce the threats to individual species and groups of species. The Protection Indices are based on 3 criteria used in the IUCN Red List to determine a species' global rank: number of populations, area of occupancy (area of habitat where protected), and geographical extent. We first use the indices to measure conservation progress in the Lake Wales Ridge scrub in central Florida, a discrete ecosystem harboring the highest concentration of endangered species in the continental USA. We then use them to determine which sites are especially important to the welfare of particular species and to determine priority sites for future acquisition. Our approach is readily transferable to other hotspots in other parts of the world.

888. THE KAYAPO VISION OF THE FUTURE OF KAYAPO LANDS AND CULTURE. TXUCARRAMAE, MEGARON. FUNAI, Colider, Mato Grosso, Brazil, fefi59@brturbo.com.

The Kayapo have fought for generations to rule their territories and maintain their culture. The result of the Kayapo struggle has been the protection of more than 10 million hectares of largely pristine forest and savanna (cerrado) and an indigenous culture in the highly threatened southeastern Amazon, a region continuing to experience relentlessly high rates of deforestation. The development frontier increasingly surrounds Kayapo lands and the

Kayapo require more means to continue to defend their territorial and constitutional rights. Kayapo communities need investment in the development of sustainable economic enterprises that can generate income without degrading ecosystems on which culture depends.

889. BIRDS AS CONSERVATION SURROGATE IN FRAGMENTED ATLANTIC FOREST LANDSCAPES. UEZU, ALEXANDRE; Metzger, Jean Paul. Departamento de Ecologia, Instituto de Biociências, Universidade de São Paulo, Rua do Matão, 321, travessa 14, 05508-900, São Paulo, SP, Brazil, aleuezu@usp.br (AU, JPWM). IPÊ - Instituto de Pesquisas Ecológicas, Rodovia Dom Pedro I, Km 47 Caixa Postal 4712960-000, Nazaré Paulista, SP, Brazil (AU).

We evaluated how different functional groups of birds respond to fragmentation of the Atlantic Forest in the Pontal do Paranapanema region. Point counts for forest birds were carried out during the period of 2002-2004, in 21 patches and seven sites in a control reserve, the Morro do Diabo State Park (36,000 ha). Species showed different responses to fragmentation. We identified four types of sensitivity: species highly affected, affected, not affected and benefited. Functional groups which are more vulnerable are: i. Atlantic Forest endemic species, possibly due to the region being located in the extreme of this bioma; ii. Species that use only one or two types of forest, possibly related to their lower flexibility to occupy degraded areas and iii. Species sensitive to human disturbance according to literature, which predicts species' responses in the region. The State Park plays an essential role for the most affected groups; conversely, medium and small patches have little contribution. For these latter, intrinsic factors (size and quality) seem to be critical, which indicates that management to protect patches and allow the vegetation to recover is crucial. Additionally, it is necessary to increase landscape connectivity to permit bird recolonization.

890. ECOSYSTEM HEALTH CAPACITY BUILDING IN SOUTH AMERICA. UHART, MARCELA M; Karesh, William B. Field Veterinary Program, Wildlife Conservation Society, Estivariz 197, (9120) Puerto Madryn, Chubut, Argentina (MMU) (muhart@speedy.com.ar). Field Veterinary Program, Wildlife Conservation Society, 2300 Southern Blvd., Bronx, NY 10460, USA (WBK).

The importance of health/disease issues at the ecosystem level, as well as the role of veterinarians in applied conservation activities, are becoming more broadly recognized in many parts of the world. However, these subjects are novel to Latin America, though the need to address disease issues at the human/wildlife/domestic animal interface is urgent. Poverty driven landscape transformation and non-environmentally sound practices are leading development in this highly biodiverse region. And the professionals to evaluate their impact, influence policy and offer alternative solutions to change this course of action, are lacking. During the past ten years, the Wildlife Conservation Society's Field Veterinary Program has been directing a significant portion of its efforts to strengthening local capacity for addressing ecosystem health issues. To make our efforts long-lasting, we have joined several universities to carry out training programs for local veterinarians with limited access to foreign educational centers. These courses have taken place in Argentina, Bolivia, Chile, Colombia and Peru, with participants from almost every country in the continent. We wish to encourage other wildlife health professionals from around the world to lend their expertise so we can establish a sound foundation for the development of 'conservation medicine' leaders for Latin America.

891. CONSERVATION IN URBAN COMMUNITIES: A CASE STUDY IN THE NELSON MANDELA METROPOLITAN MUNICIPALITY. UITHALER, ELDRID MARLON. Biodiversity Conservation Unit, Wildlife and Environment Society of South Africa, 2(b) Lawrence St, Central Hill, Port Elizabeth, 6001, South Africa (EMU). euithaler@wessa-bcu.co.za.

The Van der Kempskloof-Parsonsvlei area in the Nelson Mandela Metropole (South Africa) consists of natural valleys and plateau areas. The Van der Kempskloof-Parsonsvlei area forms part of the Cape Floral Kingdom, a biodiversity hotspot and recently declared a World Heritage site. Van der Kempskloof-Parsonsvlei was identified as a priority area through a fine-scale conservation planning exercise. The biodiversity of the area is currently threatened by a range of human activities, including poaching of flora and fauna and over burning. The area's natural assets will likely be lost if these threats are not addressed in the short- to medium term. Through a community participatory process, guidelines to manage the area as a Nature Reserve have been developed. Part of this includes an ecological management plan that will specifically focus on alien plant eradication and fire management in the vulnerable fynbos areas. This initiative will support the conservation of the biodiversity of the area and assist with the provision of social, educational, recreational and small-scale economic opportunities for the residents of the area.

892. VEGETATION STRUCTURE OF GALLERY FORESTS VERSUS BOSQUETS: CONSERVATION OF NATURAL FRAGMENTS AT LOPÉ NATIONAL PARK IN CENTRAL GABON. UKIZINTAMBARA, THARCISSE. Department of Environmental Studies Antioch New England Graduate School; Avon Street, Keene, New Hampshire 03431, USA.

Studies have been conducted on human-induced fragmentation - one of the major causes of species decline in tropical forests. However, we know little on the extent of natural fragmentation and how they have sustained rare species that could have been lost due colonization by continuous forest. Between February 2001 and January 2003, we studied the natural fragmentation in the north of Lopé National Park. This landscape was created and maintained by periodic climate changes. We compared vegetation composition of isolated fragments (bosquets) with that of gallery forests. Both shared 39% of 251 species inventoried. Gallery forests contained 45% of species no encountered in bosquets while the later accounted for 16% of all species. Distance to gallery forests was a determinant factor of the differences in species diversity and composition within bosquets. The Shannon index H' was higher in bosquets closer to a gallery forests regardless of their sizes (ranging between 0.5 and 38ha). Larger bosquets were formed farther away from gallery forests and inaccessible by most seed dispersing animals. Seasonal fires have also been playing an important role in blocking the advancing continuous forest that could engulf forest fragments and eliminate this unique vegetation formation from the Lopé landscape.

893. SMALL MAMMALS AND THE LANDSCAPE STRUCTURE OF AN ATLANTIC FOREST FRAGMENTED LANDSCAPE. UMETSU, FABIANA; Pardini, Renata. Departamento

de Ecologia, Instituto de Biociências, Universidade de São Paulo, São Paulo, SP, 05.508-900, Brazil, fabiume@yahoo.com (UF, PR).

In 20 patches of Atlantic forest, we investigated the response of small mammals to habitat quantity (patch size), connectivity (sum of forest area structurally connected to patches by native vegetation in initial stage of regeneration) and configuration (edge density in a 800-meter radio circumference around patches) and to matrix proportion (proportion of agricultural areas in a 800-meter radio circumference around patches). The relative importance of these landscape structure variables to abundance and alpha and beta diversity was investigated using multiple regression models. Small mammal diversity was primarily influenced by habitat connectivity, which was positively related to alpha diversity and negatively related to beta diversity. Small mammal total abundance, however, was mainly affected by habitat configuration, decreasing with increasing edge density. Species abundance variations, on the other hand, were related to matrix proportion. While matrix-intolerant species, like the guild of forest-dwelling terrestrial small mammals, were negatively related, a generalist species showed a positive relationship, to the proportion of agricultural areas around patches. Results highlight the importance of native vegetation in initial stages of regeneration in providing connectivity and allowing richer and more homogeneous communities to be established and the influence of the matrix in determining species abundance in patches.

894. BUILDING CAPACITY FOR FRESHWATER ECOLOGICAL ASSESSMENTS IN THE BRAZILIAN CERRADO. UPGREN, AMY; Pinder, Laurenz; Kimura de Freitas, Glauco. Nicholas School of the Environment and Earth Sciences, Levine Science Research Center, Duke University, Durham, NC, 27708, USA, aupgren@yahoo.com (AU). The Nature Conservancy, Central South America Savannas, SHIN Centro de Atividades 05, Conjunto J Bloco B Salas 301-309, Brasília, DF, 71.503-505, Brazil (LP, GF).

The growth of agricultural production in the Brazilian Cerrado has substantially affected the natural landscape. To understand and document the effects of agricultural expansion on river systems in the Cerrado, assessment programs that evaluate a broad range of ecological functions are necessary. Recognizing this need, The Nature Conservancy of Brazil (TNC) developed a comprehensive river assessment program, which evaluates the water quality, biological condition, and physical habitat structure of river systems, with the aim of transferring the assessment program to the environmental agency of the state of Goiás. To allow for the adoption of the assessment into the state's monitoring program, TNC analyzed the agency's existing resources and capabilities, took them into account while designing the assessment program, and built capacity by developing and implementing a training course to instruct agency biologists to use the assessment. The environmental agency of Goiás has begun applying the assessment on two rivers in the state and is currently integrating the assessment into its freshwater monitoring program. TNC's approach, which identified the agency's current capabilities and focused capacity-building efforts on enhancing those capabilities, provides a useful example of a strategy to improve regional capacity for ecological assessments.

895. TROPICAL HERPETOFAUNA COMMUNITIES AND MICROHABITAT IN A SEMINATURAL LANDSCAPE: IMPLICATIONS FOR CONSERVATION. URBINA-CARDONA, JOSE NICOLAS; Reynoso, Victor Hugo. Colección Nacional de Anfibios y Reptiles. Departamento de Zoología. Instituto de Biología. Universidad Nacional Autónoma de México. Apartado Postal 70-153, C.P. 04510 México, D.F., Mexico, nurbina@yahoo.com, vreynoso@mail.ibiologia.unam.mx.

To understand the effect of fragmentation in herpetofaunal communities inhabiting seminatural landscapes, we determinated the diversity of amphibians and reptiles along the pasture-edge-interior gradient, in the tropical rainforest at Los Tuxtlas (Mexico), with a collecting effort of 672 man hours. Eleven microenvironmental variables were measured in each collecting site. According to habitat use, species were grouped as generalists, only pasture, only edge, only interior, and forest species. The distribution of the community of amphibians and reptiles was strongly affected by the canopy and leaflitter coverage, the understory density, and microhabitat temperature. We found clear variables that affect strongly the diversity of interior amphibians and reptiles, known to be the most fragile in the ecosystem. Interior amphibians are positively correlated with the distance to the forest edge and negatively to the land slope, and the interior reptiles with the leaf litter coverage. Relating the use of the pasture-edge-interior gradient with the amphibian and reptile microhabitat gives clear insights for the development of conservation strategies to preserve amphibians and reptiles as a whole in seminatural environments.

896. PARTICIPATORY MARINE TURTLE CONSERVATION STRATEGY IN THE PACIFIC COAST OF NICARAGUA: FINDING THE WAY TO ACHIEVE AN EFFECTIVE CONSERVATION. URTEAGA, JOSÉ. Fauna & Flora International, Nicaragua.

Four species of sea turtle nest and inhabit waters of the Pacific coast of Nicaragua, being an important element of the culture, economy, and environment in the region. Several threats affect these reptiles, being the most relevant: poaching of eggs, target and incidental fisheries and coastal development. FFI has been involved in the conservation of marine turtles in Nicaragua since 2002. Monitoring project and hatcheries operation, in El Mogote beach, during 2002/03 and 2003/04 seasons has allowed the protections of 161 sea turtle nests including 98 of the critical endangered leatherback. At the same time, environmental education and awareness activities, targeting focal groups have been performed. This constitutes one of at least 6 initiatives on sea turtle conservation on the region. However, although considerable progress has been made, significant threats are still posed. An obstacle to achieve an effective conservation of these reptiles is the lack of framework that could orientate actions. In order to address this situation, FFI is facilitating the development of a Sea Turtles Conservation Strategy through a participatory process that will be headed by the Nicaraguan Ministry of Environment and Natural Resources and the Sea Turtle Conservation National Network.

897. ENVIRONMENTAL EDUCATION CAMPAIGNS AS A KEY FOR CONSERVATION BIOLOGY IN PRACTICE. VALDES, LOURDES MUGICA; Martín, Acosta Cruz; Reyes, Ariam Jiménez; Suárez, Antonio Rodríguez; Ponce de León, José; Avila, Dennis Denis; Tió, Efren García; Atá, Rolando Rodriguez. Facultad de Biología, Universidad de la Habana (LMV, MAC,

AJR, ARS, JPL, DDA); Federación Cubana de Caza Deportiva, Cuba (EGT, RRA).

An environmental education campaign was developed in rural communities associated with rice paddies and natural costal wetlands. Components of the program involved: 4 workshops with educators and community leaders to launch the book "The Wondrous West Indian Wetlands," contests in different artistic mediums related to the protection of wetlands, a photographic exhibition on wetlands and slideshows for different sectors of the population. A community festival, was organized as well, it included activities with children and the special cancellation of a stamp. Site Support Groups, "Wetland Friends", were established, which will help continue the work of the project in the future. Additionally, a guidebook to the birds of the Cuban wetlands was written and many materials were donated to the libraries and schools in both localities. Approximately 8,000 people participated directly in one or more activities According to the questionnaires, the participation in the different activities, and the diverse local initiatives, the objectives of the project had been fulfilled: elevating the knowledge about wetlands and the need for their protection. A movement has begun in both municipalities to continue this work, for which the leaders of the project continue offering help in the future on an advisory level.

898. DECREASED FRUGIVORY AND SEED GERMINATION DO NOT REDUCE SEEDLING RECRUITMENT RATES OF *Aristotelia chilensis* IN A FRAGMENTED FOREST. VALDIVIA, CARLOS E.; Simonetti, Javier A. Departamento de Ciencias Ecológicas, Facultad de Ciencias, Universidad de Chile, Santiago, casilla 653 Santiago, Chile, cvaldiviap@yahoo.com.

