

Species

Newsletter of the Species Survival Commission

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Species 47

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Species is the newsletter of the Species Survival Commission of IUCN—The World Conservation Union. Commission members, in addition to providing leadership for conservation efforts for specific plant and animal groups, contribute to technical and scientific counsel to biodiversity conservation projects throughout the world. They provide advice to governments, international conventions, and conservation organizations.

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One Programme, One Voice

A joint message from the SSC Chair and Head of the IUCN Species Programme

Moving into the second half of the 2004 - 2008 Quadrennium provides a good opportunity for reflection. The past two years have flown by and much has been achieved. In addition to tackling the small things - such as improving our ability to conduct and process Red List assessments - we have been steadily increasing our profile at a global policy level and the uptake of our information in influential conservation and development arenas. We are all too aware of the growing impacts of threats such as habitat loss and climate change on the myriad of species that contribute to ecosystem health and provide the services that underpin human wellbeing. Tackling these issues is not easy in a world of volunteerism, but the SSC network continues to amaze us with its enthusiasm, passion, and capacity to deliver.

Administratively, the Species Survival Commission (SSC) and Species Programme (SP) continue to function better and better. A Network Support Officer has been recruited for the SP and it is our hope that this new recruit will assist or advise Chairs on fundraising, communication tools, creating guidelines for species action plans, and providing basic information on the SSC and the many roles of its members. On the communications side, the SP is recruiting for a position that will focus on marketing and fundraising for the SSC network. The registration of Commission members in the online Commission Registration System remains challenging, but has progressed more rapidly recently with a dedicated staff member assigned to the completion of this arduous task. Over 5,500 members are now registered, but many of the email addresses on the system are malfunctioning - so we urge all SSC members to check their details online and Specialist Group Chairs to work with the staff of the SP to ensure that the email addresses are captured as accurately as possible. At the SSC Chair's Office in Cape Town, a George B. Rabb Intern has been appointed for 2007. A Senior Commission Officer is being recruited on a part-time basis, and will be focusing on the Chairs' Meeting and the World Conservation Congress.

Fundraising has improved over the last six months, with new ideas and initiatives serving to galvanise us into action. Earlier this year, we were successful in securing additional funding for the SSC's small grants programme, the Sir Peter Scott Fund. Recapitalising the Fund is a clear priority for SSC as it is currently our only meaningful tool for making funds available to the SSC Specialist Groups and their members for conservation action. At this stage, we have a total of €200,000 that will be disbursed over the next two years in two or three funding rounds. The Sustainable Use Specialist Group have been successful in securing funding from Shell to develop species-based indicators of sustainable use under the mandate of the Convention on Biological Diversity (CBD). Funding of US\$2 million has also been provided by the GEF for the development and implementation of a suite of indicators for the 2010 Biodiversity Indicators

Partnership. The largest fundraising success by far, the Government of Abu Dhabi, who have committed to being the main sponsor for the Specialist Group Chairs' Meeting in February 2008.

however, is the pledge from We have been steadily increasing our profile at a global policy level

This long-awaited meeting (the first-ever for the SSC in its 60 year history) will take place from 11-14 February 2008 in Al Ain city in the Emirate of Abu Dhabi (United Arab Emirates). We are extremely excited about this opportunity and have begun consulting with the Specialist Group Chairs to determine the priority agenda issues and to start thinking coherently and innovatively about the structure and outcomes of the meeting. Between the SG Chairs, the SSC Steering Committee, some Species Programme staff and perhaps some high-level IUCN colleagues, the meeting will bring together between 120 and 150 people.

In terms of governance matters, the SSC Steering Committee continues to function well and members have, as always, been very responsive to our intersessional requests and consultations. The various Sub-Committees and Task Forces also continue their good work, with much focus now turning towards the World Conservation Congress. The Plant Conservation Sub-Committee is tackling the challenges of conducting plant assessments and contributing to the Global Strategy for Plant Conservation. The Restructuring Task Force is striving to ensure that a well-advanced strategy and process are put forward to the October 2007 Steering Committee meeting, for further refinement at the Chairs' Meeting. We have been fortunate in securing the pro bono assistance of a highly-



experienced adviser who has already taken up the task of ensuring buy-in from all quarters to this challenging, yet essential, undertaking.

The Species Conservation Planning Task Force (SCPTF) brought together some of our most experienced Chairs and partners to overview the tools currently available for species-specific conservation planning and discuss how to collate the best elements of the many different approaches into a single, powerful planning process that would be a widely recognized contribution from the SSC. The SCPTF will be working closely with the leaders of our WCPA/SSC area-based conservation planning initiative throughout this process.

We continue with our Specialist Group Chairs' Consultation via telephone. The aim of the consultation is firstly an informal chat with the Chairs to discuss their challenges and successes, and secondly a means of collecting various data – such as statistics on shadow resources and gender balance, how the groups are focusing their activities to deliver to the SSC Strategic Plan, and feedback on the various SSC communication tools. The results of this consultation will be discussed at the next Steering Committee meeting and will feed into the restructuring process.

As always, much time has been dedicated to assisting various Specialist Groups on sensitive group dynamics and issues. Often, this involves considerable interactions with several SGs and IUCN offices on challenging, policy-related matters. In order to clarify IUCN's sometimes confusing policy processes we are planning to make a concerted effort to work with IUCN's Policy, Biodiversity and International Agreements Unit to clarify the roles and responsibilities for SG Chairs. We hope that this will enable us to find a more streamlined way through complex and sensitive policy matters related to species.

One of the biggest events on this year's calendar was the CITES COP 14, which was held in The Hague from 3-15 June 2007. We both attended this fruitful meeting as part of the IUCN delegation. As usual, many SSC members and SG Chairs contributed to the preparation of this year's IUCN/TRAFFIC Analyses of the Proposals to Amend the CITES Appendices. Another major achievement has been an intensive effort to contribute to the CBD indicators process by reviewing the development of a set of indicators on invasive species and a number of other species-based indicators to measure progress towards the CBD 2010 target. Perhaps even more importantly, the

largely by the expert network of the SSC, has provisionally been accepted as a measure for the soon-to-be-adopted biodiversity target and indicator for Millennium Development Goal 7 on environmental sustainability. A final decision will be taken by the UN General Assembly and the UN Statistics Division in early 2008.

Looking forward to the rest of 2007 climate change

IUCN Red List Index[™], based on the data provided

Looking forward to the rest of 2007, climate change issues are a priority. A Project Leader for the MacArthur Foundation and Indianapolis Zoo funded project to assess species' vulnerability to climate change has been appointed and project work will begin in the coming months. Our commitment to reducing or off-setting SSC carbon emissions remains strong and various measures are

now in place to calculate the total carbon emissions for all flights paid for by the SSC Commission Operations Fund and

carbon emissions for all flights paid for by are a priority

the Species Programme budget (see article on page 9). We will do everything in our power to ensure that travel to future Sub-Committee and Task Force meetings is off-set and that the Chairs' Meeting in February is as 'green' as possible. Data and data provider issues are further priorities for this year - including the finalisation of an interim policy on withholding spatially-explicit data on species that could be at risk if this data were made widely available, indemnity issues - especially protecting the providers of data of species in commercial use, developing a linkage between the SIS and WWF's Living Planet Index (LPI) on population estimates, and terms and conditions for data providers entering their data through the SIS Data Entry Module (DEM) for direct input to the IUCN Red List[™]. An idea to 'brand' species with their Red List Category in books or on plaques in zoos and botanical gardens is gaining momentum and there is hope that this initiative will raise awareness about threatened species and the IUCN Red List[™].

In the build-up to the World Conservation Congress 4 in October 2008, we look forward to hearing your ideas for the Forum and working with you to ensure that SSC and the Species Programme have a large and meaningful presence in Barcelona. We know that the remaining time in this Quadrennium will rush past, and we thank you for your continued support, and contributions; and your commitment to the SSC and to making this a Quadrennium that we can all look back on with pride.

Holly T. Dubli

Holly T. Dublin

Chair - IUCN Species Survival Commission

gam Jung

Jane Smart

Chair - IUCN Species Programme

Spotlight on SSC's Specialist Groups

The Flamingo Specialist Group

Following-on from the success of the three-part series profiling the SSC's 'Unsung Heroes', the chairs of the SSC Specialist Groups, this issue of *Species* marks the launch of a new feature profiling the work of individual Specialist Groups.

The SSC now has over 100 Specialist Groups, Disciplinary Groups, Task Forces, and Working Groups working on a wide array of species groups and conservation issues. These profiles aim to highlight the diversity of the work being carried out by the Groups and the expertise, enthusiasm, and commitment of their members.

The first group to be profiled is the SSC IUCN Flamingo Specialist Group, chaired by Dr Brooks Childress, which has a membership of over 200 experts who are working across the globe to promote flamingo conservation and to increase our understanding of these spectacular birds.



Overview of the Flamingo Specialist Group (FSG)

The SSC IUCN Flamingo Specialist Group (FSG) was established in 1978 at Tour du Valat in France, under the leadership of Dr Alan Johnson, who coordinated the group until 2004. Currently, the group is co-ordinated from the Wildfowl & Wetlands Trust (WWT), as part of the Specialist Group Network of the IUCN Species Survival Commission, and Wetlands International (formerly the IWRB).