Habitat fragmentation reduces frugivorous bird abundance. However, its consequences on plant fitness have not assessed despite disrupted mutualisms might compromise plant persistence. We assessed frugivory, seed germination, and seedling recruitment rates in a fragmented forest of central Chile by comparing a continuous forest with forest fragments. If fragmentation reduce frugivore abundance, we expected a lowered frugivory, seed germination and seedling recruitment rates in forest fragments. Frugivory was 2.4 times higher in continuous forest than in fragments. Seeds eaten by birds germinated 1.7 and 3.7 times higher than those from continuous forest and fragments respectively. Non-eaten seeds from continuous forest germinated 2.2 times higher than those from fragments suggesting inbreeding depression. However, seedling recruitment rates at fragments were higher regarding continuous forest where no seedling recruited. Therefore, despite forest fragmentation negatively affected frugivory, it does not produce a decreased plant fitness highlighting the importance of considering the processes as a whole.

899. RORAIMA'S INDIGENOUS RESERVES AND THE FATE OF THREATENED *Synallaxis kollari*. VALE, MARIANA; Jenkins, Clinton. Nicholas School of the Environment, Duke University, Box 90328, Durham, NC, USA, mmv3@duke.edu.

Hoary-throated Spinetail (*Synallaxis kollari*) is a passerine bird endemic to gallery forests of Roraima, extreme northern Brazil, and adjacent Guyana. Its tiny range and ongoing forest loss have meant that *S. kollari* is considered a globally threatened species. Nonetheless, the species is poorly known, and none of its known range is formally protected. A supervised classification of Landsat imagery was conducted to map the species' habitat. The map was tested using presence/absence field data collected in July 2004. We found a large proportion of the gallery forest within 0.5 km of river margins to be still intact and rice plantations to be the main source of habitat loss. The gallery forest along rio Surumu appears to be especially affected. Importantly, we found most of *S. kollari* 's habitat to be within São Marco and Raposa-Serra do Sol indigenous reserves. The fate of *S. kollari* will be necessarily tied to the fate of these reserves and any attempt to preserve the species should involve their communities.

900. PLANT DIVERSITY AND ECOSYSTEMS HEALTH IN THE MANAGED FLORISTIC RESERVE OF BACUNAYAGUA, CUBA. VALES GARCÍA, MIGUEL A.; Vilamajó Alberdi, Daysi. Centro de Gerencia de Programas y Proyectos Priorizados, CITMA, Email valvil@infomed.sld.cu (MAVG); Instituto de Ecologia y Sistemática, CITMA, Cuba, cenbio@ama.cu (DVA).

In order to validate a methodology for the evaluation of the ecosystem health in terrestrial ecosystems, the authors follow on with the application of methods of ecological integrity with the addition of the comparative analysis of the most relevant biodiversity indices that express the higher ecological diversity. The investigation were carried out in plots of two different types of forest in the protected area of Bacunayagua (semidecidous forest and the xeromorphic subcoastal scrub forest). The values of the biodiversity indices obtained by the software Biodiv (mainly for evenness and diversity) were interpreted as indicators of the ecosystems health when they are considered with the information of the status of the forest structure, presence of endemism and /or synantropic species. This area posses high natural values two endemic genera (*Espadaea* and *Dendrocereus*), and also one species of *Coccothinax*, but such important elements are found only in patches.

901. PROPOSING INTERNATIONAL GRADUATE PROGRAMS FOR THE NEXT GENERATION OF CONSERVATION LEADERS. VALLADARES-PADUA, CLAUDIO. Instituto de Pesquisas Ecológicas, SHIN QI 13 Conj. 8 Casa 5 Brasilia, DF, Brazil, cpadua@ipe.org.br and Wildlife Trust Alliance.

In most tropical countries there are less highly qualified professionals than would be necessary to implement effective conservation and sustainable development projects. Brazil is among such countries. Public universities suffer from bureaucratic systems that do not easily allow one to hire new professionals or change the direction of what is being taught to adequate to the needs that emerge over time. On the other hand, private universities usually envision financial profits, so the quality of the education offered is not always good. In this paper we will examine how IPÊ - Instituto de Pesquisas Ecológicas (Institute for Ecological Research) and its partner Wildlife Trust Alliance, have identified this need and have been offering educational opportunities in the social and the environmental fields that are lacking in Brazil. More recently, the involvement of the business world has also been critical. Guilherme Leal, owner of a Brazilian cosmetic company, Natura SA, joined IPÊ in the creating of a graduate program on Conservation Biology and Sustainability. The aim is to offer a program that links theory to practical applications, which in itself is an innovative approach to education in Brazil. This graduate program will be launched in 2006.

902. PRIORITY AREAS FOR NEW PERMANENT PLOTS IN THE BRAZILIAN AMAZON. VALLE, DENIS; Vidal, Edson; van Eldik, Tim; Silva, Versides Sebastião de Moraes; Reis, Quésia. IMAZON, Ananindeua, Pará, 67113-820, Brazil, drvalle@imazon.org.br (DV, EV). Ecoflorestal, Belém, Pará, 66063-060, Brazil (TVE). UFMT, Cuiabá, Mato Grosso, 78060-900, Brazil (VSMS). IBAMA, Manaus, Amazonas, 69075-830, Brazil (QR).

Sustainable forest management (SFM) has being proposed as an alternative to avoid forest cover loss in the Amazon. Permanent sample plot (PSP) information is essential for SFM. The objective of this article is to determine the priority areas for new PSP in the Brazilian Amazon region. PSPs from Embrapa (Acre, Amazônia Oriental e Ocidental), UFMT, UFAM, Imazon, INPA and Precious Woods Group, participants of the Ministry of the Environment's Inter-Institutional Working Group on Forest Monitoring in the Brazilian Amazon, were evaluated. Brazilian Amazon area was stratified according to climate, soil and vegetation type and a priority area of 700 mil km^2 to be sampled was defined, including the following regions and potential partners: northwest of Mato-Grosso, west of Acre (Resex Alto Juruá and Alto Tarauacá), center of Amazonas (Resex Baixo and Médio Juruá, Rio Jutaí, Auati-Paraná, Flona Tefé, RDS Mamirauá and Amanã), southwest and northwest of Pará (Flona Altamira, Itaituba I and II) and northwest of Rondônia (Floresta Estadual Rio Vermelho). The strategic location of PSP is very important to generate reliable information which in turn is essential for a greater sustainability of forest management.

903. BIRD DISPERSAL IN A PARTIALLY-FRAGMENTED TROPICAL FOREST LANDSCAPE. VAN HOUTAN, KYLE; Pimm, Stuart; Stouffer, Phil; Lovejoy, Thomas E.; Bierregaard, Richard. School of the Environment Box 90328, Duke University Durham, NC 27708 (USA) Phone: +1 919 613 8085 Email: kyle.vanhoutan@duke.edu.

A central issue in conservation ecology is understanding ranging behavior differences between species and how landscape-level changes affect them. Differences in species' willingness to cross forest gaps are likewise not extensively documented. Advances in this field are severely hampered by a lack of empirical data, which are notoriously difficult to obtain. We examined 16,201 recaptures from a database of mist-netted birds from the Biological Dynamics of Forest Fragments Project near Manaus, Brazil. Gleaning dispersal information from mist-net data is an attractive alternative to the more common method of audio playbacks, as playbacks potentially misrepresent actual behavior. We compute a series of nested models to explain movements of individual birds between successive captures. Movements within and between plots are a function of: (a) distance, (b) source plot area, (c) dispersal path "cost", and (d) species' foraging strategy. This research provides key basic insights into bird dispersal and conservation science from an empirical context of great significance.

904. HUMAN DEMOGRAPHICS, BIODIVERSITY AND THE FUTURE OF CONSERVATION AREAS IN SOUTH AFRICA. VAN RENSBURG, BERNDT J.; Chown, Steven L.; Gaston, Kevin; Evans, Karl. Department of Zoology and Entomology, University of Pretoria, Pretoria 0002, South Africa, bjvrensburg@zoology.up.ac.za.

The impacts on biodiversity as a consequence of human activities are being increasingly well explored. These take two main forms, namely: (i) current impact as a consequence of habitat alteration and degradation and the introduction of invasive alien species, and (ii) future impact as a consequence of human population change, ongoing invasion, and the indirect effects of human activities on the environment (pollution and climate change). Whilst the impacts of the former are increasingly well understood, the latter effects, which can often be subtle, are only now being fully explored. Most investigations have relied on static estimates of human population density and their relationships with current levels of diversity to assess future impacts of change and presume that impacts have not yet gone to completion and that future change will be high in areas of high population density. Whilst there is some evidence in support of the idea that impacts will be high in high-density areas, the likelihood that this process will be ongoing depends fundamentally on human patterns of change in high diversity areas. Using information on birds and frogs, we report the results on changes in South Africa's human population density over a 5-year period to explicitly examine these interactions. Species richness and human density are positively correlated, apparently because both respond positively to increasing levels of primary productivity. High species richness is maintained mostly by currently designated reserves, but the areas surrounding these have higher human population densities and human growth rates than expected by chance, placing the reserves under increasing external pressure. Future anthropogenic impacts in biodiversity-rich areas as a consequence of the introduction of invasive alien plant species are highly likely. Although population increase correlates strongly with population density, extensive variation in human population change, especially in high human density areas, may provide some flexibility for minimizing future human impacts in potential conservation areas.

905. PRECAUTIONARY REGRESSION-BASED DETERMINATION OF PROTECTIVE BOUNDARIES FOR MIGRATORY CORRIDORS OF LARGE WHALES. VANBLARICOM, GLENN R.; Zerbini, Alexandre N.; DeMaster, Douglas P.; Andriolo, Artur; Heide-Jørgensen, Mads Peter. Washington Cooperative Fish & Wildlife Research Unit, School of Aquatic and Fishery Sciences, University of Washington, ms 355020, Seattle, Washington 98195-5020, USA, glennvb@u.washington.edu & azerbini@u.washington.edu (GRVB, ANZ). Alaska Fisheries Science Center, NMFS/NOAA, 7600 Sand Point Way NE, Seattle, Washington 98115, USA, Douglas.Demaster@noaa.gov (DPM). Departamento de Zoologia, Instituto de Ciências Biológicas, Universidade Federal de Juiz de Fora, MG, Brasil, andriolo@icb.ufjf.br (AA). Greenland Institute of Natural Resources, Box 570, DK-3900 Nuuk, Greenland, mhj@dpc.dk (MPH-J).

Large whales often partition annual activity patterns into spatially and temporally isolated foraging and reproductive phases connected by migratory corridors. Conservation of such species may require protection of each activity. Locations and timing of foraging and reproductive phases are often well known and amenable to protective actions, but migratory corridors are often poorly known and unprotected against risk factors such as ship strikes or net entanglement. We propose use of linear regression to define protective boundaries for corridors used by migrating animals, based on telemetrically collected geolocational data. Linear regression of longitude on latitude (or vice versa) defines the central tendency of corridor location, and variance of data about the line provides geospatial confidence limits. Determination of confidence limits can reflect any desired percentile, allowing application of precautionary protocols scaled to uncertainty in the data, and fostering consideration of management interests. We utilize telemetric data

on humpback whales in the South Atlantic to illustrate configurations for migratory corridor protection based on varying percentile selection for confidence limits. We conclude that cases of migratory data with high variance will require wider (more precautionary) protective boundaries for corridors than cases with low variance.

906. BAT SPECIES ASSEMBLAGE IN DIFFERENT DEGREES OF HABITAT DISRUPTION IN A ANDEAN MONTANE FORESTS OF BOLIVIA. Vargas, Aideé; Selaya, Angela; GALARZA, M. ISABEL; Aguirre, Luis F. Centro de Estudios en Biología Teórica y Aplicada, Programa para la Conservación de los Murciélagos de Bolivia, Casilla 994, La Paz, Bolivia. (AV, MIG, AS, LFA), aguigal@supernet.com.bo (MIG). Centro de Biodiversidad y Genética, Universidad Mayor de San Simón, Casilla 538, Cochabamba, Bolivia, laguirre@fcyt.umss.edu.bo (LFA).

It is known that human activities affects bat species assemblages in the tropics. However, almost nothing is known about anthropic effects over bat communities in montane forests. To assess such effects over bats, during eleven months we evaluated bat species assemblages in sites with different levels of disruption at the Carrasco National Park (Cochabamba, Bolivia). For a total of 69 nights of effective sampling in Citrus Farmlands, Oldfields, Young Secondary Forests and Mature Secondary Forests, we captured 2597 individuals from 44 species. Overall, Citrus Farmlands had more species and individuals (33 and 783 respectively) followed by Mature Secondary Forest (32, 705), whereas Oldfield was the one with least species richness as well as abundance (23, 363). *Carollia perspicillata* was noticeably the most abundant species in general (n=1769) and in each habitat type. When compared, all habitat types are similar (between 76-92%) reflecting one large bat fauna with subtle differences. Despite the fact that habitats types differ from each other, bat faunas remain similar. This could be due to the high forest dynamics in montane forests (e. g. slides) and that the original forests has long been disrupted. At the present it is difficult to find true primary habitats in this montane forest.

907. HORMONAL EFFECTS OF ENVIRONMENTAL ENRICHMENT IN THE MANED WOLF (*Chrysocyon brachyurus*). VASCONCELLOS, ANGÉLICA S.; Ades, César; Guimarães, Marcelo A. B. V.; Pizzutto, Cristiane S. Departamento de Psicologia Experimental, Instituto de Psicologia, Universidade de São Paulo, São Paulo, SP, 05508-900, Brazil, angelv@usp.br (ASV, CA). Departamento de Reprodução Animal, Faculdade de Medicina Veterinária e Zootecnia, Universidade de São Paulo, São Paulo, SP, 05508-900, Brazil (MABVG, CSP).

Noninvasive fecal glucocorticoid analysis has great potential as a means of assessing stress associated with environmental challenges. In order to evaluate the influence of environmental factors that could promote well-being in the maned wolf, an endangered species that exhibits deviant behaviors when kept in captivity, environmental enrichment techniques (food and toy manipulations) were used during 16 weeks with 11 animals in three zoos. Treatment included baseline and experimental periods. Fecal samples were collected three times a week. A double-antibody radioimmunoassay (RIA) for corticosterone was used to quantify the immunoactive fecal corticosteroid concentration. Two profiles of reaction to enrichment treatments were observed, involving either corticosterone increase or decrease. Such profiles may be related to gender once 5 out of 6 females reacted with an increase while 4 out of 5 males reacted with a decrease in corticosterone levels. Lack of significant differences between initial and final baseline periods indicates that treatment was only efficient during the enrichment period. Results suggest that the relationship between corticosterone levels and well being is more complex than usually conceived and show the importance of taking into account the individuality of animals in the planning of research on enrichment and in the implementation of enrichment programs.

908. URBAN EXPANSION AT A HOTSPOT: AN EXAMPLE OF ENVIRONMENTAL PLANNING BASED ON BIRD CONSERVATION. VASCONCELOS, MARCELO F.; Lamas, Ivana R.; Fernandes, Alexandre M.; Resende, Saulo R. O. Sete Soluções e Tecnologia Ambiental, Av. Getúlio Vargas 1420, 16º andar, Savassi 30112-021 Belo Horizonte MG Brasil (MFV, AMF, SROR), sete@sete-sta.com.br; Conservation International - Brazil Program Av. Getúlio Vargas 1300, 7º andar, Savassi, 30112-021 Belo Horizonte MG Brazil (IRL) i.lamas@conservacao.org.

The southern Espinhaço Range is a priority area for bird conservation in the state of Minas Gerais, southeast Brazil. Nevertheless, natural habitats of this region have been degraded by a series of human activities, including rapid urban expansion. This study aims to present the results obtained during an ecological mapping project based on the avifauna distribution and conservation. The study was conducted at Vale dos Cristais, a region of urban expansion at Nova Lima municipality, southern Espinhaço Range. The area is located in contact zones of Cerrado and Atlantic Forest, two globally recognized hotspots for biodiversity conservation. Bird surveys were conducted based on observations and using mist-nets between December 2001 and January 2002. We recorded 131 bird species in the study area, including threatened species in Minas Gerais (e. g. Dusky-legged Guan *Penelope obscura* and Cinereous Warbling-finch *Poospiza cinerea*), endemic species of the Cerrado (e. g. Collared Crescentchest *Melanopareia torquata* and Blue Finch *Porphyrospiza caerulescens*), and endemics of the Atlantic Forest (e. g. Red-eyed Thornbird *Phacellodomus erythrophthalmus* and Gilt-edged Tanager *Tangara cyanoventris*). The study for urbanization at Vale dos Cristais was projected taking into account the natural corridors of native vegetation and the most relevant habitats for bird conservation.

909. USE OF MULTI-TIME SEQUENCES OF RADAR JERS-1 SAR IMAGES TO ESTIMATE MONTHLY VARIATION IN HABITAT AVAILABILITY AND ITS INFLUENCE ON A FISH COMMUNITY. VEGA-CORREDOR, MARÍA; Forsberg, Bruce; Arruda, Warley C. Laboratorio de Ecossistemas Aquáticos, Centro de Pesquisas em Ecologia, Instituto Nacional de Pesquisas da Amazônia; Av. Efigenio Sales 2239, 69011-970, Manaus, AM. Brazil, mariacvc@hotmail.com (WR, BF, MCV).

The flood pulse produces cyclical variations in aquatic habitat availability, creating expansion and contraction of flooded areas. This, in turn, causes changes in shelter and food resource availability for fish communities, forcing them to adapt to varying conditions. Remote sensing and Geographical Information Systems (GIS) are proving useful in evaluations of how changes in flooded wetland habitats and impacts of human activities affect the distribution of the fish communities utilizing these habitats. The objective of this research was to determine how changes in habitat availability influenced the structure of a fish community in a floodplain lake. A multi-time sequence of radar JERS-1 SAR images was classified to estimate the monthly variation in habitat availability (open water, aquatic macrophyte beds, and flooded forest). Fish were collected monthly between January and November 2003 in the three types of habitat. Fish community structure did not differ

between habitats, as the majority of species were caught in whatever habitats were available at the particular time of the year. With respect to variations in seasonal flooding, the results demonstrate a high level of plasticity in the utilization of available food resources and shelter by the icthiofauna associated with these habitats.

910. HOW MUCH AREA DO BIRDS NEED: INSIGHTS FROM RADIOTELEMETRY. VEGA RIVERA, JORGE H.; Rappole, John H.; Haas, Carola A. Estación de Biología Chamela, Instituto de Biología, UNAM, Aptdo Postal 21, San Patricio, Jalisco, 48980, México; jhvega@ibiologia.unam.mx (JHVR). Conservation and Research Center, 1500 Remount Rd, Front Royal, VA 24060, jrappole@crc.si.edu (JHR); Virginia Polytechnic Inst and State University, Dept of Fisheries and Wildlife Sc., Blacksburg, VA 24061, USA, cahaas@vt.edu (CAH).

We used radio-telemetry and geographical information systems to study landscape movements, area requirements, and habitat use during the breeding and post-breeding periods of two migratory bird species: wood thrush (*Hylocichla mustelina*) and scarlet tanager (*Piranga olivacea*) on the temperate deciduous forest of eastern U. S. A., and two resident species: ivory-billed woodcreeper (*Xiphorhynchus flavigaster*) and citreoline trogon (*Trogon citreolus*) on the tropical deciduous forest of western Mexico. While habitat use at a macro level did not appear to change significantly between breeding and post-breeding periods for both migratory species, it was apparent that some factor or combination of factors, presumably related to habitat, favored home-range shifts. Regarding resident tropical species, we found that the insectivorous Ivory-billed Woodcreeper showed site attachment, frugivorous Citreoline Trogon were restricted to a few ha during the breeding season, but moved over larger areas during the non-breeding season. Our results suggest that protection of nesting areas alone will not ensure adequate protection for the species living on extreme seasonal environments. An integrated regional approach to habitat protection that considers the needs of these species throughout the life cycle will have a more realistic chance of preserving an ecosystem's diversity.

911. GAP ANALYSIS AND CONSERVATION PRIORITIES FOR THREATENED PARROTS OF COLOMBIA. VELÁSQUEZ-TIBATA, JORGE; López-Arévalo, Hugo F. Department of Ecology and Evolution, 650 Life Sciences Building, Stony Brook University, NY 11794, USA, jorvelt@hotmail.com (JVT). Instituto de Ciencias Naturales, A. A. 7495, Bogotá, DC, Colombia, hlopez@unal.edu.co (HFLA).

This study identified conservation gaps and priority areas for protection of threatened parrots in Colombia. Representation targets were set for all species on the basis of their distribution ranges. Parrot distribution ranges and maps from two protected area types were overlaid to determine if representation targets were met by the existing protected area network. Given that representation targets were not met for any species, we used irreplaceability and vulnerability measures to identify priority areas for conservation outside the network. Prioritary areas identified by this study are concentrated on mo untainous regions, where most human pressure is and where the greatest number of bird species are found, including threatened and endemics. Priority areas total 1% of Colombia's continental surface, and if they were protected would cover 26 gap bird species of conservation concern and increase the representation targets a further 88.4%. Nonetheless, priority site conservation would not by itself ensure persistence of parrot populations, and therefore further management actions within reserves and enhancement of landscape connectivity among reserves is needed. Capacity building among decision makers is a vital step towards increasing the use of this kind of approach for conservation planning in Colombia.

912. THE IMPORTANCE OF AMAZONIAN RIVERS FOR THE CONSERVATION UNITS LOCATION. VENTICINQUE, EDUARDO M.; Moreira, Marcelo; Neto, Hermógenes B. Wildlife Conservation Society - Andes Amazon Conservation Program, Rua dos Jatobás 274, Coroado III, Manaus, AM, 69085-380, Brazil, eventicinque@wcs.org, (EMV). Projeto Dinâmica Biológica de Fragmentos Florestais, Manaus, AM, 69011-970, CP 478, Brazil (MM, HBN).

A number of conservation units (CU) have been created in Amazonas state in the last years. Most recently created CUs are Sustainable Development areas and not Integral Protection areas. In the present study we have analyzed the role of the 14 main rivers of the Brazilian Amazonian basin as barriers for the distribution of mammalian species in the state of Amazonas. Data on species distribution were obtained from the literature. We built a matrix for each of the margins of the 14 rivers considering the presence or absence of 196 mammalian species. The rivers Negro, Solimões and Amazonas were the most effective barriers for the distribution of mammals within Brazilian Amazonia. Differences between species sets in each margin of the same river were 27% (Rio Negro), 27% (Amazonas) and 19% (Solimões). The most affected groups were the monkeys (51%), rabbits (40%), opossumus (26%), cavylike rodents (21%), sloths (17%), rodents (16%) and carnivores (6%). As most of the conservation units designed for integral protection are north of Rio Solimões-Amazonas and west of Rio Negro, there is an expressive number of mammal species which are not protected in the state of Amazonas.

913. THE FUTURE OF AGRO-INDUSTRY: MODELING SOYBEAN YIELD IN THE AMAZON BASIN. VERA-DIAZ, MARIA DEL CARMEN; Kaufmann, Robert; Nepstad, Daniel. Geography Department, Boston University, 675 Commonwealth Av. Room 141, Boston, MA, 02215, USA, mcarmen@bu.edu.

Industrial agriculture has become one of the main economic forces driving the expansion of the agricultural frontier in the Brazilian Amazon, led by soybean production. Between 1990 and 2003, soybean production grew from 3 to 14 million tons/year and the area planted increased from 16,000 to 47,000 km^2. This expansion has been stimulated by several factors, including growing international demand, money devaluation, and improvements in infrastructure. The future expansion of soybean production into the Amazon is still unknown. Here, we present a model of soybean yield that integrates the major climatic, ecological, economic, and spatial determinants in the Amazon Basin. Yield is modeled as a function of: *Soybean Physiological Model* that captures the effects of climate and physical attributes on the development of soybean plant; fertilizer applications; transport costs; and latitude. The results indicate that these parameters can account for about 45 percent of the spatial variation in yield. We estimated that 20% of Amazon Region has potential to develop soybean crops. The hybrid model provides a mathematical and cartographic framework that the scientific community and policymakers can use in their efforts to maximize the benefits from soybean economic activity while minimizing its negative externalities for Amazon economies and ecosystems.

914. PRELIMINARY RESULTS OF A CAMERA TRAPPING STUDY OF FELIDS IN THE PARQUE ESTADUAL DO RIO DOCE, MINAS GERAIS, BRAZIL. VIANA, LEONARDO R.; Scoss, Leandro M.; Fonseca, Gustavo. Laboratório de Mastozoologia e Manejo de Fauna, Universidade Federal de Minas Gerais 30161-970, Belo Horizonte, MG, Brazil. (LRV, GABF). Universidade Vale do Rio Doce, Campus Antônio Rodrigues Coelho, Rua Israel Pinheiro 2000, Bairro Universitário, 35020-220, Brazil (LSM).

Felids are reputably difficult to assess and monitor in the wild due to their secretive behavior and frequent persecution by humans. Camera trapping offers a non-invasive method to obtain such data. The Parque Estadual do Rio Doce (PERD) is approximately 36,000 ha in size, and the largest Atlantic Forest remnant in the state of Minas Gerais, Brazil. Here we present the results of the first year-long camera trapping study of felids ever conducted in the area, totaling 2207 trap nights. We obtained 45 photographic felid "captures" comprising four species (*Panthera onca*, *Puma concolor*, *Herpailurus yaguarondi*, *Leopardus pardalis*). The relative abundances indices (RAI) for these species were as follows: (0.181) *P. onca*, (0.271) *P. concolor*, (0.045) *H. yaguarondi*, (0.815) *L. pardalis*. The RAI from *L. pardalis* is at least three times greater than for any other species. The record of *P. onca* represents the first definitive proof in nine years of the species' continued persistence within park boundaries, an assumption that had been frequently challenged in the literature.

915. OVARIAN FUNCTION ASSESSMENT IN CAPTIVE JAGUARS (*Panthera onca*) BY FECAL STEROID EXTRACTION AND QUANTIFICATION. VIAU, PRISCILA; Morato, Ronaldo G.; Felippe, Érika C. G.; Oliveira, Claudio A. Laboratório de Dosagens Hormonais, Departamento de Reprodução Animal, FMVZ/USP, São Paulo, SP, 05508-000, Brazil, priviau@usp.br (PV, EGF, CAO), Centro Nacional para a Pesquisa e Conservação dos Predadores Naturais, IBAMA, Atibaia, SP, 12941-600, Brazil (RGM).

Non-invasive methods for reproductive studies in wild animals have been encouraged as they reduce, or even eliminate behavioral and hormonal disturbances produced by successive restraining. One of the most common techniques to assess ovarian function in zoo and wild species is the monitoring of sexual hormones. Ovarian function of captive jaguars was assessed by monitoring estrogens and progestins in feces. Fecal samples were collected along 18 months. Ovarian cycle mean duration defined by two consecutive peaks of fecal estrogens, was 38.28 ±2.52days. During estrous period, the mean value for this hormone was 115.91 ±8.82ng/g of dry feces, with an observed peak of 164.45 ±3.49ng/g of dry feces. Fecal progestins had no significant variations during the cycles. Longitudinal profiles of fecal estrogen in the pre-pubertal group indicate the beginning of ovarian activity in August-September. All animals started pre-pubertal phase around 20 months of age.

916. THE ROLE OF LAND USE CHANGES ON THE BIOGEOCHEMICAL FUNCTIONING OF AQUATIC ECOSYSTEMS IN THE AMAZON. VICTORIA, REYNALDO L.; Ballester, M. V. R.; Krusche, Alex V.; Richey, J.; Kavaguishi, N.; Gomes, B.; Victoria, D.; Montebelo, A.; Neill, Christopher; Deegan, Linda A. CENA/USP, Av. Centenario 303, 13416-000 Piracicaba SP, Brazil, reyna@cena.usp.br.