The FSG is a global network of flamingo specialists (both scientists and non-scientists) concerned with the study, monitoring, management, and conservation of the world's six flamingo species. Its role is to actively promote flamingo research and conservation worldwide by encouraging information exchange and co-operation among specialists and other relevant organizations, and by producing international action plans for the most threatened of the flamingo species.

FSG members include experts in both *in situ* (wild) and *ex situ* (captive) flamingo conservation of all six species, as well as in fields ranging from field surveys to breeding biology, infectious diseases, toxicology, movement tracking, and data management. There are currently over 200 members from 55 countries around the world, from India to Chile, and from Finland to South Africa. Further information about the FSG, its membership, governance, list serve, and annual



bulletin is available here: http://www.wetlands. org/specialistgroups/En/articlemenu. aspx?id=cadbfa31-e440-4fee-aca0-5878d42837fc

Flamingo Specialist Group Projects

In addition to all of the important conservation work carried out by its members in their individual countries, the FSG is co-ordinating several projects of international scope:

Lesser Flamingo Action Plan

An international single-species action plan for the conservation of the Lesser Flamingo (*Phoenicopterus minor*) is being developed by the FSG and Wildfowl & Wetlands Trust (WWT). It has been compiled by a team of experts based on input from a workshop that was held in Nairobi, Kenya in September 2006 organized by the FSG. The action plan draft is going through rigorous consultations and should be endorsed for implementation by early 2008.

Andean and James's Flamingo Action Plan

An international action plan for the conservation of the Andean Flamingo (*Phoenicoparrus andinus*) and the James's Flamingo (*Phoenicoparrus jamesi*) is being developed by the FSG, in cooperation with the Grupo para la Conservación de Flamencos Altoandinos (GCFA). It is being compiled by Dr Felicity Arengo, Western Hemisphere Chair of the FSG, who will also be chairing an action plan workshop of species experts in Argentina in June 2007.

Caribbean Flamingo Research and Conservation Network

A new network of *in situ* and *ex situ* conservation organizations is being launched in November 2007 to focus on the conservation of the Caribbean Flamingo. This new initiative will be co-ordinated by FSG member Dr Nancy Clum of the Wildlife Conservation Society, with the assistance of Dr Felicity Arengo. The purpose of this new group will be to provide funding and co-ordinate the research efforts of those researchers working on the Caribbean Flamingo.

FSG Member Profiles

Nigel Jarrett



In the early 1970s, Nigel Jarrett had an unexpected first encounter with a flamingo on a coastal mudflat near his home in the north east of England unexpected, because his home was then 52° N! As a schoolboy birder he identified the bird as Chilean Flamingo and therefore an escapee from a nearby zoo collection. That bird got him hooked on waterbirds and when for his tenth birthday he was given a copy of Janet Kear and Nicole Duplaix-Hall's book, Flamingos, he knew there was only one place where he should work when he grew up - the Wildfowl & Wetlands Trust (WWT) in Slimbridge, UK! Since graduating from Newcastle University (UK), Nigel Jarrett has been WWT's Aviculture Manager based at Slimbridge. He is responsible for the captive management of almost 800 flamingos and over 5,000 wildfowl at seven WWT centres in the UK. With 25 years hands-on experience, he has worked at home and abroad with all the world's flamingos and all but 10 of the world's 163 wildfowl species. At WWT he seeks to develop ex situ conservation projects which contribute directly to species conservation in the wild (e.g. by using captive birds to develop best practice techniques for use by field ornithologists). In recent years, he and colleagues have developed flamingo husbandry techniques that have resulted in WWT gaining global recognition as a Flamingo Flock Factory - WWT's flamingo flocks now produce 70-100 young each year. Since 2000, almost 500 of these young birds have been relocated to other zoo collections around the world, generating funds for in situ conservation while reducing the demand for wild caught birds. In addition to his many duties, Nigel is currently Assistant Chair of the Flamingo Specialist Group.



Mark Anderson



Mark lives in Kimberley, South Africa, in the arid Northern Cape Province, which is fortunate as the largest permanent population of Lesser Flamingos in all of southern Africa (approximately 20,000, or one-third of the southern African population) located at Kamfers Dam, about 5 km north of the city. In September 2006, Mark's 10-year-old dream was realized when Ekapa Mining constructed a 25 x 250 m artificial flamingo breeding island at Kamfers Dam. Within weeks, the flamingos started using the island and now, on most nights, 10,000+ Lesser Flamingos can be seen roosting on this new island. This important conservation project has received much positive publicity, on television, radio, and in newspapers, magazines, and journals. Ekapa Mining has been nominated for a Nedbank Green Mining Award for the project. Mark has also been instrumental in ensuring the conservation of the important Kamfer's Dam wetland. He was responsible for the erection of two large information boards at the Dam, and is currently raising funds for a flamingo viewing platform and a webcam which will be placed on the flamingo island. Mark has been monitoring flamingo numbers at wetlands in the arid Northern Cape Province, South Africa, since 1991, and during 2005, he conducted an operation to rescue Greater Flamingo chicks from a pan near Vanwykslei, after the wetland dried up and the birds started dying. In September 2008, Mark will co-convene a symposium and round table discussion on Africa's flamingos at the Pan African Ornithological Congress in Cape Town.

Felicity Arengo



Felicity (standing, left) is a wildlife ecologist with over 15 years experience working on research and conservation projects in the neotropics. She is a native of Argentina, where she began her studies at the Universidad Nacional de La Plata. After working as a field research technician for several years she enrolled in graduate school where she discovered the subject that would captivate and entertain her for years (and perhaps decades) to come: flamingos. "I will never forget the first time I saw flamingos in the wild" she recalls. "We were driving a boat slowly up a coastal lagoon in Mexico and from a distance I could see a pink line along the mangrove fringe. As we got closer the line materialized into hundreds of Caribbean Flamingos. It was a magical moment that I get to relive every time I go to flamingo wetland sites." Felicity obtained an MSc and PhD from the State University of New York College of Environmental Science and Forestry studying Caribbean Flamingo foraging behaviour and conservation in Yucatan. In 1997, she went to work for the Latin America Program of the Wildlife Conservation Society in New York, through which she became involved with the Grupo para la Conservación de Flamencos Altoandinos (GCFA), a group focused on research and conservation of James' and Andean Flamingos, and their wetland habitats of the high Andes in South America. With GCFA colleagues, Felicity has been studying the movements and habitat use of Andean Flamingos using satellite telemetry. They are also working on the design and implementation of a network of priority wetlands for conservation of flamingos, and in June 2007, will hold an action planning workshop for the Andean and James's flamingos. Felicity has been the Western Hemisphere Chair of the FSG for many years, and since December 2004, Associate Director of the Centre for Biodiversity and Conservation at the American Museum of Natural History in New York.



Rodrigo Migoya



The Caribbean Flamingo Conservation Programme (CFCP) in Mexico is co-ordinated by Rodrigo Migova, (standing, second right), Director of the non-governmental organization Niños v Crías NGO. In Mexico, Caribbean Flamingos live mainly along the 450-km corridor between the Biosphere Reserves of Ría Lagartos and Los Petenes on the northern coastline of the Yucatan Peninsula. The estimated population is between 44,000-54,000 individuals. The CFCP has three main objectives: 1) Assure the availability of flamingo nesting grounds; 2) Ensure that the feeding grounds are in good condition; and 3) Guarantee the flow of freshwater springs at crucial feeding and nesting areas. A banding programme was initiated in 1999 and migration results showed that birds from the Yucatan breeding sites visited Florida and Texas. In 2001, three individuals were spotted in Cuba. Such findings confirmed that the Yucatan population is part of a metapopulation distributed throughout the Caribbean Islands and Gulf of Mexico. The main Yucatan nesting grounds are located within the Ría Lagartos Biosphere Reserve comprized of shallow mudflats often flooded by heavy rains that cause the loss of nests. The restoration of Punta Mecoh Island in 2003 and 2004 resulted on an increase in the breeding bird population, from 26,000 individuals in 1999 to 44,000 in 2005. Hurricane Wilma eroded and hardened the island in 2005, so in 2006, flamingos nested at an adjacent mudflat where eggs were washed away after a heavy rain in June, calling for a new restoration in March-April 2007. Access ramps and protective wooden boards were used, implementing techniques from Fuente de Piedra Natural Reserve in Spain. Currently, they are waiting for the flamingos to adopt this new structure.

Boudjéma Samraoui



Konrad Lorenz has been instrumental in shaping up my career which took a roundabout way. I graduated in nuclear physics in 1979 from Algiers University. After acquiring, in 1985, a DPhil in structural molecular biology (Wolfson College, Oxford University), I spent three years as a Research Fellow in molecular biology at Harvard University. I was equally blessed in solving the structure of HLA A2 and auditing courses of illustrious colleagues like S.J. Gould and E.O. Wilson. In 1988, I moved back to an economically declining Algeria and fairly quickly focused on the study of the ecology and biodiversity of wetlands and carried out research on dragonflies, zooplankton, and waterbirds. Beginning in 2001, as Head of the Laboratoire de recherche des zones humides, I focused, with the help of the Algerian Ministry of Higher Education and the Ministry of Environment, on the ecology of herons and other colonial waterbirds. In 2004, we discovered a breeding colony of the Greater Flamingo at Garaet Ezzemoul. Protective measures led to successful breeding in 2005 and 2006. The MAVA foundation has since backed up the Flamingo project and a ringing programme is carried out with the active support of the Station Biologique de la Tour du Valat. Biodiversity has enriched my life and I hope to do my little bit to pay it back.