In this study we present the results of an integrated analysis of physical and anthropogenic controls of river biogeochemistry in Amazônia. At the meso-scale level, both soil properties and land use are the main drivers of river biogeochemistry and metabolism. Pasture and soil ECC explains 99% ($p < 0.01$) of the variability observed in surface water ions and nutrients concentrations. In small rivers, forest clearing can increase cations, P and C inputs. P and light are the main PPL limiting factors in forested streams, while in pasture streams N becomes limiting. Pasture streams on Oxisols have very low P export, while on Ultisols P export is increased. Conversions of forest to pasture leads to extensive growth of in channel Paspalum resulting in higher DOC concentrations and respiration rates. In pasture areas the soil are compacted, there is less infiltration and higher surface run off, leaching soil superficial layers and caring more DOC to the streams. Mineralogy and soil properties are key factors determining exports of nutrients to streams. Therefore, land use change effects on nutrient export from terrestrial to aquatic ecosystems and the atmosphere must be understood within the context of varying soil properties across the Amazon Basin.

917. PHYLOGEOGRAPHY OF THE ASIAN ELEPHANT (*Elephas maximus*) BASED ON NESTED CLADE ANALYSIS OF MITOCHONDRIAL DNA. VIDYA, T. N. C.; Sukumar, Raman; Fernando, Prithiviraj; Melnick, Don J. Center for Ecological Sciences, Indian Institute of Science, Bangalore 560 012, India, tncvidya@ces.iisc.ernet.in (TV, RS), Center for Environmental Research and Conservation, Columbia University, 1200 Amsterdam Avenue, New York, NY 10027, USA (PF, DJM), Department of Ecology, Evolution and Environmental Biology, Columbia University, 1200 Amsterdam Avenue, New York NY 10027, USA (DJM).

The Asian elephant (*Elephas maximus*) is among the increasing numbers of endangered species today, restricted to 41,400-52,300 individuals worldwide. Previous molecular genetic studies of the species have reported two divergent clades of mitochondrial haplotypes, whose coexistence and distribution seem to be central to understanding the species' evolutionary history. Here, we combine data from 365 Asian elephants from across its range and 169 previously published mitochondrial d-loop sequences into a phylogeographic analysis. Most pairs of populations show significant mitochondrial differentiation. It would seem that some populations that do not show differentiation have exchanged elephants through trade, but using a nested clade analysis (NCA), we find instead that the absence of differentiation probably arose from ancient patterns of colonization. Based on the inferences from the NCA, we suggest that the b clade probably originated in *E. hysudricus*, progenitor of *E. maximus*, while the a clade either arose due to lineage retention or from a hitherto undiscovered species of *Elephas*. We also suggest a contraction-expansion paradigm through the severe climatic oscillations of the Quaternary, during which Sri Lanka and the Sunda region appear to have served as Pleistocene refugia for the b clade and Myanmar possibly as a refugium for the a clade.

918. THE SPECIES INFORMATION SERVICE - PUBLISHING DATA FOR THE WORLD'S SPECIES. Vié, Jean-Christophe; OLIVIERI, SILVIO. IUCN The World Conservation Union, Rue Mauverney 28 CH-1196 Gland Switzerland; Conservation International, Conservation Knowledge Department, 1919 M St. NW #600, Washington DC 20036 USA (SO).

The IUCN Species Survival Commission comprises a volunteer membership of over 7000 conservation experts. The Species Information Service was conceived as a worldwide resource on species data managed by the SSC's specialist groups using a common data

model and information exchange standards. Over the past five years the SIS produced an online data entry module that is valid across several taxa. This data model is now being integrated with the database management system for the IUCN World Red List Database of Threatened Species. Support for SIS is provided by the scientific, conservation, government and business communities. The experience of SIS demonstrated the need to identify immediate applications and decision support tools that drive the justification for developing a common infrastructure to manage species information.

919. COMMUNITY MANAGEMENT OF PIRARUCU: A PARTICIPATIVE EXPERIENCE IN AMAZÔNIA. Vieira, Elisabeth, F.; Farias, Izeni P.; ESTUPIÑAN, GUILLERMO. Instituto de Ciências Biológicas, Departamento de Biologia, Universidade Federal do Amazonas, Av. Gen. Rodrigo Octávio Jordão Ramos, 3000, Campus Universitário, Bairro Coroado I, 69077-000, Manaus, AM, Brazil.

Important goals for successful management of pirarucu is to know whether traditional systems of management address the immediate needs of the riverine communities, and at the same time are sustainable. Our study integrates a series of research activities and participative work methods, focusing on better understanding of population dynamics, behavior, dispersal and fishery of pirarucu. These studies proceed through monitoring and evaluation of the actual and hypothesized state of exploitation socioeconomic and ambiental indicators. The principles of this evaluation are based on the dynamic alterations of traditional communities in response to growing socioeconomic needs, and on alterations of fishing levels correlated with local population density and with the presence of local consumer markets. The three studied regions are the Costa do Canabuoca in the municipality of Manacapuru, and sets of communities in the middle Juruá and the middle Purus River regions. The communities differ in their use of fisheries resources. Participation of the local users in the data collection and implementation of management methods facilitates the passing of this knowledge to the community, the strengthening of local community organization, which then in turn is better organized to control its natural resources, and for example implement aquiculture and harvest schemes

920. CONSERVATION OF SMALL MAMMALS FROM BRAZILIAN CERRADO: GENERA DISTRIBUTION AND COMMUNITY STRUCTURE IN THE DIFFERENT HABITATS. VIEIRA, EMERSON M.; Palma, Alexandre R. T. Laboratório de Ecologia de Mamíferos, Universidade do Vale do Rio dos Sinos, São Leopoldo, RS, 93022-000, Brazil, emersonmv@bios.unisinos.br (EMV). Departamento de Ecologia, Universidade de Brasília, Brasília, DF, Brazil; current address: Universidade Católica de Brasília, Brasília, DF, Brazil (ARTP).

We analyzed distribution patterns of rodents and marsupials and their association with distinct habitats of the Brazilian Cerrado. We used data gathered from published and unpublished sources. We included in the analysis (DCA) communities from 82 sites (17 areas), recording 28 genera. Differences between communities were not correlated with their geographic distance (p>0,4). Forests surrounding watercourses had higher a-diversity, whereas open areas had lower genera richness. Habitat type was the main factor determining community structure. These communities could be divided in three groups: 1) genera from savannic habitats (*Thalpomys*); 2) typically forest-dweller genera, including arboreal (*Rhipidomys*, *Micoureus*), semi-aquatic (*Nectomys*) and some cursorial ones (*Proechimys*); and 3) an intermediary group, with specialists in wet grasslands (*Oxymycterus*) and genera that also occur in other habitats (*Gracilinanus*, *Bolomys*). Relatively few genera were abundant in several areas and many restricted to a few sites. This pattern, and the high among-habitat b-diversity, reinforces the need for several protected areas in different regions for the adequate conservation of the mammalian diversity of Cerrado.

921. FRESHWATER ECOSYSTEM CONSERVATION: PERSPECTIVES FROM THE FLOODPLAIN. Viers, Joshua H.; Mount, Jeffrey F.; Moyle, Peter B.; Quinn, James F.; HOGLE, INGRID B. University of California - Davis, One Shields Ave., Davis, CA 95616, USA, ibhogle@ucdavis.edu.

California has embarked upon an ambitious plan to restore the San Francisco Bay-Delta ecosystem while improving the quality and reliability of its water supply through the CALFED Bay-Delta Authority. The CALFED-funded Cosumnes Research Group joins biologists from three institutions and the Nature Conservancy to examine floodplain dynamics in the Cosumnes watershed. Restoration activities at the Cosumnes River Preserve involve the intentional compromise of flood protection levees to restore the ecosystem benefits of hydrologic connectivity-the exchange of water, sediment, nutrients, food resources and organisms between the Cosumnes River and its surrounding landscape. Our studies of these restoration activities show an increase in primary and secondary production through changes in nutrient composition, subsequent increases in the abundance of native fishes through improved rearing habitat, and improved habitat utilization by a variety of birds and bats due to changes in the composition and structure of adjacent riparian forests. Ongoing studies focus on the role of regional groundwater on the timing and magnitude of river flow, including the impact of evapotranspiration by riparian vegetation, and local groundwater extraction. Study results show that the timing, duration, and magnitude of flood waters have a profound effect upon the dynamics of this freshwater ecosystem.

922. PASTURE DEGRADATION AND LONG-TERM SUSTAINABILITY OF BEEF CATTLE SYSTEMS IN THE BRAZILIAN CERRADO. VILELA, LOURIVAL; Martha Júnior, Geraldo B.; Barioni, Luis Gustavo; Barcellos, Alexandre O.; Andrade, Ronaldo P. Embrapa Cerrados, Planaltina, DF, 73.310-970, Brazil, lvilela@cpac.embrapa.br.

The Cerrado is the most important beef production region in Brazil with a pastoral land area of around 60 million ha. Recent surveys indicated that 50% to 60% of this area shows some degree of degradation. Pasture degradation is an evolutionary processes initiated by the loss of herbage quality and production, leading to a reduction of liveweight gain and/or calf crops. Consequently, the economic output of the system is jeopardized. In order to maintain the business' profitability, farmers usually recover degraded pastures or open new areas of Cerrado for establishing improved pastures. The conversion of the Cerrado into pastures contributes to the loss of biodiversity. Additionally, as pasture degradation advances, there is a loss of ground cover and soil organic matter. As a result, unfavorable changes in soil structure are observed and problems associated with soil compaction, reduced water infiltration rates and soil erosion are magnified. Finally, it has been emphasized that the intensification of grassland systems is a powerful mean of generating economic and labor benefits in an environmentally sound way. However, intensive grassland systems should also be sustainable, implying that there is a need to balance the often

conflicting goals of profitable production and environmental protection.

923. RED LIST OF PLANTS OF ARGENTINA: A PRELIMINARY SURVEY. Villamil, Carlos B.; DE VILLALOBOS, ANA E. GEPSAT (Grupo de Estudio para Suramérica Templada), UICN, Bahía Blanca, 8000, Argentina, avillalo@criba.edu.ar (CBV, AEV). Universidad Nacional del Sur Departamento de Biología, San Juan 670, Bahía Blanca, 8000, Argentina.

Red Date Lists are important tools for the development of priorities and policies of conservation. In order to be recognized as such they must be reliable and based on sound scientific infromation. The categories proposed by UICN (2000) have reached wide acceptation as an estimation of the degree of threat for any species although the criteria often cannot be applied when the number of taxa to be categorized is high or the available information is insufficient. In spite of this a Red List of the vascular plants of Argentina is being prepared as a temporary tool to meet the immediate needs of conservationists. A bibliographic search was made complemented with the direct consultation with experts (botanists, conservationists, decission makers). A tentative degree of threat is being assigned to each species endemic to Argentina and to species whose area of distribution extends into the bordering countries, on a subjective scale (0 = no risk; 5 = critically endangered). The preliminary list includes, until now, 360 species (4% pteridophytes, 3% gymnosperms, 58% dicots and 35% monocots), but a considerable amount of information on new taxa is being received and added at a good pace. The list is being organized as a data base and has been conceived only as a step to encourage the necessary research required for the formal categorization of the native plant species of the country. The launch of the list is estimated towards the end of 2005 as a data base of free access.

924. CORTISOL IS PRESENT IN THE BLOOD AND FECES OF MANATEES: VALIDATION OF A NON-INVASIVE METHOD TO ASSIST CONSERVATION EFFORTS. VILLANUEVA-GARCÍA, CLAUDIA; Valdéz, Ricardo A.; Romano, Marta C. División Académica de Ciencias Biológicas, Universidad Juárez Autónoma de Tabasco, Villahermosa, Tabasco, México, golemcv@yahoo.com.mx (CVG). Departamento de Fisiología, Biofísica y Neurociencias, Centro de Investigación y de Estudios Avanzados del IPN, Apartado Postal 14-740, 07000, México D.F., México, mromano@fisio.cinvestav.mx (MCR).

The West Indian manatee (*Trichechus manatus)* is an endangered species in many areas of Mexico and other countries. Populations are small and disperse due to the species low reproductiverate, and because of habitat alteration and excessive hunting. These disturbances may induce stress, and affect the welfare, health and reproduction of these mammals. Cortisol levels are closely related to stress situations, and therefore have been used as stress indicators. The existence of this hormone in the manatee had not been detected before. We investigated the presence of cortisol in the blood and feces of manatees located in four Mexican aquariums, and validated a technique that allows to measure cortisol excretion by a non-invasive method. We determined cortisol concentration by radioimmunoanalysis (RIA) in 160 fecal samples from 16 captive animals, and 4 plasma samples. Results show that cortisol can be measured in the plasma and feces of manatees. Serum cortisol levels averaged 333.04 ± 115.74 ng/ml (rank: 188.71-464.22 ng/ml) and fecal cortisol averaged 354.08 ± 321.33 pg/ml/gr (rank: 42.75-2008.62 pg/ml/gr). This non-invasive technique can be a valuable tool to evaluate the welfare of captive manatees and to help assess manatee population status to aid conservation efforts. Financed in part by IFAW.

925. PARTNERSHIPS FOR SUSTAINABILITY IN INDIGENOUS LANDS AND REGIONAL CHANGE: THE XINGU INDIGENOUS PARK AND THE INSTITUTO SOCIOAMBIENTAL. Villas-Boas, André; SANCHEZ, ROSELY; Junqueira, Paulo. Instituto Socioambiental, Av. Higienópolis 901, 01238-001, São Paulo, SP, Brasil. vboas@socioambiental.org (AVB, RS, PJ).

The Xingu Indigenous Park, 2.6 million ha., inhabited by about 4,700 people of 14 distinct indigenous peoples, is the only remaining large-scale example of the transitional forest of Northern Mato Grosso. Expansion of cattle ranching, and soybeans eliminated about 30% of the original vegetation cover in the headwaters of the Xingu River outside of the Park, and severely fragmented much of the rest. Over the last 15 years, the Instituto Socioambiental (ISA) has built partnerships with the Associação Terra Indígena do Xingu (Atix) (the Xingu peoples' indigenous association) and the communities of the Park to ensure the reserve's territorial and ecological integrity and create the basis for long term sustainability and increasing autonomy. Joint initiatives include monitoring and protection of boundaries, mapping of regional land use change, capacity building, and institutional strengthening of the association, as well as training health and education monitors. After mapping severe environmental degradation of the Xingu headwaters, ISA and Atix last year negotiated an unprecedented agreement with regional and national ranchers' organizations for the restoration of riparian forests in the headwaters. Long-term partnership and investment has resulted in a robust alliance, capable of instigating environmental protection at a regional scale.