At the latest IUCN Council meeting, the Commissions hosted a session on the impacts and effects of climate change. The aim of the session was to inspire creative thought about what IUCN can do in terms of climate change. IUCN is working hard to build a strategy for Commission work on mitigating and adapting to climate change. The SSC is committed to this strategy and is already taking positive action in terms of research, and offsetting the 'carbon footprint' of its own activities.

The SSC and climate change: going carbon neutral

SSC and climate change research

Significant fundraising efforts in 2006 have paid off as a grant from the MacArthur Foundation and the Indianapolis Zoo has been secured to investigate the "Species Response to Climate Change". To date the likely impacts of climate change have been based either on isolated case studies, or on large-scale modelling. Recent media releases and the film "An Inconvenient Truth" have made an icon of the polar bear as one species being affected directly by climate change - due to diminishing sea ice surface area as result of the warming Arctic Ocean. However, this one example is definitely not enough to demonstrate the likely impacts of climate change on species. An empirical approach across large numbers of species to gain an understanding of which species are likely to be affected, and where, has so far not been undertaken, and is an essential step if biodiversity

conservation planning strategies and approaches are to incorporate mechanisms for addressing

climate in a meaningful way. The grant will allow the SSC-SP to build on the current Species Information Service database so as to identify the proportions of species that will be adversely impacted by climate change, identify those species that will be most critically affected, and provide a basis to assess the severity of the threat.

All SSC travel funded through the Commission Operating Fund will be offset through the IUCN Carbon Fund

Carbon neutrality for SSC Commission Operating Fund-related travel

SSC has pledged that all its activities should be carbon neutral as far as possible. Although one of IUCN's main aims is that of convening experts, managers, and politicians in round-table discussions about conservation matters, one has to consider what the implications are of this seemingly endless global travel. One economy return flight between Europe and somewhere in



the southern hemisphere (Buenos Aires for example) produces carbon emissions approximately 2.2 tonnes - the equivalent of four trees. Trips within the northern hemisphere across the Atlantic could amount to 1.3 tonnes (two trees), and trips between Europe and the Oceania region could emit over 3 tonnes of carbon (five trees).

As an initial gesture, all SSC travel funded through the Commission Operating Fund will be offset through the IUCN Carbon Fund. All flights taken by Steering Committee members and members of Task Forces or Sub-Committees will be entered onto the

There are many things SSC members or Specialist emitted when given the Groups can do to tackle the issue of climate change

IUCN Flight Emissions Calculator (an online tool calculates tonnes route of a flight). Twice per year a lump sum (equivalent to CHF22 per tonne of carbon) will be transferred from the Commission

Operations Fund to the IUCN Carbon Fund. Each vear the IUCN staff vote for the most worthy way to spend the funds accumulated in the IUCN Carbon Fund - e.g. the last project supported by the fund was a forestry project in the Chiapas, Mexico.

Shark Specialist Group holds SSC's first carbon-neutral IUCN Red List workshop

Following the SSC's recent announcement that it is seeking to reduce its contribution to global climate change, the IUCN SSC Shark Specialist Group became the first Specialist Group to offset the carbon emissions created through participants' travel to attend a Red List workshop.

The Shark Specialist Group is part-way through a series of regional and thematic workshops to complete a global IUCN Red List assessment for the world's 1,200 species of sharks, rays, and chimaeras. In February 2007 the Shark Specialist Group held an IUCN Red List workshop in Oxford, UK, to assess the status of pelagic and oceanic sharks and rays. (For details of the workshop findings, please see: http://www.iucn.org/en/news/ archive/2007/02/22_pr_sharks.htm)

Eighteen experts from government agencies, universities, non-governmental organisations and private institutions attended the workshop; travelling from the UK, USA, Canada, Croatia,

Belgium, New Zealand, Australia, South Africa, Uruguay, and Ecuador.

The Shark Specialist Group used The Carbon Neutral Company's 'carbon neutral calculator' (http://www. carbonneutral.com///calculators/index shop calculator.asp) to calculate the distance of every participant's return journey for attending the workshop. Results also provided information on the amount of CO₂ produced by each journey and an estimate of how much money it would cost to offset these emissions.

In total, participants covered an estimated 153,700 km to attend the workshop and return home, producing 17 tonnes of CO₂ emissions. The cost to offset these emissions was just £180. This money has been donated to the IUCN's Carbon Fund and will be invested in a suitable project, to be chosen through an IUCN vote in the near future.

The Shark Specialist Group would like to thank the Lenfest Ocean Programme, funders of the pelagic shark workshop, for approving this donation to offset these carbon emissions.

Please contact Shark Specialist Group Programme Officer Claudine Gibson (Claudine@naturebureau. co.uk), if you would like further details.

How SSC members can reduce their carbon footprint

All SSC Specialist Groups and members are encouraged to follow the Shark Specialist Group's example and find ways of offsetting their carbon emissions when travelling on SSC business (whether it is for meetings or for other Specialist Group work). Another role SSC Members can play is that actively encouraging their institutions/ corporations to set an example for others by reducing and/or offsetting travel of staff members. Since the SSC announcement, several other Commissions have also pledged their desire to be carbon neutral and there is hope that a joint effort will show leadership in this regard.

There are many things individual SSC members or Specialist Groups can do to tackle the issue of climate change. We would like to hear about your research on specific species' reactions to climate change, your emission reduction activities, and any other ideas you or your group has had in

Send your ideas and stories to species@iucn.org



From the Specialist Groups

African rhino

International best practice for African rhino conservation as promoted by the African Rhino Specialist Group is being increasingly applied in the Range States in both strategies and field programmes

One of the best current examples is the programme re-establishing black rhino in Luangwa NP, Zambia, by the Zambian Wildlife Authority and Frankfurt Zoological Society. To this end, 10 rhinos were brought in from South Africa in 2006 and the target founder population of at least 20 animals will hopefully be achieved, with a final batch being reintroduced in 2008.

A workshop to review Kenya's black rhino strategy was held in early 2007 and a draft will soon be available for comment. The strategy is aiming at 700 black rhinos by 2011 with a minimum target annual rate of increase of 6% in the fenced sanctuaries. An improved performance in the latter will be assisted by the removal of all 255 elephants from Ngulia Sanctuary in Tsavo West, which was completed in late 2006, and by its planned expansion by 26 km². The review of South Africa's black rhino conservation plan, which is also nearing completion, includes inter alia, a revised target of 3,000 plus for the most abundant south-central subspecies, and emphasis is given on creating large viable populations of 50 to 100 or more animals. Another important strategic planning initiative concerns the management of the four remaining northern white rhino in Garamba National Park, Democratic Republic of Congo (DRC). A workshop organized by African Parks Foundation and DRC's Institut Congolaise pour la Conservation de la Nature is being planned for September this year. In the interim, further surveys will be conducted to confirm the population size.

The AfRSG, in collaboration with the Asian Rhino Specialist Group and TRAFFIC (the wildlife trade monitoring network), has compiled an overview of the current status of rhino conservation and trade issues worldwide, and submitted this to the CITES Secretariat for consideration at CITES CoP 14, as requested in CITES Decision 13.23 where it was adopted by the Parties to the Convention.

Martin Brooks, Chair

Amphibian

Announcing the first winner of the Sabin Award for Amphibian Conservation

Made possible by a generous donation from Andrew Sabin, the Amphibian Specialist Group is pleased to announce the winner of the first annual Sabin Award for Amphibian Conservation, which was presented in New York on May 17. This award recognizes contributions that an individual or

group has made to amphibian conservation worldwide.

The recipient of this first award is Dr Luis Coloma forhispioneering work on the conservation of Ecuador is ranked third in the world for total number of amphibian species and number of threatened species

amphibians in Ecuador. Despite being a relatively small country, Ecuador is ranked as third in the world for total number of amphibian species (447) and number of threatened species (163). Traditional threats to amphibians, such as habitat loss, combine with novel threats, such as climate change and disease. Dr Coloma has made a significant contribution to our body of knowledge on amphibian declines through research and has raised awareness of amphibian conservation in this important country.

Robin D. Moore, Amphibian Conservation Officer, Conservation International

Asian elephant

The Asian Elephant Specialist Group (AsESG) has begun work to produce a review of human–elephant conflict (HEC) assessment and mitigation practices in Asia

The review will be prepared by the AsESG, and our partners in Governments and NGOs (and other interested individuals). The purpose of this review publication will be to provide an easy-to-access summary of successes and failures in HEC management and the reasons for these. We believe that gathering such information – much of which is currently in the grey literature or peoples' heads – in one publication will provide a valuable and indeed overdue resource.

The HEC review will be made available on the web and there will be a facility to submit new data and update existing entries so that the information contained in the review is kept as up to date as possible. This initiative builds on discussions held at last year's Asian Elephant Range States' Meeting



in Kuala Lumpur, Malaysia, which highlighted: (a) the need for practical guidelines for addressing HEC that are based on good data; (b) the value of sharing information related to HEC between Range States; and (c) the need to standardize the measurement and interpretation of HEC.

The AsESG has also begun discussing how best to implement an Asian Elephant Database, similar to the widely-used African Elephant Database that is maintained by the African Elephant Specialist Group. Creation of an Asian Elephant Database was also recommended at the Range States' Meeting last year and we hope to eventually form the most authoritative, comprehensive, and up to date source of information about the distribution and abundance of Asian elephants.