926. CONSERVATION IN AGRO-INDUSTRIAL LANDSCAPES: THE CASE OF GRUPO AMAGGI IN MATO GROSSO. VILLELA, OCIMAR DE CAMARGO. Grupo Andre Maggi, Av. Presidente Medici 4269, Rondonopolis, Mato Grosso, CEP 78705-000, Brazil.

Grupo Amaggi, one of the world's largest producers of soybeans, has implemented an ambitious program of natural resource conservation on the soy farms that it owns and finances in the southeastern Amazon state of Mato Grosso. On five farms owned by Grupo Amaggi and 490 farms financed by our company through a loan from the International Finance Corporation, we require full compliance with the law and the adoption of "best practices". Compliance with environmental regulations includes the protection or restoration of riparian zone vegetation and of private forest reserves comprising 35 to 80% of each property's area (varying by biome). "Best practices" includes the use of only certified fertilizers and defensive agents, correct disposal of chemical packaging, reduced impact chemical application techniques, no till cultivation, and erosion terracing. Student interns conducted on-farm surveys to assess each farm's progress in fulfilling these requirements.

927. AMAZON DUNG BEETLE COMMUNITY VARIATION, SECONDARY SEED DISPERSAL, AND FOREST REGENERATION. VULINEC, KEVINA; Lima, Albertina Pimentel. Department of Agriculture and Natural Re-

sources, Delaware State University, Dover, Delaware USA (kvulinec@desu.edu); Instituto Nacional de Pesquisas da Amazônia, Departamento de Ecologia, Manaus, AM, Brasil (APL).

Dung beetles are often considered to have positive effects on seeds defecated by frugivores in tropical forests. In research that spanned several divergent locations and habitat types across the Amazon, we surveyed beetle communities through baited pitfall trap transects. We determined that dung beetle community structure varied substantially and resulted in dominance by different species at each locality. Large nocturnal tunnelers (*Dichotomius* spp.) dominated terra firme forest, medium-sized diurnal and nocturnal rollers (*Canthon fulgidus* and *C. aequinoctialis*) dominated varzea sites, and dry tropical forest fragments were dominated by one medium-sized tunneler (*Dichotomius lucasi*). Additionally, we measured seed burial and movement patterns at three locations. The pattern of bead movement and burial differed radically across locations, indicating that seeds may be both positively and negatively impacted by the activity of dung beetles. Forest disturbance generally has a detrimental effect on beetle communities, although secondary forest in most areas contains a high biomass of large nocturnal tunneling beetles that bury large seeds effectively. Because secondary forests often harbor as many frugivorous primates as primary forests, these habitats may become critical refugia for important suites of seed dispersers and deserve protection for their potential to regenerate to primary forest.

928. LAND MATRIX COMPOSITION AFFECTS DISTRIBUTION OF MANED WOLF, PUMA, AND JAGUAR IN A CERRADO ECOSYSTEM. VYNNE, CARLY; Silveira, Leandro; Groom, Martha; Wasser, Samuel K. Department of Biology, University of Washington, Box 351800, Seattle, WA, 98195, USA, cvynne@u.washington.edu (CV, MG, SW). Jaguar Conservation Fund, Caixa Postal 193, Mineiros, GO, 75830-000, Brazil (LS).

Species with large habitat requirements can rarely be supported in protected areas alone and the majority of mortality for large carnivores occurs outside of the reserves designed to provide them safe haven. We are examining how changes in the landscape matrix affect the viability of wide-ranging carnivores in and around Emas National Park, Brazil. Specially-trained scat detection dogs were used to locate feces of maned wolf, *Chrysocyon brachyurus*, puma, *Puma concolor*, and jaguar, *Panthera onca*. Three dog-handler teams sampled a 1200 km^2 area, consisting of natural habitat, pasture, and croplands, four times in 25 days. We collected 650 scat samples (1.9 samples/hr) and plotted their locations on land use maps. Samples are being used to identify individuals, their sex, reproductive status, and stress hormone levels. Maned wolf and puma were found inside and outside the national park, with both species making extensive use of forest fragments on private lands surrounded by croplands and pasture. Crop harvest cycle and amount of edge habitat predict occurrence of both puma and wolf. By contrast, jaguars were found only within the national park in close proximity to closed canopy forest.

929. INTEGRATING RESEARCH, EDUCATION AND OUTREACH: BUILDING PARTNERSHIPS BETWEEN UNIVERSITY SCIENTISTS, GOVERNMENT AND PRIVATE LAND MANAGEMENT AGENCIES. WAITS, LISETTE P.; Brunsfeld, Steve; Anderson, Cort. Center for Research on Invasive Species and Small Populations, Department of Fish and Wildlife (LPW, CA) and Department of Forest Resources (SB), University of Idaho, Moscow ID 83844-1136, USA. lwaits@uidaho.edu.

We recently established the Center for Research on Invasive Species and Small Populations (CRISSP) with the goal of using interdisciplinary scientific research to identify appropriate management actions for addressing the biological and economic challenges of invasive species and small and declining populations. CRISSP has assembled a team of 20 participating faculty from diverse disciplines in biological sciences, and social sciences and an advisory board of regional land managers. The mission of CRISSP is to integrate research, education and outreach efforts by being a nexus for the development of innovative research, graduate and undergraduate education and training programs, and collaboration with regional government and private land management efforts. This presentation will overview the organizational structure of our Center and current research, education and outreach efforts. We will describe newly developed collaborative efforts in invasive species management with The Nature Conservancy and the Idaho Governor's Council on Invasive Species. We will also discuss new partnerships for statewide wildlife conservation planning with Idaho Fish and Game and the Idaho Governor's Office for Species Conservation.

930. STATUS AND CONSERVATION OF ENDANGERED GANGETIC DOLPHIN (*Platanista gangetica*) IN BRAHMAPUTRA RIVER SYSTEM, INDIA. WAKID, ABDUL; Rahman, Imdadur; Baruah, Ani; Baruah, Binita; Biswas, Shyama P.; Gogoi, Pradip K.; Sharma, Jogendra N. Department of Life Sciences (AW, IR, AB, BB, SPB); Department of Chemistry (PKG); Department of Geology (NJS); Dibrugarh University, Dibrugarh, 786004, Assam, India, (AW) (wakid@rediffmail.com).

The Brahmaputra river system of India is one of the major habitats of the endangered Gangetic dolphin *Platanista gangetica* in the world. Two decades ago, the species was one of the commonly sighted megafauna in the river system. However, in the last two decades, the population has been rapidly declining from its entire habitat due to various pressures. As an attempt to initiate a long term conservation process for the species, extensive riverine surveys were conducted to identify the threatened microhabitats and the factors threatening the species in its entire habitat. River confluences were found as the most favourable microhabitats for the dolphins due to high fish assemblage. Among the threatening factors, bycatch was found as the most dangerous threat to the entire population. In order to ensure the long-term conservation of the species in the Brahmaputra river system, the following have been proposed: extensive awareness-raising campaigns among fishing communities, encouraging traditional fishing practices and prohibiting the use of gill nets and mosquito nets, and protecting important river confluences in collaboration with the local communities.

931. ECOLOGY AND CONSERVATION OF PANTANAL OTTERS, RIO NEGRO, PANTANAL, BRAZIL. WALDEMARIN, HELEN; Muanis, Manoel; Rico, Miguel. Projeto Ecolontras, Associação Ecológica Ecomarapendi, Rua Paissandu 362, Rio de Janeiro, RJ, Brazil, ecolontras@ecomarapendi.org.br.

Two otter species occur in Brazil, the Neotropical otter (*Lontra longicaudis*) and the giant otter (*Pteronura brasiliensis*) and in Pantanal both species occur sympatricaly. This study is being undertaken since March 2002 at Fazenda Rio Negro, with field trips approximately every two months. We are studying specially habitat use, diet and behavior of these otter species, using both, signs and sightings of the animals. As a general rule the river is more used by Neotropical otters while the oxbow lakes are more used by

giant otters. Neotropical otters are solitary animals, and more animals are been seen together (two or three) more frequently around October and November. Both species are diurnal animals in the area and there is not a visible separation between the areas that they use. It is very common see Neotropical otters using old giant otter dens and vice versa. Several times we saw both species using a same fishing area, but never in the same time. These are the first available data concerning a study of both otter species in the same area in Brazil and one of the first information about observation of Neotropical otters that is more crepuscular and shyer in other areas.

932. THE GRAZING ECOLOGY OF THE WHITE RHINO AND ITS HABITAT SIGNIFICANCE. WALDRAM, MATTHEW; Bond, William; Stock, Willie. Botany Department, University of Cape Town, Rondebosch, Cape Town, 7701, Cape Town, South Africa, matteoscottwaldram@yahoo.com.

Megaherbivores were common on all the worlds major landmasses until approxiamtely 20,000 years ago, but today are found only in Africa. The study of eco-systems with this component of the fauna intact can shed a new light on global conservation problems such as bush encroachment. The white rhino is a grazing megaherbivore common in Hluhluwe-iMfolozi game reserve. I present data from exclosure experiments, burning trials and other surveys which examine the effects of white rhino grazing on grass biomass and consequently on the feeding behavior of other grazing mammals and on grassland fire regimes at both ends of a rainfall gradient. Through their feeding behaviour white rhino can facilitate other species of grazers by influencing the distribution of grazing lawns. Alternatively they can compete with other grazers depending on the annual rainfall of an area. White rhino grazing can also limit the spread of grass fires. Grazing and fires interact in a complex manner to influence change between vegetation types particularly in areas with high rainfall. These results have an importance for the conservation of savannas and guilds of grazing mammals and also for the study of bush encroachment. They are also of importance in trophic ecology.

933. HIDDEN DEPTHS AND HIDDEN DANGERS: CONSERVATION OF SEAMOUNT ECOSYSTEMS. WALKER, NATHALIE; Johnston, Paul; Santillo, David. Greenpeace International, Ottho Heldgringstraat 5, 1066 AZ Amsterdam, The Netherlands, nathalie.walker@int.greenpeace.org (NW). Greenpeace Research Laboratories, University of Exeter, North Park Road, Exeter, EX4 4QE, UK (PJ, DS).

As coastal fish stocks decline worldwide, the commercial fishing industry is increasingly exploiting deep waters, threatening, in particular, diverse and little-studied deep seamount ecosystems. Seamounts are geological structures rising from the sea floor which contrast markedly with the surrounding flat or shallow-sloping sediments in terms of both physical and biological characteristics. Studies of seamounts have found extremely high levels of biodiversity and endemism, with deep sea species often slow-growing and showing low levels of fecundity. This makes them particularly sensitive to disturbance. Commercial fishing vessels harvest deep sea fish by bottom trawling, a practice which can destroy up to 95% of coral and other benthic macrofauna in heavily fished areas. Most bottom trawling is carried out by eleven industrialized countries and, though it comprises less than 1% of the global fishing fleet, its impact on marine biodiversity is disproportionately large. The practice is mainly carried out on the high seas and is largely unregulated. Even where regulation does exist, within EEZs, it has not been sufficient to prevent widespread ecosystem damage. In order to prevent deep seamounts ecosystems being destroyed before their biodiversity has even been properly studied, an international moratorium on bottom trawling over seamounts is urgently required.

934. BREEDING GRASSLAND BIRD USE OF RESTORED PRAIRIES IN THE LOESS HILLS, IOWA, USA. WALKER, TRACY A.; Miller, James R. Department of Natural Resource Ecology and Management, Iowa State University, 339 Science II, Ames, IA, 50011, USA (TAW, JRM), walker76@iastate.edu. Department of Landscape Architecture, Iowa State University, 146 College of Design, Ames, IA 50011, USA (JRM).

In the central US, land use change has resulted in the loss and fragmentation of grassland habitats. We examined the influence of different restoration practices (burning and grazing, both separately and in combination) on native plants and grassland birds within the Loess Hills at Broken Kettle Grasslands (BKG), the largest contiguous prairie in Iowa. We quantified bird response by using point count surveys in four management types in 2003-04. Vegetation characteristics varied significantly with treatment. Burned-only plots had more native plant species and a higher percentage of bare ground compared to other treatments, while grazed plots tended to have fewer shrubs. Bird response to habitat restoration varied with treatment and species life history traits. Obligate grassland species, such as the Grasshopper Sparrow, Dickcissel, and Western Meadowlark, were consistently less abundant in burned treatments. In contrast, edge species, such as the Lark Sparrow, were more abundant in these areas. These responses suggest that grassland dependent birds may be more sensitive to the amount of litter, presence of shrubs, and landscape composition, than to variation in vegetation composition. We recommend a restoration approach that includes both burning and grazing for sustaining populations of threatened grassland bird species with varying habitat preferences.

935. COLLABORATIVE RESEARCH AND TRAINING TO MEET SUSTAINABLE DEVELOPMENT CHALLENGES IN ACRE, BRAZIL. WALLACE, RICHARD H.; Schmink, Marianne; Kainer, Karen A.; Stone, Samantha S. Tropical Conservation and Development Program, Center for Latin American Studies, University of Florida, 319 Grinter Hall, Gainesville, FL 32611-5530, U.S.A, wallacer@ufl.edu (RHW, MS, KAK, SSS); School of Forest Resources and Conservation, University of Florida, 210 Newins-Ziegler Hall, Gainesville, FL 32611-0410, USA (KAK).

In the state of Acre, in the southeast Brazilian Amazon located along the borders of Peru and Bolivia, nearly 90% of rainforest remains standing. Relative geographic isolation, a unique economic history linked to rubber collection, the rich cultural traditions of indigenous peoples, rubber tappers and *riberinhos* with livelihoods based on extractive resource use, a strong social movement, and most recently, a state "forest government" committed to sustainable use of Acre's forests, have created a promising context for reconciling biodiversity conservation and sustainable development. But many challenges remain, including a growing cattle sector, encroaching soybean frontier, increasingly competitive extractive sector and regional road building. Research and capacity-building efforts to address these challenges include cross-scale analysis of policies, markets, and networks; institutions and landscape changes within different land rights systems; and the dynamics of diverse livelihood systems in local communities. In

collaboration with Brazilian partner organizations, University of Florida researchers are focusing on the interface between macro-level policies and markets, and community-level surveys that reveal the complex interplay of factors determining land use decisions by individual resource-users. The research seeks ways to strengthen local producers and communities to negotiate their policy and market interests with other actors.

936. THE ECOLOGY AND ECONOMICS OF HUMAN-WILDLIFE CONFLICT IN THE MARA-SERENGETI. WALPOLE, MATTHEW; Kisotu, Stephen; Sitati, Noah; Lengalen, Benson; Doinyo, Yannick; Leader-Williams, Nigel. Fauna & Flora International, Cambridge, UK, matt.walpole@fauna-flora.org (MW), Friends of Conservation, Nairobi, Kenya (SK), Durrell Institute of Conservation & Ecology, University of Kent, Canterbury, UK (NS, NL-W), Department of Wildlife Management, Moi University, Eldoret, Kenya (BL), Frankfurt Zoological Society, Seronera, Tanzania (YD).

Conservation of large mammals incurs disproportionate costs on local communities, but our efforts to mitigate or offset such costs are often hampered by a lack of rigorous evidence. This series of studies explored the ecological and economic characteristics of human-wildlife conflict around the Mara-Serengeti ecosystem in Kenya and Tanzania, using community-based monitoring, participatory appraisal and GIS. Over a dozen species of bird and mammal were involved in livestock predation or crop raiding. Conflict patterns varied geographically, seasonally and in relation to rainfall and the choice of prey or crop, between different predators and crop pests. Average annual losses to wildlife represented a relatively small proportion of household assets, and livestock losses to predators were outweighed by losses due to stock theft and disease. However, economic losses were unevenly distributed between households, and an increasing propensity to cultivate increased both the magnitude and inequitability of losses, as well as increasing the range of species in conflict with people. Current park outreach programs do not offset the value of losses to wildlife, but the appropriate deployment of current tourism revenues could do so. However, the results of these studies suggest technical solutions that could minimize losses without recourse to controversial compensation schemes.

937. CULTURAL EVOLUTION IN THE INTRODUCED HOUSE MOUSE: EVIDENCE FOR THE CULTURAL TRANSMISSION OF A UNIQUE PREDATORY BEHAVIOUR ON GOUGH ISLAND? WANLESS, ROSS M.; Angel, Andrea; Hilton, Geoff; Ryan, Peter G. Percy Fitz-Patrick Institute of African Ornithology, University of Cape Town, Private Bag, Rondebosch, 7701, South Africa, rwanless@botzoo.uct.ac.za (RMW, AA, PGR). Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, UK (GH).

Gough Island (South Atlantic) is one of only three UK Natural World Heritage Sites and is the breeding site of the only viable tristan albatross *Diomedea dabbenena* population. An alarming pattern of breeding failure was reported in 2001. In 2004 we recorded the introduced house mouse *Mus musculus* attacking and killing albatross chicks. Certain sub-colonies experienced extreme predation levels, with a mean island-wide breeding failure of 65.7% (range 92.5% - 22.2%). We compared ecological variables in two adjacent areas that had very different failure rates, but found no differences that could explain different attack rates. This lead us to hypothesise that predatory behaviour has spread through cultural transmission, and that this could explain the observed heterogeneity. This hypothesis is supported by observations during the filming of attacks, when only certain individual mice participated, while other mice in the vicinity foraged for invertebrates. This can be tested by continued monitoring, to see if predation rates in areas largely unaffected by predation as yet change over time. The evolution of this predatory ability in the house mice on Gough Island is apparently unique.

938. MANAGEMENT PLAN, CAPTURES, AND LOCAL COMMUNITY INVOLVEMENT OF VICUÑAS IN ARGENTINA. WAWRZYK, ANA; Vilá, Bibiana; Arzamendia, Yanina; Yacobaccio, Hugo; Lamas, Hugo; Borgnia, Mariela; Bonacic, Cristian; Laker, Jerry. Universidad Nacional de Luján, Buenos Aires, Argentina (AW, BV, MB) macs@mail.unlu.edu.ar. CONICET, Argentina (BV, HY, YA). Fundandes (YA, HL). Pontificia Universidad Católica, Chile (CB). Macaulay Land Use Research Institute, Scotland (JL).

Some vicuña (*Vicugna vicugna)* populations have recently been moved from CITES Appendix I to Appendix II, allowing limited exploitation. Management plans are particularly important to ensure that these populations are not over-exploited. The plan identifies the costs, benefits and risks of the management activity before it starts, giving importance to rights to access resources, cultural attitudes, historical background, ethnicity and environmental impacts. The objective of our group is to develop science-based management plans for the wild management of vicuña, implement participatory instruments enhancing the cooperation between scientists and local communities and designing techniques for capture and shearing that provides economic returns to livelihood, is sustainable for the vicuna population and has a low environmental impact. The ultimate aim is to balance income generation with ecological sustainability and equitable sharing of benefits. The traditional Andean "chaku" consists in a drive, capture, shearing and release of wild vicuñas that minimizes the short and long-term effects on individuals and populations. The first capture in Argentina occurred in November 2003 in which 102 vicuñas were captured, of which 70 were shorn, providing 16.5 kg of fiber. In the second capture (November 2004), 165 vicuñas were captured, 129 shorn and 27.4 kg of fiber collected.

939. THE THREATENED SPOT-BILLED PELICAN IN SRI LANKA: ENGAGING UNUSUAL PARTNERS IN A VOLUNTEER RUN PARTICIPATORY CONSERVATION PROJECT. WEERAKOON RANASINGHE, KANCHANA. 93/5 Eco Friendly Volunteers (ECO-V), Jambugasmulla Mawatha, NUgegoda, Sri Lanka. ecov@sltnet.lk.

The Spot-billed pelican (*Pelecanus philippensis*) is a globally threatened bird, categorised as vulnerable by IUCN. Sri Lanka is one of only three countries where it breeds successfully. Individuals live as long as 50 years making them vulnerable to hunting, and loss of wetlands is also a serious threat. Their survival is highly dependent on both the local communities as well as on security forces who are ever present in the war torn areas where some of the remaining habitat is found. Both these groups hunt the birds for meat. Eco Friendly Volunteers (ECO-V), has been conducting the first research on this species in Sri Lanka. Our approach is unusual as we engage stakeholders like Buddhist priests, hoteliers, school groups and the security forces to encourage direct participation in the conservation of this charismatic species. We are all volunteers and this volunteer mentality has encouraged participation. By creating awareness among local people, and forming pelican friendly youth teams in villages we have already mapped

the pelican's feeding, breeding and roosting habitats within six districts of the country including North East, an area recently ravaged by war. We emphasise the importance of engaging with all possible partners to ensure effective conservation.

940. THE AMAZON REGION PROTECTED AREAS (ARPA) PROGRAM: CHALLENGES AND STRATEGIES. WEIGAND JR., RONALDO. Ministério do Meio Ambiente, CRS 514, Bloco B, Loja 69, Asa Sul, Brasília, DF, Brazil, ronaldo.weigand@mma.gov.br.

The Amazon Region Protected Areas (ARPA) Program is one of the largest efforts to create protected areas of tropical forest in the the world's history. The Brazilian government is implementing the Program in Partnership with the World Bank/GEF, WWF, KfW, GTZ, Brazilian Biodiversity Fund and local government and non-government organizations. The first two years of ARPA have been used to structure the Program and make it operational. ARPA presents an institutional arrangement that offers both challenges and opportunities, because of its hybrid (government and non-government) nature. In the third year, ARPA has deepened its strategic focus, based on the choice of protected areas and evaluation of the PA system in order to increase its biodiversity representativeness, on enhanced participation of the stakeholders, and on decetralization and capacity building of the state institutions and their non-government partners. Several advisory groups contribute to enhance these strategies. With 80 million dollars to spend in the next three years, as ARPA becomes fully operational, the Brazilian government and its partners intend to change the history of conservation in the Amazon.

941. FLORA CONSERVATION AND ENVIRONMENTAL PLANNING IN THE CONTEXT OF URBAN EXPANSION: A STUDY CASE IN METROPOLITAN AREA OF BELO HORIZONTE, MINAS GERAIS, BRAZIL. WERNECK, MÁRCIO S.; Brina, Ana Elisa; Rezende, Saulo G.; Resende, Saulo R. O. Sete Soluções e Tecnologia Ambiental, Av. Getúlio Vargas 1420, 16º andar, Savassi 30112-021 Belo Horizonte MG Brazil (MSW, AEB, SGR, SROR), sete@setesta.com.br; Pós-graduação ECMVS - UFMG Belo Horizonte MG Brazil (MSW).

he real estate development, Vale dos Cristais, is located in a Protected Area (category V, IUCN), in a contact zone between Cerrado and Atlantic Rainforest. The region of this development is under high pressure due to urban expansion of the Metropolitan Area of Belo Horizonte. Flora surveys were conducted in order to subsidize the environmental zoning of Vale dos Cristais and a masterplan that considers biological conservation and sustainability concepts was created. These surveys were based on floristic and phytosociological studies (15 intercept lines of 20m for fields; 44 plots of 100 m 2 for forest). The results revealed richness in species: 430 species in 78 botanic families. Eight endangered species listed in the Minas Gerais Red Data Book were recorded. There was no significant variation in the species composition among the samples of each ecosystem. An ecological zoning concerning flora was made and areas were pointed out according to its biological importance and conservation degree. As flora premises for the masterplan development, the conservation of the existing pieces of forest and its surroundings (ca 30 meters) were established and so was the implementation of a private reserve in order to maintain a natural site with representative field and forest flora.

942. THE IMPACT OF CLIMATE CHANGE ON THE DISTRIBUTION, FUNCTION AND CONDITION OF ALPINE PEATLANDS ON THE BOGONG HIGH PLAINS, VICTORIA, AUSTRALIA. WHITE, ANDREA. Australia.

The alpine and subalpine peatlands of the Bogong High Plains represent a rare and restricted vegetation type. They also provide important ecosystem services, and are of critical importance to catchment health. It has been postulated that the peatlands have contracted by as much as 50% since European settlement, having been replaced by other vegetation types. The main threats to alpine areas in Victoria are grazing of cattle, recreational pressures and climate change. Of these threats climate change is the most serious. The impacts of climate change on the condition, function and distribution of peatlands on the Bogong High Plains have been explored using spatial and conceptual models and aerial photo interpretation, with the aid of a geographic information system. These methods have been used to predict distribution changes under a number of different climate change scenarios. With warmer temperatures and lower precipitation combining to produce drier conditions, increased fire frequency, along with continued pressure from the grazing of cattle, have emerged as the most serious threats to the perseverance of the peatlands of the Bogong High Plains.

943. SNOW LEOPARDS IN A SACRED HIMALAYAN LANDSCAPE: HABITAT MODELLING FOR CONSERVATION OF AN ELUSIVE SPECIES. WIKRAMANAYAKE, ERIC; Thapa, Gokarna Jung; McKnight, Meghan; Lama, Yeshi; Khaling, Sarala. Conservation Science Program, WWF US, 1250, 24th St. N.W., Washington D.C. 20037 USA, eric.wikramanayake@wwfus.org (EW). WWF Nepal Program, Baluwater, Katmandu, Nepal (GJT, YL, SK). Curriculum in Ecology, University of North Carolina, Chapel Hill 27516 NC, USA (MM).

The snow leopard, (*Uncia uncia*) is the top predator in the alpine habitats of the Himalayas. Its Endangered status, ecological role in alpine communities, extensive habitat requirements, and mystical qualities make it a focal species in landscape conservation planning. We modeled snow leopard habitat in the Sacred Himalayan Landscape, which extends from Nepal's Langtang National Park to Bhutan's Toorsa Wildlife Reserve, in the Eastern Himalayas. Previous research has indicated that snow leopards prefer terrain with steep, rocky alpine slopes, and avoid large forest tracts and human habitations. In ArcView, we used a Topographic Position Index to identify ridges and valleys from a 90m Digital Terrain Model of the eastern Himalayan region and developed a Ruggedness Index to classify topographic complexity of the ridges. We restricted our model to elevations between 4,000 m, which approximates the lower boundary of alpine habitat, and 6,000 m, which represents rock and ice habitat. The resulting habitat map was validated with point locations of snow leopard signs, and used as a base to develop the landscape conservation plan. This model has potential for application elsewhere in the snow leopard range to identify suitable habitat for conservation planning for this elusive carnivore.

944. EFFICIENT ERADICATION OF INVASIVE SPECIES IN A FLUCTUATING ENVIRONMENT: AN APPLICATION TO RABBITS ON MEDITERRANEAN ISLANDS. WILCOX, CHRIS; Baxter, Peter; Donlan, C. Josh; Keitt, Brad; Sabo, John L. The Ecology Centre, University of Queensland,

Brisbane, QLD, 4072, Australia, chris.wilcox@csiro.au (CW); School of Botany, University of Melbourne, Parkville, VIC 3010, Australia, pbaxter@unimelb.edu.au (PB); Island Conservation, Center for Ocean Health, University of California, Santa Cruz, CA 95060, USA, bkeitt@islandconservation.org (CJD); Department of Ecology and Evolutionary Biology, Cornell University Ithaca, New York 14853, USA, cjd34@cornell.edu (CJD, BK); School of Life Sciences, Arizona State University, Tempe AZ 85287-4701 John.L.Sabo@asu.edu (JLS).

Invasive species have major economic and ecological impacts, and are the second most important cause of biodiversity loss. Islands in particular are hard hit, owing to their isolation over evolutionary time and thus their susceptibility to competition and predation by introduced continental species. Empirical evidence of the severity of these impacts for a wide range of taxa is accumulating. As eradication efforts expand to larger island sizes and encompass more species, eradication efforts may prove more difficult and it may prove important to utilize natural fluctuations in pest abundance to assist in eradication. To examine this possibility for rabbits on Mediterranean islands off the coast of Central and North America we developed a model for rabbit population dynamics in a fluctuating environment. We focus on the question of how predictable does a future low reproduction year for a pest have to be, before delaying eradication becomes more efficient. In analyzing this question we compare pulse, press, and mixed eradication strategies, and suggest their relative efficiencies under differing amounts of climatic predictability.

945. FUTURE CLIMATE CHANGE - AN OVERLOOKED FACTOR IN BIODIVERSITY CONSERVATION PLANNING. WILLIS, STEPHEN G.; Collingham, Yvonne C.; Hilton, Geoff; Rahbek, Carsten; Huntley, Brian. Institute of Ecosystem Science, School of Biological & Biomedical Sciences, University of Durham, South Road, Durham, DH13LE, UK (SGW, YCC, BH). Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, UK (GH). Vertebrate Dept, Zoological Museum, Universitetsparken 15, DK-2100 Copenhagen Ø, Denmark (CR).