Simon Hedges and Ajay Desai, Co-chairs

Asian wild cattle

The kouprey: *Critically Endangered* species or feral hybrid, can genetics help?

Conservation of a number of Asian wild cattle, such as the banteng, anoas, and kouprey is complicated by the need to accurately define the units to be conserved. Members of the Asian Wild Cattle Specialist Group (AWCSG) are engaged in research to resolve these issues.

Recently, the species status of the *Critically Endangered* kouprey (*Bos sauveli*), has been called into question. This situation is made all the more complicated as the species is on the verge of extinction. A recent genetic study (Galbreath *et al.* 2006) suggested that the kouprey may not be a species (as it is currently classified), but rather a feral hybrid of banteng (*Bos javanicus*) and domestic zebu cattle (*Bos indicus*). Mitochondrial DNA sequences from a single kouprey (the

Solid genetic and morphological information is essential holotype) and two banteng from Cambodia showed many similarities.

AWCSG members suggested that the proposed change in

status of the kouprey from species to feral hybrid was premature for multiple reasons (Hedges et al. 2007), some highlighted in the original paper. For example, it is possible that kouprey mitochondrial DNA may have been introduced into the banteng population by minimal cross-breeding, rather than the kouprey being descendants of banteng. Analysis of another banteng DNA sample (Galbreath et al. 2007) and the observation of a skull that is reportedly kouprey-like in form, from the Late Pleistocene or early Holocene age, suggest the kouprey may be natural in origin. It is hoped that this ongoing genetic work will resolve this issue; it may also reveal a more complex evolutionary history for these and other sympatric cattle species as more populations are sampled.

The lesson from this research is that when proposing alterations to taxonomic or conservation status solid genetic (and morphological) information is essential. More importantly, the challenge is to stop other extant but endangered species, such as the banteng, suffering the same fate as the kouprey, whatever it is or was.

Dr James Burton, Chair

Bryophyte

Bryophyte conservation work has been progressing steadily in a large number of countries across the globe

The conservation status of bryophytes in **Australia** has been assessed at the national level (1997). Approximately 200 taxa would qualify for listing under the Australian Environment Protection and Biodiversity Act. A proposal for a programme nominating bryophytes to the list will be discussed at the Australasian Bryological Workshop in Tasmania (December 2007). At the state level, bryophyte status was assessed in Victoria (2005) and in Tasmania (1996).

In 2005, Specialist Group members in **Brazil** took part in the Red Listing of Brazilian plants which included 17 bryophyte species. Specialist group bryologists were also involved with the coordination of the revision of the Red List for Minas Gerais which included 26 bryophytes (see web publication in 2007). A similar evaluation has been published for Rio de Janeiro revealing 155 threatened species.

In Canada COSEWIC, the committee charged with assessing the status of species at the national level, is actively listing mosses for legal protection. In 2005-06, six mosses were assessed and listed. Details: http://www.speciesatrisk.gc.ca/default_e. cfm, database: http://www.cosewic.gc.ca/eng/ sct1/searchform e.cfm. The province Newfoundland and Labrador has an endangered species programme and listed Bryum porsildii in late 2006. B. porsildii now receives legal protection there. The organization Adopt-A-Plant Alberta was started in Alberta (2006). This organization trains volunteers to search for rare plant species in the province and gather the data needed for writing status reports.

In 2007, the **Czech** Agency for the conservation of nature will initiate a monitoring programme for *Critically Endangered* bryophyte species. Monitoring intensity will depend on available funding. The Agency prepared a first report that will be reviewed in early May 2007.

The European Committee for Conservation of Bryophytes (ECCB) has concentrated its work on updating the Red List of hepatics for Europe. An updated checklist for Europe and Macronesia with all new Red List treatments will be published this year. ECCB has also organized a workshop on red listing of hepatics in Uppsala. Completed species



evaluations can be found on www.bio.nt.ntnu.no/ ECCB/. Less work has been done on mosses, but a European checklist is published (Hill *et al.* 2006). This will form the basis for Red List evaluation of the mosses.

Luxembourg, Switzerland, Serbia and Montenegro, the Czech Republic, Sweden and Norway have each published Red Lists in the last five years, all with the new IUCN Categories. Together with earlier lists, these form a solid base for our work. ECCB will have its next conference in Cluj, Romania (September 2007), in connection with the Planta Europa conference. Bryophyte conservation will be discussed, with a focus on South-eastern Europe.

The **New Zealand** Dept. of Conservation has just published a list of threatened species, including 21 "nationally critical' species of mosses, as well as priorities for taxonomic research. In contrast to the situation in Australia and the United States, listed species and varieties do not have legal protection. The list is equivalent to the Australian State threatened plant lists.

Bryophyte seminars have been held in **El Salvador** and **Guatemala** as part of a project to develop expertise and infrastructure for Central American herbaria. Two publications have been produced on the mosses of Guatemala which contain detailed information on 580 species and their distribution. The University of Panama website offers liverwort and lichen databases and a moss database that is under construction

In **Russia**, the Government confirmed in October 2006, that 61 threatened bryophyte species were included in the list of species protected by law. The Red Data Book of Russia should be published in 2007. A number Red Data Books for different Republics and Provinces of Russia were published in the last two years all of which included bryophytes.

During the last three years, **Sweden's** efforts involving bryophytes have been focused on four projects: New Red List, Natura 2000, Species Action Plans and field studies. More precise monitoring of population sizes and fertility is slowly being built up for the annex 2 species and less threatened taxa. Skilled amateurs participate in this work and they frequently report their findings via the Internet to the Species Information Centre, thereby contributing useful information. To date, approximately 13,000 bryophyte findings have been reported directly to ArtPortalen (http://www.artportalen.se/).

The result of a three-year survey of bryophytes of Arable Land in **United Kingdom** is being written up and work is underway to produce a 'popular' arable bryophyte booklet to complement the technical papers. In addition to raising awareness of bryophyte conservation issues, several papers have been published and novel techniques for initiation and growth in aseptic culture have been developed. The CBD has focused the UK government on

producing Biodiversity Action Plans (BAP) which has resulted in resources to assess the status of many of the UK's rarest species including bryophytes. Progress is being made to incorporate bryophyte monitoring in Natura 2000 sites and SSSIs.

In the **USA** a survey has been sent to bryologists and botanists in order to ascertain the conservation status of bryophytes. Replies can be found at http://www.fingerlakesnativeplantsociety.org/. Work is also underway to revise the rare moss list for New York State and to make bryophyte common names more widely known.

In **Venezuela**, a national law prohibiting the extraction of bryophytes has been extended from one to three years thanks to a group from the Mérida Botanical Garden. The group had launched an educational campaign to preserve bryophyte diversity in 2004, raising awareness among local communities by associating bryophyte preservation with water conservation. Other activities include several research projects on cloud forest and paramo bryophyte, and research on *in vitro* culturing.

Tomas Hallingbäck, Chair

Cat and Canid

Range-wide conservation planning for cheetah and African wild dogs

We are used to thinking on a big scale for the conservation needs of big carnivores, but for cheetah and wild dogs we need to think even bigger. They occur at much lower densities than most of the other large carnivores, so the areas they need for long term survival are much bigger. Most existing protected areas are simply too small to guarantee their conservation.



The Cat and Canid Groups together at a regional workshop held in Kenya

The Cat and Canid Specialist Groups are working together in a series of regional conservation planning workshops to map cheetah and wild dog distributions and to establish conservation strategies for their entire range. These species were paired because of their similar conservation needs and to increase the likelihood that the recommendations will be implemented. The first



workshop was held in Kenya in February with funding from Wildlife Conservation Society (WCS) and the Howard G. Buffett Foundation, and involved representatives from Kenya, Tanzania, South Sudan, Ethiopia, and Uganda.

The workshop meshed two existing workshop processes -the WCS range-wide priority setting exercise and the IUCN strategic planning process, thus building on the strengths of both. The mapping process revealed the importance of both protected and unprotected land for the species' survival, highlighting the need for land use planning on a scale that has rarely been seen before in conservation. The mapping informed the development of the regional strategic plan, which was structured so that it could be easily used to develop country-specific national plans. This is important as conservation, including policy, legislation, and enforcement, all occur at national levels; national planning and commitment of government is therefore vital for implementation of the regional strategic plan.

Workshops for southern Africa and west/north Africa will follow. The report from the Kenya workshop is expected to be finalized in June 2007 and will be made available through the Canid and Cat Specialist Groups websites.

Cormorant

The Cormorant Specialist Group is providing scientific data to help resolve the complex issues of cormorant-fisherman conflicts

For a long time Cormorants (Phalacrocorax sp.,) have had a bad reputation among fishermen. The food habits of this keen fish-eating bird are

The cormorant often sports fisheries. The debate is Serves as a scapegoat focusing on the tree breeding

supposed to counteract the activities of commercial and subspecies of P. carbo sinensis in Europe and the

Double Crested P. auritus in North America. Expansion of breeding populations is occurring on both continents and is associated with a dramatic change in fish populations, especially those in shallow freshwater. Many causes can be listed of which eutrophication, damming off water bodies leading to compartmentalization, and overfishing rank highest. The cormorant often serves as a scapegoat and local management measures are often proposed to control their numbers.