Policies for biodiversity conservation are currently based largely around networks of nature reserves, managed to protect biodiversity. Designation of such reserves is based entirely upon current patterns of biodiversity and takes no account of the fact that, over time, species ranges shift. Such shifts are driven primarily by climate change. Given past shifts in species ranges and predicted future changes in the global climate, it is essential that the effects of future climate change are incorporated into conservation planning to safeguard biodiversity in the long-term. Shifting species ranges could affect the management of extant reserves and enforce the acquisition of new reserves to continue protecting species whose ranges no longer span such reserves. In areas where extensive movement of many species are predicted, a wholesale shift in fundamental conservation policy may be necessary, with a switch from maintaining discrete reserves to making the intermediate habitat matrix more permeable to range shifts. Here we use species-climate envelope modelling to demonstrate the potential effects of climate change on the future viability of a reserve network, using the example of BirdLife International's Important Bird Areas network across sub-Saharan Africa.

946. PRIORITISING THE ALLOCATION OF CONSERVATION RESOURCES BETWEEN BIODIVERSITY HOTSPOTS. WILSON, KERRIE; McBride, Marissa; Possingham, Hugh; Bode, Michael. The Ecology Centre, The University of Queensland, Brisbane, Queensland, 4072, Australia, k.wilson2@uq.edu.au.

For effective conservation of biodiversity it is essential to identify priorities for conservation. In order to maximise the conservation of biodiversity within these regions, the investment of resources must be prioritised within and between them. This requires the consideration of a number of factors including relative biological value, the urgency for the protection of these values and the relative cost of investment. Given the dynamic and uncertain nature of landscapes and property availability, a decision theory approach is required. We use stochastic dynamic programming (SDP) to determine whether or not a particular area of land should be acquired at a particular time, given the current state of the area. We also compare the results of the SDP with two commonly used rules of thumb: minimise number of species lost and maximise number of species conserved. For three hotspots, data on number of endemic species, deforestation rates and relative costs of land acquisition were obtained. The results illustrate that the allocation of conservation resources can be prioritised to provide the best outcomes for biodiversity conservation in the most cost effective manner and that simple rules of thumb can be used to approximate the optimal allocation of resources.

947. THE NAPOLEON WRASSE PROMOTES HEALTHY CORAL REEF AND MARINE CONSERVATION TO THE COMMUNITY AT THE TOGEAN ISLANDS, CENTRAL SULAWESI, INDONESIA. WIRAWAN, NI PUTU SARILANI. Jl. Bukit No 2A RT/RW 03/07, Ds. Pasirgunung Selatan - Kelapa Dua, Cimanggis 16951, Indonesia, sarilani@indo.net.id.

Destructive fishing activities was the major threat toward the sustainability of natural resources in the Togean Island of Central Sulawesi - Indonesia. Through the PRIDE Campaign, communities were motivated to support conservation concepts in terms of enhancing the ability of communities to manage natural resources. Social marketing technique and stakeholder participatory approach were used. A key stone species: *Cheilinus undulatus* (Napoleon wrasse) was used to focus on the importance of healthy coral reef and emphasized long term benefits to livelihood sustainability. Integrated and comprehensive outreach program were designed and implemented based on the preliminary assessment and differences in target group characteristic. As a result, the campaign had been successful in raising awareness toward marine conservation issues. As the campaign were developed and implemented in a community participation process, it led to the development of a village regulation to protect coral reef areas. 3 years after the campaign ended, this village established the area as a Community Based Marine Protected area, followed by another village that protect the mangrove ecosystem. These two villages serves as the embryo to the declaration of the Togean Islands as a Marine National Park.

948. CONSERVING AFRICA'S SUCCULENT EUPHORBIAS. WITKOWSKI, E. T. F. Restoration and Conservation Biology Research Group, School of Animal, Plant and Environmental Sciences, University of the Witwatersrand, PO Wits 2050, Johannesburg, South Africa. (ed@gecko.biol.wits.ac.za). Tel:: +27 11 717 6428, Fax 403 1429.

Many succulent Euphorbias (Euphorbiaceae) are listed as threatened in southern African country Red Lists. Euphorbias are popular with horticultural collectors, but typically don't feature on medicinal plant lists, although they have various uses. Threats

include fungal diseases, plant collectors, habitat loss and fragmentation. Succulent Euphorbias are often prevalent in more arid tropical climes, often on rocky hill-slopes, where human land pressure is typically less intense. We have a poor understanding of the effects of fire on this group in moister regions. Climate change is likely to have profound impacts on Euphorbias due to generally poor dispersal abilities, and hence response to climate change may depend largely on *in-situ* tolerance. Furthermore bush-encroachment (woody plant densification) may inhibit establishment of Euphorbias due to increased shading. Herbivory by mammalian herbivores is usually not a feature, but becomes prevalent during droughts. Plants are often damaged by cattle, and the impacts of goats can be locally severe. Increased precipitation may also increase disease prevalence. Case studies of South African species, *E. perangusta*, *E. clivicola*, and *E. barnardii*, suggest that threats and regeneration requirements are highly species and site-specific, so familial generalizations helpful for conserving a wider range of species are probably illusive.

949. TO BURN OR NOT TO BURN: WHAT IS THE QUESTION? WOOLF, JENNIFER C.; Whiteley, Andrew R.; Brewer, Carol A. College of Forestry and Conservation, University of Montana, Missoula, MT, 59812 USA jennifer.woolf@umontana.edu (JW). Division of Biological Sciences, University of Montana, Missoula, MT, 59812 USA (AW, CB).

The ECOS Program is a partnership between the University of Montana's Division of Biological Sciences and College of Forestry and Conservation and Missoula County Schools Curriculum Consortium. The goal of ECOS is to contribute to an adaptable model of how locally based ecological research can be introduced to improve the teaching and learning of science in K-12 environments. A primary objective of ECOS is to develop science demonstration projects related to local ecology and conservation biology. As a demonstration project at a local high school, we conducted an experimental prescribed burn in a field dominated by invasive weeds. The project focused on two primary ecological themes: disturbance and invasive organisms, both of which are extremely relevant locally because residents often burn fields to reduce invasive weeds. This project successfully taught students about the scientific process and about ecology as science by having them develop and participate in a field experiment. We also designed and implemented other outdoor exercises throughout the school year to ensure the students fully participated in the experiment, including lessons on sampling, population biology and data collection. This demonstration project can be used as an international model for teaching science through hands-on schoolyard ecology.

950. SPATIAL SOLUTIONS FOR COMPETING LAND USE IN THE LIAOHE RIVER DELTA WETLANDS, CHINA. XIAOWEN, LI. Institute of Geographic Sciences and Nature Resources Research, Chinese Academy of Science (CAS), Datun Road, Chaoyang District, Beijing, P.R. China, lixw@igsnrr.ac.cn.

The Liaohe River Delta wetlands has over 80,000 hectares of the world's most important and unique natural wetlands, supporting an wide range of important biological diversity, the economic values and social benefits of wetlands are also enormous in Liaohe Delta. In the past decades, this unique wetland has suffered from increasingly human activities, a lot of reed marsh and intertidal area had been encroached by agricultural & oil development and rapid urbanization. As a consequence, the competing land use between wetland conservation vs. economic benefits has been intensified and confronted as the bottleneck for the regional sustainable development. Aiming at compromising the conflicts between the regional development and nature conservation, three land use scenarios were elaborated, i. e. wetland mitigation (scenario A), habitat management (scenario B) and agricultural development (Scenario C). By using LEDESS expert model (Landscape Ecological Decision & Evaluation Support System), the ecological consequences on habitats of two indicator species (i. e. Red-crowned crane and Saunders gull) were evaluated, along with the effects on ecological economic efficiency. The results indicate that, by employing wise land use planning and associated spatial strategies & habitat management types, there exist the possibility involving "spatial solution" to mitigate the competing land use between ecological conservation and economic development, and to maintain the "no-net-loss" of wetland habitats in the Liaohe River Delta.

951. OPTIMAL CONSERVATION STRATEGY IN FLUCTUATING ENVIRONMENTS: PROTECTION OF ENDEMIC AND EXTERMINATION OF ALIEN SPECIES. YOKOMIZO, HIROYUKI; Haccou, Patsy; Iwasa, Yoh. Department of Biology, Kyushu University, Fukuoka 812-8581, Japan, yokomizo@bio-math10.biology.kyushu-u.ac.jp (HY). Institute of Biology, Leiden University, PO Box 9516, 2300 RA Leiden, The Netherlands (PH). Department of Biology, Faculty of Sciences, Kyushu University, Fukuoka 812-8581, Japan (YI).

We consider optimal conservation strategies for a population whose viability is jeopardized by an alien species (such as e. g. a predator) as well as a random environmental factor (e. g. humidity). We assume that the survivorship of the endangered population can be improved by a conservation effort plus an extermination effort that decreases the population size of an alien species. Both efforts decrease the extinction probability of the endangered population, but they are accompanied by economic costs. The optimal conservation strategy minimizes the weighted sum of the extinction probability and the economic costs. In this way we devise practical guidelines for conservation. We derived conditions for the optimal conservation and/or extermination effort to be positive and obtained optimal effort levels. It turns out that, when conservation as well as extermination should be used, the optimal extermination effort level does not depend on the population size of the endemic species.

952. INDIGENOUS POPULATIONS, CONSERVATION POLICIES, AND BUSHMEAT HUNTING IN MANU NATIONAL PARK, PERU. YU, DOUGLAS W.; Shepard Jr., Glenn; Ohl, Julia; Peres, Carlos A.; Levi, Taal. Centre for Ecology, Evolution, and Conservation Biology (CEEC), University of East Anglia, Norwich, Norfolk, NR4 7TJ, UK, douglas.yu@uea.ac.uk.

The presence of native people in nature reserves has spawned debate between those who view indigenous people as conservationists and those who see them as a threat to biodiversity conservation. We examine the people/parks polemic from the perspective of a particularly celebrated case: Manu National Park, in Peru, and present preliminary results from a recently initiated study of indigenous hunting. Manu Park suffers from a fundamental contradiction: the core area, considered closed to human interference, is home to a substantial indigenous population. However, for now, Manu's large size dwarfs its human inhabitants, likely allowing source-sink dynamics to replenish game populations. In fact, vulnerable game species are still found within a day's walk of indige-

nous Matsigenka settlements. In this light, the parks versus people debate boils down to a single question, "How long can Manu remain big?" We are addressing this question through an interdisciplinary research project that seeks to (1) estimate the degree to which hunting is sustainable in the present, (2) scale-up catchment areas based on different scenarios of population growth and cultural change, and (3) develop, in collaboration with the major stakeholders, a management plan that is also politically and socially sustainable.

953. EVALUATION ON THE CONSERVATION STATUS OF THE CHINESE GROUSE (*Bonasa sewerzowi*) IN CHINA. YUE-HUA, SUN; Fang, Yun; Siegfried, Klaus. Institute of Zoology, Chinese Academy of Sciences, Beijing 100080, China (YHS, YF), sunyh@ioz.ac.cn. Thüringer Landesanstalt für Umwelt und Geologie, Prüssingstrasse 25, 07749 Jena, Germany (SEK).

The Chinese Grouse (*Bonasa sewerzowi*) is an endemic bird in China; it is listed as an endangered species and highest-rank of nationally protected animals. Population ecological work at the Lianhuashan Natural Reserve in Gansu from 1995-2004 showed that the density of Chinese Grouse was around 17.2 birds/ km^2 with no significant trend in size. Local people found an estimated 10-29% of the nests, from which they took the eggs for food. Satellite image analysis showed that this population suffered much of habitat fragmentation and isolation; genetic variation analysis came to the same conclusion. By analyzing the distribution of the conifer forest along the Qinghai-Tibet Plateau, we found the Chinese Grouse is restricted to coniferous-dominated habitats between 2400 and 4300 m in elevation, and the size of its distribution range was estimated as 23,700 km^2. We suggest that the Chinese Grouse could stand for some extent of habitat destruction or loss, and it is not endangered at present. We recommend stopping the taking of eggs, protecting the remaining uncut coniferous forest and constructing an effective reserve system, which will not only benefit the Chinese Grouse, but also other endemic birds in the mountain conifer forest of western China.

954. ADAPTIVE MANAGEMENT OF BIOLOGICAL INVASIONS: A TOOL FOR REDUCING UNCERTAINTY AND IMPROVING DIAGNOSIS AND EFFECTIVENESS OF CONTROL. ZALBA, SERGIO M. GEKKO - Grupo de Estudios en Conservación y Manejo, Departamento de Biología, Bioquímica y Farmacia, Universidad Nacional del Sur, San Juan 670 (8000) Bahía Blanca, Argentina, szalba@criba.edu.ar.

Management of invasive species requires rapid intervention, usually with scarce baseline information. Adaptive management permits organize control actions as an experiment, allowing to test their efficiency and to assess the precision of the diagnosis that motivated them. Since 1999 we are developing a program for controlling invasive woody plants, mainly pines, in Argentinean Pampas. Objectives are set in terms of restoring affected grassland. Priorities for control were established considering conservatio n value and control feasibility in different areas. More of 10000 trees have been cut in a reserve of 6700 ha. For each tree felled we registered its position, age and reproductive status. From this data we know that trees start producing seeds at seven years old, what helped us to establish the frequency of control activities. We studied seed releasing from felled trees (concentrated in summer, independently of the time of felling), germination potential (greater for trees felled immediately before summer) and survival in the soil (not exceeding a year). This information guided the distribution of control actions along the year. We also studied the relationship between pines recruitment and fire. Fire appears as an efficient management tool providing that it occurs at intervals of less than seven years.

955. BIOLOGICAL INVASIONS IN LAST RELICTS OF PAMPAS GRASSLANDS (ARGENTINA): IMPACT AND MANAGEMENT. Zalba, Sergio M.; Cuevas, Yannina A.; de Villalobos, Ana E.; SANHUEZA, CRISTINA C.; Dispigno, Leandro A.; Zucchino, Enrique E.; Loydi, Alejandro. GEKKO -Grupo de Estudios en Conservación y Manejo-, Universidad Nacional del Sur, Bahía Blanca 8000, Argentina, sanhueza@criba.edu.ar (SMZ, YAC, AEV, CCS, LAD, EEZ, AL) Departamento de Biología, San Juan 670, Bahía Blanca, 8000, Argentina.

Ernesto Tornquist Provincial Park (Buenos Aires, Argentina) is one of the last relicts of Pampas grasslands. Invasion by exotic species, especially feral horses, pines (*Pinus* spp.) and Spanish broom (*Spartium junceum*), stands out as one of its main conservation challenges. In 1994 we started research and management activities directed to reduce their impact. We found that pines and broom invasions result in significant reductions in the diversity of native plants and in changes in bird and terrestrial invertebrates communities. Feral horses in turn are responsible for increasing the abundance of woody plants and the proportion of bare soil. In all this cases we observed that these species facilitate the establishment of other aliens. Fire promotes the releasing of seeds from pines cones and their establishment and also produce the depletion of brooms seed banks. Mechanical control (cutting with chain-saws) is highly effective for pines. Spanish brooms showed 50% mortality when treated with fire and with a combination of cutting and herbicides, with significant differences depending on plant size. Lack of public appreciation about the value of native grasslands appears as the critical issue for managing these invasions and we started an education strategy directed to the local community.

956. ASSESSING THE VALUE OF ANIMAL GENETIC RESOURCES AS JUSTIFICATION FOR CONSERVATION INITIATIVES - THE CASE OF THE BORANA CATTLE IN EAST AFRICA. ZANDER, KERSTIN; Holm-Müller, Karin; Mburu, John; Drucker, Adam. Center for Development Research (ZEF), Walter-Flex-Str. 3, 53113 Bonn, Germany, kzander@uni-bonn.de.

The Borana cattle have their origin in Southern Ethiopia where they are guarded by pastoralists because of their unique traits making them suitable for the harsh environment in the lowlands. Borana cattle are also the main source of the livestock-keepers' income and the local people's cultural identity is based on the husbandry of these animals. Nevertheless, the existence of this breed is threatened due to genetic erosion and dwindling number of pure Borana animals as well as increasing crossbreeding among different breeds. Driving factors for this depletion are population pressure, ecological changes and natural catastrophes. The preservation of these animal genetic resources is crucial for future use, for preserving the irreversible loss of the Borana genes and enhancement of global biodiversity, but financial aid for conservation is scarce. This study seeks to quantify the total value of the Borana cattle as an indicator of its potential for deserving conservation priority. A discrete-choice ranking approach is used to estimate the livestock-keepers' willingness to pay and the relative preferences for different attributes of Borana cattle. Furthermore, a random parameter logit model is applied, revealing heterogeneity among livestock-keepers' utilities for different cattle breeds,

showing which group of livestock-keepers could be targeted in conservation initiatives.

957. CAPTIVE CONSERVATION PROGRAM FOR BRAZILIAN DWARF RED BROCKET DEER (*Mazama nana*): GENETIC BASIS OF THE INITIAL STOCK. ZANETTI, EVELINE S.; Capalbo, Christina R.; Abril, Vanessa V.; Duarte, José M. B. Departamento de Genética e Melhoramento Animal, Faculdade de Ciências Agrárias e Veterinária, Universidade Estadual Paulista, Jaboticabal, SP, 14884-900, Brazil, eveline_zanetti@yahoo.com.br (ESZ).

In 2003, *Mazama nana* was added to the extinction threatened species list of IBAMA, while in the IUCN Red List it was added as Deficient Data due to insufficient knowledge about wild and captive populations. In Brazil, there is few captive animals and the elaboration of a Stud Book is an important step to facilitate its ex situ management. We preliminarily analyze genetic parameters of the captive population, kept at 5 Brazilian institutions. The current captive population is constituted by 33 animals (19 M and 14 F) coming from 19 founders, 15 of which are alive (11 M and 4 F). The founders' contribution varied between 1,51 and 9,85%, with an average of 5,26%. These results show that the genetic basis of the population is well distributed. The population inbreeding coefficient, calculated through the Sparks 1.4, was 0,026. Although the inbreeding is not a worrying factor for the species conservation, the fact of the population to be small and badly distributed between 5 institutions (66.7% of the animals in 2 of them) indicates the necessity of genetics management, preventing the loss of genetic variability and fitness.

958. NARROWING THE AQUATIC NEURAL NET. ZARADIC, PATRICIA; Jackson, John. Stroud Water Research Center, 970 Spencer Road, Avondale, PA 19311, pzaradic@sas.upenn.edu (PZ), jjackson@stroudcenter.org (JJ).

Aquatic insects are key indicators of stream health for watershed monitoring. However, identifying aquatic insects to species can be a labor intensive and costly process. Moreover, the resulting data can be difficult to analyze due to the number of taxa and even more difficult to uncover underlying causal mechanisms. This study applies a new type of sensitivity analysis to an artificial neural net (ANN) model of 60 monitoring stations within the over 5000 km^2 larger New York City drinking water drainage. The ANN models the relationship between aquatic insect community data and watershed agriculture, impervious surface and forested area. The results of the sensitivity analysis identify key species (among the over 500 taxa) that can act as indicators for specific watershed impacts with the potential to better direct management practices and focus research on underlying mechanistic processes. Both the modeling strategy and the sensitivity analysis for identifying key indicator species can be applied to address a variety of watershed conservation management needs.

959. JAGUAR CONSERVATION IN SOUTHERN MÉXICO: MODELING ITS HABITAT USE IN A HUMAN-DOMINATED LANDSCAPE. ZARZA, HELIOT; Chavez, Cuauhtémoc; Colchero, Fernando; Ceballos, Gerardo; Pimm, Stuart. Instituto de Ecología, Universidad Nacional Autónoma de México, México, D.F. 04510 México, hzarza@miranda.ecologia.unam.mx (HZ, CC, GC). The Nicholas School of the Environment and Earth Sciences, Duke University, NC, USA (FC, SP).

Jaguar populations have been steadily declining due to habitat deterioration and hunting. Jaguars long-term conservation will depend on determining their spatial habitat requirements and use in human dominated landscapes, because those will likely be the conditions where a large number of individuals will survive. In Mexico, the largest jaguar population is found in the Calakmul region, in the south of the Yucatan Peninsula, where although habitat is still plentiful, agriculture and logging are becoming major factors in habitat loss and fragmentation. The goal of this study was to determine the jaguars' habitat requirements in that region. Our work was based on data gathered from GPS-collared jaguars and a Geographic Information System. To determine the effect of human impacts on the patterns of habitat use, we analyzed jaguar movements in relation to habitat type, land use, settlements, and roads. Jaguars preferred evergreen forests, which are the most heavily used for forestry practices in the region. Jaguars tended to use less frequently forest found as far as 6.5 kilometers from settlements and 4.5 kilometers from roads. We develop a model of potential habitat of jaguar for the region and to identify high-priority areas for its long-term conservation in the Mayan Forest.

960. HATCHLINGS BODY CONDITION AND TEMPERATURE VARIATIONS IN GREEN TURTLES (*Chelonia mydas*) NESTS IN VERACRUZ, MÉXICO. ZAVALETA-LIZÁRRAGA, LEONEL; Hernández-Castro, Cristina; Morales-Mávil, Jorge E. Instituto de Neuroetología. Universidad Veracruzana. Av. Dos Vistas km. 3.5 Carretera Xalapa-Veracruz, C.P. 91190. Xalapa, Veracruz, México.

Five of the eight species of marine turtles distributed in world oceans arrive at the coasts of Veracruz. At present, marine turtle populations have been reduced due to overfishing, illegal trade, nest sacking, and the killing of nesting females. Unfortunately, there is a lack of knowledge about the biology and ecology of the nesting populations that arrive at Veracruz, as well as whether the conservation and protection centers management are adequate. Our aim was to determinee the matutinal, diurnal and nocturnal temperature variations in green turtle (*Chelonia mydas*) nests, and detecting differences of body size in natural and artificial hatchlings during the 2004 season. Ten nests from each natural and artificial condition were measured from June to September. No significant differences ($P>0.05$) between matutinal, diurnal and nocturnal temperatures were found. Nevertheless, statistical differences in weight, snout-cloacal length, plastron length and plastron width were found ($P<0.05$). This suggests that the differences between natural and artificial conditions have a direct influence in the hatchlings development.

961. BAIJI AND YANGTZE FINLESS PORPOISE: THEIR POPULATION STATUS, RESEARCH AND CONSERVATION IN CHINA. ZHANG, XIANFENG; Wang, Ding. Institute of Hydrobiology, Chinese Academy of Sciences, # 7 Donghu South Road, Wuhan 430072, China, zhangx@ihb.ac.cn.

The baiji or Yangtze River dolphin (*Lipotes vexillifer*), which inhabits only in the middle and lower reaches of the Yangtze River in China, is the world's most endangered cetacean species. The baiji faces human impacts, such as over fishing, accidental killing, ensnarement in rolling hook fishing gear, electrocution from electrical fishing methods, collisions with motorized vessels, habitat loss and disturbance resulted from the construction of water development projects, and water pollution. Except for the baiji, there is another small cetacean that shares the Yangtze River, which is the Yangtze finless porpoise (*Neophocaena phocaenoides asiaeorien-*

talis). The porpoise suffers from many of the same impacts that affect the baiji in the Yangtze River. Here, research and conservation history will be reviewed. A success rearing case of baiji will be introduced. Population dynamics of these two cetaceans will be analyzed. Finally, conservation strategies, including ongoing measures, international co-operations and future action plans, will be presented.

962. CONSERVATION ALLIANCES WITH AMERINDIAN PEOPLES OF THE AMAZON. ZIMMERMAN, BARBARA. Conservation International, 1919 M Street NW, Washington DC, 20036, USA, b.zimmerman@conservation.org.

Ongoing alliances between indigenous peoples and conservation organizations in the Brazilian Amazon have helped achieve the official recognition of ~1 million km² of indigenous lands. The future of Amazonian indigenous reserves is of strategic importance for the fate of biodiversity in the region. The Kayapo people's consolidation and protection of their > 100,000 km² territory provides an instructive example. Like many Amazonian indigenous peoples the Kayapo have halted the expansion of the agricultural frontier on their lands, but also allowed selective logging and goldmining. Prospects for long-term conservation and sustainability on these lands will depend both on indigenous peoples' understandings of their resource base, and on available economic alternatives. While neither tenure security nor indigenous knowledge guarantee forest conservation, Amerindian societies' egalitarian common-property resource management regimes, with adequate incentives and long-term partnerships with conservation organizations can achieve this result.

963. STRATEGY FOR THE CONSERVATION OF BATS IN ROMANIA. ZOLTÁN, L. NAGY. Transylvanian Museum Association, 4 00750 Cluj-Napoca, Op. 1, Cp. 191, Romania (bigze@rmdsz.ro).

The 30 recorded bat species (2 families), out of the 45 European bats form about 30% of the Romanian mammal fauna. With a various landscape including the Carpathian Mountains, the Danube Delta - Romania provides many suitable habitats for important bat population. The large karstic areas with more than 12.000 natural caves, host a large diversity of bats in big number. All the 14 EU Habitats and Species Directive Annex II species, 2 Bern Species Action Plan species, 8 vulnerable A2c species according to IUCN are present in the Romanian bat fauna. The strategy was set up in 2003 as a result of different workshops series, with a common agreement of all involved persons representing NGO's, research institutions, and governmental departments. The legislative framework of bat conservation should be assured by a set of international agreements and national obligations. The aim is to provide for the sustainable conservation of the biodiversity and populations of bats and their habitats in Romania. The strategy identifies problems and defines actions.

964. BIRDS AS A CONSERVATION TOOL FOR BIOLOGICAL CORRIDOR MONITORING IN THE ATLANTIC FOREST ECOREGION: A STUDY CASE IN MISIONES, ARGENTINA. ZURITA, GUSTAVO A.; Varela, Diego M.; Rey, Nicolás R.; Arienti, Cecilia M. Conservación Argentina, CEBBAD Universidad Maimónides, Hidalgo 775 6º piso, Buenos Aires, Argentina, gazurita@arnet.com.ar (GAZ, DMV, NRR, CMA). Laboratorio de Ecología de Comunidades y Macroecología, Universidad de Buenos Aires, Argentina (GAZ).

Biological corridors are one of the best strategies for Atlantic forest conservation, whereas in most cases its effectiveness is unknown. Since 2002 we implemented a conservation project in a corridor between two protected area separated by 3 kilometers in Misiones (Argentina), in one of the majors remnants of Atlantic forest ecoregion. Bird use of the corridor is monitored through a long term banding program. We established 10 permanent sampling sites inside the corridor with 10 mist nets on each one. At the moment we captured 72 species (4500 hours/net). The 76% of the captured species (58) presents in protected areas use the corridor whereas *Campyloramphus falcularius, Dendrocolaptes fuliginosa, Haplozpiza unicolor* and two *Phylidor* were restricted to protected areas. Richness and diversity decreased from protected areas to the center of the corridor. Banded individuals of *Trichotraupis melanops*, *Habia rubica, Leptopogon amaurocephalus* and *Lepidocolaptes fuscus* move more than 1 km through the corridor. This monitoring program provide the information to identify important routes to birds movements between protected areas and to select key areas for forest restoration and protection inside the corridor. The connectivity between protected areas is not fully efficient because at least 25% of the species don't use the corridor.

965. EFFECTS OF EXPLOITATION ON POPULATION STRUCTURE OF IRONWOOD (*Olneya tesota*) IN THE SONORAN DESERT, MÉXICO. ZUÑIGA, BERTHA; Suzan-Azpiri, Humberto. Escuela de Biología, Universidad Autónoma de Querétaro, Cerro de las Campanas s/n. Querétaro, Qro. C.P. 76010, México, berzut@hotmail.com.

Among the most ecologically and economically important species in the Sonoran Desert is the endemic tree known as ironwood, *Olneya tesota*. Its function as a nurse plant and habitat-modifying keystone species has been widely documented. Human activities in the past 30 years have affected ironwood populations by tree and branch removal for charcoal and carvings production. Our study area was Baja California Peninsula and continental Sonora, Mexico, both with different histories of ironwood use and extraction. We described the structure of ironwood populations to estimate ironwood harvest and determine damaged basal area, and percentages of damaged individuals per site. We found high damage levels in all continental sites, with similar basal area and percentages of damaged individuals. All sites exhibited low densities of juveniles (individual basal area <20 cm^2). Damaged individuals were restricted to intermediate and larger classes. Peninsular sites exhibited contrasting characteristics, the distribution of size classes was dominated by high juvenile frequency. Baja California's damaged basal area and percentages of damaged individuals were significantly smaller than continental sites. In addition to overexploitation a possible disruption of juvenile recruitment in continental sites are threatening ironwood survival and possibly the stability of Sonoran Desert communities.

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