The Cormorant Research Group (CRG) contributes to the debate by providing basic data and coordinating the counts of birds on a continental scale. The migratory habit of the species means that summer and winter distribution differ a lot and activities of the Group's members focus on the entire range from breeding ecology, food and feeding habits, interaction with fisheries, migration studies, and wintering ecology. During the last meeting of the group, November 2005 in

Villeneuve, Switzerland, over 90 participants shared information, including contributions from USA, Canada, Belarus, Nepal, India, and China.

Pan-European counts

Many colonies are monitored at a country level annually, which provides good information about regional trends. In order to have an accurate idea about the numbers and distribution of the entire population in winter, several countries have started winter counts on roosts. In January 2003, we have conducted the first European mid-winter count, an event that revealed a lot of new data and is in the finalizing phase. After a last check of recently received data, the results will be published in the proceedings of the Villeneuve conference, later this year. Another example of an integrated approach was the Pan European breeding count in 2006. Specifically, the expansion towards the NE was clearly demonstrated with some 45,000 breeding pairs in Sweden, 11,500 in Estonia, 6,500 in Finland, and ca. 3,800 in the Russian part of the Finnish Gulf.

Colour ringing projects

Individually recognisable birds provide valuable information about migration pathways and individual habits. Site fidelity, both in summer stop-over sites, and winter roosts is a common phenomenon. Females and young birds tend to migrate further south than adult males do. Coordination of colour ringing projects and information about other activities are available on the website of the group: http://web.tiscali.it/ sv2001/

Linking knowledge and future plans

The information gathered by the group's members is shared in several fora, mainly European at the moment. Group members have also contributed to the EU-financed projects REDCAFE and currently INTERCAFE. Here the full integration of the complex issue of conflict resolution is taken up, including sharing information with local stakeholders and policy makers. One thing has become very clear: the role of valid information is crucial before any decision on a local case can be taken. Therefore it is relevant to continue the data gathering, and to promote the exchange and similar application of methods used. As the biological changes of the fishing waters will continue, both based on managerial activities and on climate change, the demand for a Cormorant Research Group will be vital. However, the voluntary basis at which much of the research is being carried out, does not cover the needs by individual countries or at the EU level. The current EU projects are valuable instruments to guide the discussion, the need for scientifically sound research is also apparent and maybe a logical next step.

Another desirable development would be to combine the available information mentioned earlier on both continents, perhaps extending it



even into Asia where major changes in the river and lake systems occur.

Mennobart van Eerden, Chair

Crocodile

A "New' Population of Orinoco Crocodile

The Orinoco Crocodile (*Crocodylus intermedius*) is largely restricted to the Orinoco River drainage basin in Venezuela. Recent population surveys



Orinoco crocodile, Crocodylus intermedius

have confirmed the success of a Programme for the Conservation of the Orinoco Crocodile that was implemented in 1990 by the Ministry of the Environment, in collaboration with NGOs, universities, and private landowners in the Venezuelan Llanos. The first phase of the reintroduction programme (1989–1994) involved wild and captive-bred hatchlings being raised in captivity and later released into suitable natural habitats in Caño Guaritico-Estación Biológica El Frío.

The Caño Guaritico Fauna Refuge was established in 1992, principally for the conservation and reintroduction of C. intermedius. The species was totally exterminated from the area in the late 1950s, but recent surveys indicate that the C. intermedius population is increasing and is currently estimated at over 400 individuals. Other encouraging signs include over 25 nests being produced annually, a high proportion of adults in the population, and an increasing area occupied by the species each year. This "new' population is similar in size to that at the Cojedes and Capanaparo Rivers. The second phase of the programme (1996-present) involves the collection of wild eggs from this "new' population and the raising of resulting hatchlings to 1 m in length before releasing them back into Caño Guaritico-Estación Biológica El Frío.

A workshop held in January 2007 on the Conservation of the Orinoco Crocodile in Venezuela evaluated the successes and failures of the entire programme over the last 30 years. A new programme to guide actions in the short-term, based on the knowledge and experiences gained to date, will be developed. With the population well on the way to recovery, an egg ranching programme is one possible way to involve local communities and create incentives for the continued conservation of the Orinoco Crocodile.

José Ayarzaguena, Director, Estación Biológica El Frío, Venezuela,

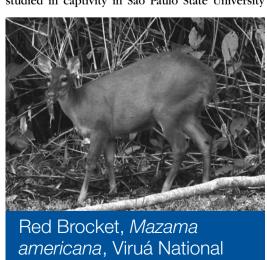
Alvaro Velasco, IUCN-SSC CSG Regional Chairman for Latin America and the Caribbean,

and Rafael Antelo, Estación Biológica El Frío.

Deer

The Deer Specialist Group is actively working to influence regional conservation policies and to support research and training, particularly in South America and Asia

The number of deer species in South America is currently unknown. This is not an easy question to answer and the complicated taxonomy of the genus Mazama makes it all the more difficult. Recently some species have been described for this genus, like M. pandora and M. bororo. However, classifying the red brockets (M. americana) is an intriguing challenge for deer scientists. A project entitled "Morphological, genetic, and ecological differences between different cytotypes of Mazama americana" is being led by Dr Jose Mauricio Barbanti Duarte, in Brazil. The goal of the project is to analyze the complex taxonomy of the red brocket group by examining several populations, to determine phylogeographic patterns and the speciation processes involved. The research is being carried out in the field at several locations in Brazil. In addition, a number of individuals from groups with significant genetic differences are being studied in captivity in São Paulo State University



Park, Roraima, Brazil



(UNESP) facilities in order to determine the extent of reproductive isolation between the variants. Ecological differences between populations are determined in the field using radio telemetry and camera traps. The discovery of a new red brocket species in Central and South America would change their conservation status in many localities. Extending the survey brocket deer to other unexplored regions and countries would allow to us to determine how many species are part of the red brocket deer complex and to assess their conservation status.

Susana González, Chair and José Maurício Barbanti Duarte

Freshwater fish

Business and strategy plan developed, and fundraising concept document finalized for a Global Freshwater Fish Assessment

Even though the group is still in its infancy – its inaugural meeting was in 2005 – huge progress has been made in expanding the group through the appointment of the regional chairs and special advisors. The group also has a vision: "Freshwater fishes sustained in their natural environments", and a mission: "To achieve conservation and sustainable use of freshwater fishes and their habitats through:

- generating and disseminating sound scientific knowledge;
- creating widespread awareness of their values;
- influencing decision-making processes at all levels".

The third Meeting of the Freshwater Fish Specialist Group (FFSG), held in March this year at Chester Zoo and kindly supported by the North of England Zoological Society, was attended by the regional chairs and advisors. At the meeting a business and strategy plan were developed and a fundraising concept document was finalized for a Global Freshwater Fish Assessment.

One of the key developments from the FFSG is the European Freshwater Fish Assessment. Dr Jörg Freyhof (the European Chair of the FFSG) along with Dr Maurice Kottelat are publishing, with funding raised through the FFSG from Chester Zoo, a Handbook of European Freshwater Fishes, which contains information on the distribution, taxonomy, habitat and ecology, threats, and global Red List status of all of Europe's freshwater fish species. All the information collated for this publication will be added to the IUCN Species Information Service and Red List. This publication will greatly improve the quality of, and access to, information for decision makers such as basin management authorities on the status and distribution of freshwater fishes in Europe where it will help target and prioritize conservation action and inform development activities.

Indian Ocean Island Plants Specialist Group

Preliminary assessments of over half of Mauritian flowering plants complete and funding promised for the national strategy against invasive alien species

With the help of several botanists, including group members, Dr Rachel Atkinson has compiled data for a preliminary assessment of 353 flowering plants species or 55% of the Mauritian flora. The focus was on Mauritian species unique to the Mascarene region. While 38 species appear extinct and another five extinct in the wild, the remaining species could be categorized thus: 141 *Critically Endangered*, 55 *Endangered*, and 98 *Vulnerable*. The exercise revealed that at least 95 of the 141 *Critically Endangered* species have less than 50 known adults in the wild. These figures reflect the current situation where about 2% of the mainland native forests of Mauritius remain of which only some 2% receives conservation management. Most of the

native forests continue to degrade under the effects of invasive species, habitat fragmentation, and localized projects, development including deer ranching. Unfortunately, in an attempt to boost fruit production, the Government of Mauritius recently approved culling of endemic fruit bats (Pteropus

It is feared that culling will accelerate the degradation of the Mauritian forest

niger) without a sound scientific approach and against recommendations of independent conservation stakeholders like Bat Conservation International and the Mauritian Wildlife Foundation. It is feared that culling will accelerate the degradation of the Mauritian forest remnants, as the bat is one of the last surviving seed disseminator of several native plants.

On a positive note, the National Biodiversity Strategy and Action Plan for Mauritius was finalized recently with the help of several members of the group. The plan includes recognition of the need to increase forest under conservation management some 20-fold, but implementation may now be difficult since Government has removed most of the US\$3 million from the Conservation Fund which usually finances such management.

Other good news is that the Government of Mauritius has earmarked about US\$30,000 for the drafting of a National Strategy against Invasive Alien Species (IAS). IAS constitutes the main threat to the native plants of the island. Members of the group have worked on the strategy and an international consultant is now being sought to finalize the document.

At a regional level, a joint database of Mascarene plants is being created led by the Conservatoire Botanique National de Mascarin (Réunion). This



will enable Red Listing of Mascarene species shared between islands. Several members of the groups are working on this project. The group is also currently helping Dr Scott Zona, Chair of the Palm Specialist Group, to organize a Red Listing workshop to be held on 25 July at the University of Mauritius, when the 37 species of the Mascarenes, Seychelles, Comoros, and Mayotte will be assessed.

Eight new members with expertise from Réunion, Mayotte, Seychelles, and Mauritius recently joined the group. More new members are due to follow to enable each island in the group to have its own functional sub-group of experts.

Vincent Florens, Chair Indian Ocean Islands Plants Specialist Group

Madagascar Plant

The Madagascar Plant Specialist Group (MPSG) has embarked upon an ambitious project to assess 3,000 endemic Malagasy plant species over the next three years

The project is "Towards a Red List of the Endemic Plants of Madagascar: an integrated project to inform conservation planning". Funding for the project has been received from the Marisla Foundation through the Missouri Botanical Garden (MBG) and provides support for a MPSG Secretariat to assist the Chair, Professor Charlotte Rajeriarison, in the activities and development of the Specialist Group. MBG-Madagascar staff member Sylvie Andriambololonera will co-ordinate the project and serve as the Technical Liaison Officer to the GSPM.

The project team will compile comprehensive distributional data on the 3,000 endemic species and conduct GIS analyses to determine the key spatial parameters (Extent of Occurrence; Area of Occupancy) utilized for assigning Red List categories. A series of workshops will be held to train Malagasy botanists in the concepts and methodology of IUCN Red List™ assessments and to evaluate and validate preliminary assessments. All assessment data will be captured into the IUCN Species Information Service (SIS) data entry module.

The first major Red List training workshop was held in Antananarivo at the Parc Botanique et Zoologique de Tsimbazaza, 2-4 October 2006, led by Project Technical Advisor George E. Schatz from MBG and IUCN, and attended by 35 participants from 12 Malagasy partner organizations. Objectives of the Workshop included: 1) overview of the concepts and methodology utilized in IUCN Red List[™] assessments; 2) introduction to the IUCN SIS DEM database for Red List assessments, and conservation, sustainable use, and human livelihood information; 3) overview of the mapping of primary occurrence data for conservation assessments; 4) working through a variety of practical examples, including species with both broad and restricted distributions, and species known only from older

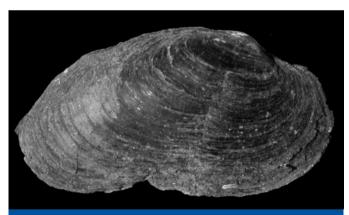
historical collections and/or a single locality; and 5) identification of priority species for assessment.

Priority target species include: reevaluation of the ca. 200 species currently on the Red List that were assessed with the earlier 1994 criteria to bring them up-to-date with the current 2001 criteria; the remaining species in Madagascar's seven endemic families that are not yet assessed; the ca. 200 species included in the GEF-funded Crop Wild Relatives project; all endemic Malagasy species of legumes; endemic orchid species whose distributions are well known; endemic freshwater species in the genera Hydrostacbys and Aponogeton; endemic Malagasy medicinal plants; endemic species utilized for their wood for either fuel or construction; and other commercial species, including those listed on CITES. The MPSG continues to serve as the focal point for the IUCN/BGCI GEF-funded project "Implementation of GSPC: Identification of threatened species and protection of Important Plant Areas in six priority countries", as well as contribute to the elaboration of a National Strategy for Plant Conservation.

Charlotte Rajeriarison, Chair and George E. Schatz

Mollusc

The giant pearl mussel, one of Europe's most threatened invertebrates: sixth location in France found to be threatened by river development



A fresh shell of the giant pearl mussel, *Margaritifera auricularia*, from the Oise river in France

The giant pearl mussel (*Margaritifera auricularia*) is probably among the most threatened invertebrate species in the world. Previously, it occurred in most European rivers from Denmark to Spain. It was thought to be extinct in the 20th century before its rediscovery in Spain in 1996, and in France in 1999. It is categorized as *Critically Endangered* on the IUCN Red List of Threatened Species[™] and listed in appendix IV of the European Habitat Directive.

With a lifespan of up to 120 years the giant pearl mussel is the largest European continental mollusc.



It needs a stable environment and free running rivers to complete its life cycle and it cannot cope with the permanent changes due to the human management of slow flowing rivers. Main causes of decline are thought to be (1) river management including recalibration, dredging, dam building, and subsequent hydrological changes; and (2) extreme rarefaction of European sturgeon, its presumed intermediary host.

Today, its severely fragmented population is restricted to seven locations: one in Spain (estimated at several thousand individuals) and six in France (estimated at a few hundred individuals). At the six French locations, one was threatened by a bridge project and another is scheduled to be dredged against floods. A new site was recently discovered during an impact study for a major canalization project dedicated to shipping.

In light of the alarming situation, funds have been allocated by projects holders for the study of these last known populations, including proposed compensatory measures. Nevertheless a global plan is urgently needed to counteract the giant pearl Mussel's global decline. A European action plan was set up in 2000, but it has never been implemented.

Biotope, a consultant agency specialized in ecology, is planning to gather private funds for a European restoration plan that should include (1) further investigation to estimate the global living population, (2) artificial breeding, and (3) practical environmental measures.

Vincent Prié, Mollusc Specialist Group

Creeping threat in Lake Malawi

The threat of an introduced Melanoides gastropod in Lake Malawi

As part of an expanding effort to investigate and describe the endemic thiarid gastropods (freshwater snails) of Lake Malawi, a suprising discovery was made that underscores the importance of accurate, fine-scaled species recognition. Results from a combination of molecular and morphological work revealed that Lake Malawi harbours not only a number of native lineages of Melanoides gastropods, but also an invasive Melanoides (Genner et al. 2004). Among the natives to the Lake Malawi basin, the group Melanoides polymorpha includes, as you might guess from the specific name 'polymorpha', huge morphological diversity. 'Morphs' of these are potentially identifiable as 'species equivalents' as they are strongly genetically differentiated, however their reproduction is primarily asexual (Genner et al. 2007a), so their equivalence to standard species is somewhat debatable. There is also a second native Melanoides that looks quite distinct from the various M. polymorpha morphs and is commonly identified as M. tuberculata. Recently, DNA sequence results have uncovered a third separate lineage of M. tuberculata with origins in Asia. We have termed

this a camouflaged invasion, as to the casual observer the new *M. tuberculata* looks similar to the native *M. tuberculata*. However, it is still possible to distinguish the new lineage by its subtle, but distinctive, shell characters.

We have termed this a camouflaged invasion

The absence of this invasive snail from historic museum collections indicates that it arrived in Lake Malawi recently, potentially as an introduction with ornamental fishes. This invasive M. tuberculata is becoming extremely common. It is not only possibly displacing members of the other Melanoides gastropods native to the area, but its sheer abundance may be influencing other aspects of the lacustrine ecology of the region. Lake Malombe, a large peripheral water body of Lake Malawi, where fishers use 'nkatcha nets', finemeshed bottom-weighted set seines approximately 5 m depth before being pulled together at the base by a swimmer. This net drags up everything, which is landed and sold by the tin bucket-load. Buyers dump the catch on the ground and pick the fish from the snails. The landing beaches are now carpeted with thick layer of dried or decomposing invasive Melanoides. In 1996 the fishers of Malombe caught only fish (MG pers. obs.). We hypothesize that among the many possible reasons for the rapid expansion of this invasive is release from parasite pressure, as our work has shown that the invasive Melanoides is unexpectedly free from the parasites common to native thiarid gastropods (Genner et al. 2007b). The invasive snail has also recently been found in Lake Chilwa, a huge shallow lake in a neighbouring catchment. Future colonisations of freshwaters throughout the region are likely.

Ellinor Michel, Martin Genner, and Jonathan Todd

Odonata

New Chair takes over and efforts continue to complete a Global Assessment of all odonata (dragonflies and damselflies) species

The Odonata (dragonflies and damselflies) Specialist Group (OSG) consists of 30 members from all over the globe. After four years, Viola Clausnitzer from Germany, stepped down as chair and will continue as Red List Authority Focal Point for the group. Vincent Kalkman from the Netherlands accepted the appointment as new Chair of the OSG during a meeting in Swakopmund in April in 2007.

The SSC would like to thank Viola for her tremendous contribution to the OSG over the last few years. During her time as Chair, Viola has managed to build a highly motivated team of experts with global coverage and has successfully cajoled all to complete Red List assessments for those species thought to be threatened globally. The results, as published in the 'Guardians of the Watershed' in 2004, now provide a very strong base for the ongoing efforts to complete a Global



Assessment of all species. Viola will remain actively involved in the OSG, as the Red List Focal Point, for which we are all very grateful. We now welcome Vincent as the new Chair and wish him success

We have to 'translate' information on dragonflies from scientific articles to easy-to-use field guides on behalf of the world's dragonflies. Vincent works at the European Invertebrate Survey which is housed in the Dutch National Museum of Natural History (Leiden). He is currently organizing a project for a European atlas of dragonflies and

spends most of his free time on the study of the dragonflies of tropical Asia.

The meeting in Swakopmund took place in the frame of the 5th WDA International Symposium of Odonatology during which Viola and Will Darwall were invited to present the case for completing the Global Dragonfly Assessment - this was well received by all present. During the OSG meeting the main tasks for the OSG for the coming years were discussed. The past four years have been very productive for the IUCN Odonata specialist group. In 2004 a special issue of the *International* Journal of Odonatology 'Guardians of the watershed. Global status of dragonflies: critical species, threat and conservation' was published containing 22 regional reports on the threat-status $of \, drag on flies \, (available \, from \, the \, IUCN \, bookstore).$ Based on these reports the red listing process was intensified, mainly concentrating on species in the threat categories NT, VU, EN, and CR. All African species will be assessed as part of the African Freshwater Assessment by the end of 2007. At the same time a quarter of the world species will be assessed as part of the Sampled Red List Species Index (SRLI). Together this will result in 40% to 50% of the world dragonflies being assessed by the end of 2007.

Future steps of the OSG

Having a global assessment of dragonflies similar to those carried out for amphibians, birds, mammals, conifers, and cycads would be very important for the further study and conservation of dragonflies. At the moment assessments of dragonflies are often based on old information and for many areas more recent information is only available in collections or recent fieldwork is lacking altogether. For this reason the Odonata SG is looking for ways to continue the work on a global dragonfly assessment in such a way that it is more than just reshuffling old information. Activities to search for funding are being undertaken in co-operation with Piotr Naskrecki from Conservation International. Work on regional databases will continue as long as there is no funding to bring together a world distribution database for dragonflies. Momentarily, databases are being maintained for Africa, Europe, North-America, Malaysia, Indonesia, and Papua New Guinea. Several

other regional databases are in preparation (Russia, China, and the Guyana Shield).

In temperate regions, dragonfly conservation is in most cases already being undertaken by local governments and local nature or dragonfly organizations. However, the highest dragonfly diversity occurs in the tropics. This is also where dragonfly species are facing the greatest threats. As a result the dragonfly specialist group has an important role to play in tropical dragonfly conservation.

Conservation activities in the tropics are hampered by the lack of local people involved in conservation and by the lack of basic information on dragonfly distributions. In the last decade the number of naturalists in the tropics has increased. Most of these are interested in birds, as this is often the only group for which field guides are available. If we want more people in the tropics to become interested in dragonflies we have to 'translate' information on dragonflies from scientific articles to easy to use field guides. Finding ways to publish field guides on tropical areas will therefore be one of the Odonata SG priorities as this is the best way in which we can contribute to long term conservation.

Vincent Kalkman, Chair, Viola Clausnitzer, former Chair, Will Darwall

Pigs, peccaries and hippos

Update from the Hippo Sub-Group

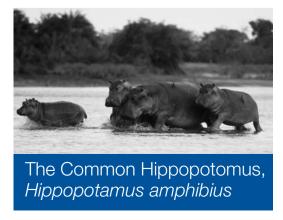
The Hippo Specialist Sub-Group has maintained its core of members with a notable absence following

the passing of Dr Keith Eltringham this year. His insights and knowledge will be sorely missed.

There has been a growing interest in common hippo conservation from numerous film production companies regarding the threats to hippos and growing concerns regarding hippohuman conflict. In development are also several field survey projects focused on common hippos in West African countries, which have the

most fragmented and isolated populations.

There has been a growing interest in common hippo conservation from numerous film production companies





Unfortunately, the conservation status for both common and pygmy hippos continued to worsen this year. The near extirpation of the 20,000 common hippos in the Democratic Republic of Congo (DRC) and rampant deforestation in the forest complexes of Liberia, suggests that populations of both species are in decline across the continent. The DRC situation is unique in scale, but there are similar reports from other countries of rampant unregulated hunting of common hippos. The majority of pygmy hippo habitat does not have enforced protection and our ecological knowledge of this species remains extremely limited.

The lack of funds to support hippo conservation research projects contributes to the crisis. The Hippo Specialist Sub-Group has been focusing much of its efforts on establishing a closer link with AZA facilities to work towards establishing an effective non-profit organization that would directly support hippo conservation and research projects. Without this support, it is unlikely we can make progress within the international community to reverse the current population trends.

Rebecca Lewison, Chair Hippo sub-group

Tapir

Announcing the development of the second IUCN Tapir Action Plan, after five years of dedicated hard work

During the First Tapir Symposium in Costa Rica in 2001, participants agreed that the revision of the IUCN *Tapir Status Survey and Conservation Action Plan* (Brooks, Bodmer and Matola, 1997) was urgently needed. An Action Planning Committee was created and selected the Population and Habitat Viability Assessment (PHVA) as the most appropriate method for the development of updated action plans for each tapir species. The first step towards achieving this

goal was the Malayan Tapir PHVA, held in Malaysia, in August 2003; followed by the Mountain Tapir PHVA in Colombia, in October 2004; and the

Baird's Tapir PHVA in Belize, in August 2005. Two weeks ago, the Tapir Specialist Group (TSG) finalized the last meeting, the Lowland Tapir PHVA, held in Sorocaba, São Paulo, Brazil, including 70 participants from the species distribution throughout South America. As the previous

TSG wants this plan to be a "living document"

ones, this final meeting was extremely successful and we can now say we have new, updated, prioritized action plans for each tapir species.

The TSG worked hard to fundraise for and organize these PHVAs around the world. Now it is time to change focus to make sure the new plan will be actively used by all organizations involved with tapir conservation, and guarantee that all actions will be implemented. Our Action Plan Implementation Taskforce will focus on promoting the plan throughout tapir range countries in Central and South America, and Southeast Asia, reaching all possible stakeholders. TSG wants this plan to be a "living document", which will be constantly reviewed, updated, and adapted according to tapir conservation needs. Additionally, we will provide support for any initiatives aiming to implement actions, including technical assistance, help with proposal development, fundraising, and political lobbying. The progress made in implementing the plan will be evaluated every two years during the International Tapir Symposium.

For further information about each one of our PHVA Workshops and Action Plans, including lists of organizers, institutional and financial support, and lists of participants per range country, please visit our website www.tapirs.org

Patrícia Medici, Chair



From the SSC Steering Committee Sub-groups

Invertebrate Conservation **Sub-Committee**

Focusing on invertebrates

Invertebrates are suffering extinction as much as any other taxon. It has been estimated that perhaps as many as a quarter of all insects will go extinct over the next few decades. Estimates from Britain suggest that insects are even going through local extinction faster than vascular plants or vertebrates. One of the first tasks is identify which and where these threatened species are declining. This is one of the important aims of Red Listing, and is the first priority of the Invertebrate Conservation Sub-Committee (ICSC). Red Listing of course is closely allied to topics such as habitat and landscape conservation, and may be described as the fine filter of species conservation overlying the coarse filter of landscape conservation. For these activities within the remit of IUCN/SSC this is being done through the Biodiversity Assessment Sub-Committee (BASC), with the ICSC ambassador to BASC being Mary Seddon (Chair of the IUCN SSC Mollusc Specialist Group).

The ICSC now has two prongs, one covering the marine environment, and other the terrestrial realm. These prongs are the Marine Invertebrate Red List Authority (MIRLA) and the Terrestrial Invertebrate Red List Authority (TIRLA). These are being spearheaded by two well-known invertebrate biologists, Alex Rogers and Sacha Spector respectively.

Under both MIRLA and TIRLA are scientific experts (Focal Points) driving particular focal taxa and/or geographical areas. Some have been appointed, including Freshwater Crabs (Neil Cumberlidge), Scarabaeidae (Sacha Spector), Orthoptera Ensifer (Piotr Nascrecki), Orthoptera Caelifera (Axel Hochkirch), Cicindelidae (Dave Pearson), European Invertebrates (Deb Proctor) and Western Indian Ocean Invertebrates (Justin Gerlach). These are in addition to the existing Mollusc SG, as well as the Odonata SG (Chaired by Vincent Kalkman).

An important point is that the ICSC is planning in step with current discussions in the SSC steering committee so that a fully fledged structure is in



Close up of a grasshopper from Crete, Greece

place right at the start of the next Quadrennium. Meanwhile, a process is in place that is beginning to feed into the SSC Strategic Plan and can at the same time cater for necessary Red Listing assessments that may be required on individual species.

Should any experts, on whatever taxonomic groups or geographical areas where they have specialist knowledge, be interested in making a valuable contribution to the ICSC, please do contact Samways@sun.ac.za. All support from dedicated invertebrate conservationists is most welcome indeed!

Michael Samways, Chair



News Features

Tribute to mammal taxonomist Peter Grubb

Peter Grubb, one of the most eminent and admired mammalogists of this age, died of cancer on 24 December, 2006. He was 64.

Those involved with SSC will be familiar with his work on the taxonomy of African mammals. He was always interested in solving biogeographic problems, and these often determined which mammalian groups attracted his attention taxonomically. He discovered that there really are two living species of warthog, not just one; that the nature of the hair on the neck is a significant distinguishing feature of species-groups of duikers, and has implications for their behaviour and their distribution; that the West African savannah tends to be populated by local forest species that have

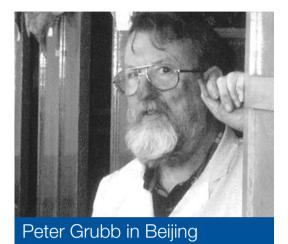
Only Peter could have pulled together disparate sources and followed up the leads with such perspicacity

ventured out into the open, rather than by their congeners that live in the savannahs of East and South Africa; and so on. Only Peter could have pulled together disparate sources and followed up the leads with such perspicacity. A special

interest of his was species or species-groups that have populations in both rainforest and savannah zones: how do they interrelate, both taxonomically and phylogenetically? He returned again and again to these themes (working on primates, duikers, bushbuck, elephants, squirrels and other mammals), and published several papers on African mammal biogeography which have achieved the status of standard works in the field.

At the conference-workshop on Primate Taxonomy organized by Conservation International in Orlando, Florida (USA) in 2000, he found himself allotted the task of compiling and editing the publication of the workshop on African Primates. There had been unprecedented levels of dissension during this particular workshop, and the skill with which he worked the disagreements into a final coherent form (Grubb et al., 2003. Assessment of the diversity of African primates. Int J Primatol 24(6): 1301-57) testifies not only to his own good nature, which abhorred confrontation, but to his keen understanding of the subject matter and its context. The result is worth reading for its nuances, for its balance, and for its insistence that it was not the final statement, it had to be very preliminary and there was much more to be learned.

Much of his work is still unpublished, and some of the rest (such as his important African suid work)



has been published only in preliminary form. It is an amazing achievement to have published as much as he did, because most of his working life was spent as a school teacher, and his opportunities for research and writing were reduced to his spare time and occasional periods of leave.

Peter made a major contribution to primate and ungulate taxonomy and was greatly admired by those who were fortunate to work with him. He will be sadly missed.

Based on a tribute by Colin Groves

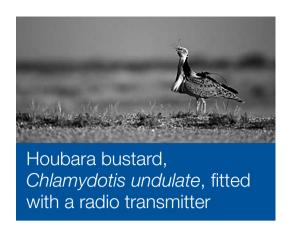
Return of the native: re-introducing the houbara bustard to Saudi Arabia

The houbara bustard (*Chlamydotis undulate*) is a striking bird of deserts and drylands, particularly scrub-covered plains. Despite its huge range, from Spain across North Africa through the Middle East and central Asia to China, it is declining at an increasing rate and is listed as *Vulnerable* on the IUCN Red List of Threatened Species™. The total population is estimated at between 49,000–62,000 birds, but is decreasing because of habitat loss and degradation, including agricultural and infrastructure projects, all compounded by high hunting pressures.

Falconry and hunting of the houbara bustard is deeply embedded in Arabian culture and has been described in the works of poets and story tellers. Falconers on camel back used to regard the arrival of large numbers of houbara from central Asia as a reward from the Almighty to those who had endured the summer heat.

Since the advent of four-wheel drive vehicles, it has become easier for people to chase and poach





houbara, even on sand dunes. Today, houbara are not hunted for food but for sport. They are also illegally trapped for falconry.

Houbara bustard in Saudi Arabia

Formerly widespread through large parts of the country, breeding wild houbara have almost disappeared and are now restricted to the northwest: mainly in the protected areas of Harrat al-Harrah, al Hammad and Al Nafud. However, in the last five years there have been numerous reports of poaching in these protected areas.

The Saudi Arabian houbara bustard breeding programme was started in an attempt to restore the breeding population by re-introducing captive birds into the wild. Between 1986–1988, fertile eggs were collected from Baluchistan in Pakistan. By the 1990s, through the application of artificial insemination techniques the National Wildlife Research Centre (NWRC) was able to produce enough houbara chicks for the first trial release.

All re-introductions were done in accordance with the *IUCN Guidelines for Re-introductions*.

Re-introduction sites in Saudi Arabia

Two sites have been chosen: Mahazat as-Sayd in 1988 and Saja Umm Ar-Rimth in 1994 as an extension of Mahazat as-Sayd protected area. The reserves are sandy plains with a few rocky outcrops and moderately vegetated with trees and scrubs such as *Acacia totilis*, *Indigofera* and *Salsola*.

Re-introduction methods and survival rates

The captive-bred juveniles are moved to long, tunnel-shaped cages when they are four to six months old, in order to acclimatize them to their new surroundings. After three to four weeks the birds are then released into a predator-free core enclosure. They gradually start going out of this zone but tend to return when they see mammal predators.

A total of 781 birds have been released in Mahazat as-Sayd protected area since 1991, with a further 145 in Saja Umm Ar-Rimth between 2003 and 2006.

Mortalities have been mainly due to mammal predators (cats and foxes), with some dying of starvation or poaching. In Mahazat as-Sayd, 133 died within the first month and only 35 had survived up to May 2007 in Saja Umm Ar-Rimth.

These results clearly show that the creation of an additional predator-free enclosure would allow the birds to acclimatize better to the natural environment and significantly improve survival rates.

Total population and densities of houbara in Mahazat and Saja protected areas

Houbara bustard densities in the release areas are high compared to wild populations. The minimum density in 2006 was 0.367 birds per km².

Populations were assessed using three methods: observations during car driving transect; observation on circular points; and by calculating the number of houbara radio-tracked during the month divided by the size of the area they used (Kernel 95 method).

Challenges for the future

- Regular monitoring of houbara is necessary to check population status of houbara in Saudi Arabia.
- Need to support national legislation concerning the houbara and other species of birds for conservation.
- Hunting should be avoided during the breeding season and no hunting should occur in and around re-introduction sites.
- Regular check on conservation planning to determine whether modifications are needed.
- Falconers/Hunters should also participate in the conservation programmes initiated by the NWRC (National Wildlife Research Centre) in Taif, and provide information about their activities.





- All the houbara range countries should exchange information regularly.
- There should be an international team of researchers to share data and strategize conservation planning in consultation with government bodies.
- •• All the breeding sites should be strictly protected.
- Large-scale habitat conservation programmes are among the most promising steps for houbara conservation, particularly if hunting is prohibited or strictly controlled in such areas.
- •• More potential houbara release sites need to be identified and protected in order to restore a stable population
- Conservation awareness programmes should be initiated.
- Regular articles in local news papers should be published.

Awareness programmes

NWRC has been carrying out educational and awareness programmes to meet these challenges for long-term survival and conservation of endangered houbara bustard in Saudi Arabia.

Conclusions

If the hunting trend continues, houbara populations may eventually collapse over most of their range,

reaching such low levels that recovery would be difficult. Such a decline would certainly mean houbara would no longer be able to be harvested for falconry, and this ancient Arab tradition would die. If the

Today, houbara are not hunted for food but for sport

disappearance of houbara from many countries is to be avoided, then conservation action must be taken immediately to ensure the protection of habitats within the houbara's range, and to reduce the loss of animals from hunting.

Further information and acknowledgements

Detailed scientific information on this project is available from M.Zafar-ul Islam email: zafar@ nwrc-sa.org

The project leaders wish to extend their thanks and gratitude to HH Prince Bandar bin Saud Al Saud (Secretary General, NCWCD) for his leadership, generosity and continuous support towards the research and conservation work by the NWRC in the Kingdom. Also Mr Abdulrahman Khoja, Mr Ali Zahrani, Mr Chukkans, Rangers in the protected areas for their continuous support and encouragement for the field work.



Houbara and falcon



News Round-Up

Announcing the Sir Peter Scott Fund for Conservation Action Grants

Madagascan flying foxes, Ganges river dolphins, Hawaiian plants and Arabian leopards are among the species that are all set to benefit from the second round of grants issued under the Sir Peter Scott Fund for Conservation Action, created by the IUCN Species Survival Commission (SSC) to support its Specialist Group's conservation projects.

The Sir Peter Scott Fund for Conservation Action provides small grants (up to US\$15,000) to support the activities of its members in their work to conserve threatened species around the globe. In many parts of the world, a small amount of well-directed money can have a significant impact.

The selection committee was very impressed by the diversity of applications which reflected the wide scope of the work of the SSC. A new call for projects is due to be issued in September. In total six projects have been selected to receive grants in this round.

Flying fox roosts in Madagascar

SSC Chiroptera Specialist Group

The Madagascan flying fox (*Pteropus rufus*) is a large endemic fruit bat which plays an important role in seed dispersal and pollination. It is threatened by hunting, persecution and roost disturbance. Protected areas do not contribute greatly to Madagascan flying fox conservation because they roost in small forest fragments. This project will develop community based conservation plans at the village level for the conservation of fragments supporting flying fox roosts. It will also include a community based habitat monitoring initiative at two of the most threatened roost sites.

Ganges River dolphins in the Brahamaputra River, India

SSC Cetacean Specialist Group

Ganges river dolphin populations are thought to have declined by at least 50% over the last 50 years and are listed as Endangered on the IUCN Red List of Threatened Species™. The Ganges-Brahmaputra River basin has one of the highest human population densities on earth and the dolphins are under enormous pressure due to intense utilization and degradation of their river habitat. This project will provide vital information on the distribution, abundance, behaviour and acoustics of Ganges

River dolphins to guide conservation and management of these Endangered cetaceans.

Hawaii's rare plant genetic safety net programme

SSC Hawaiian Plant Specialist Group

Nearly 200 of the 1,500 native plant species in Hawaii are at risk of going extinct within the next few years due to threats such as habitat destruction and invasive species. This project aims to prevent the extinction of the rarest of the rare Hawaiian plants by introducing management measures for wild populations, collecting seeds or cuttings for genetic storage and reintroducing some of these species into protected managed sites.

Southwest Wolf Information Network

SSC Wolf Specialist Group

The Mexican sub-species of the gray wolf is the most threatened wolf type in North America. A gray wolf population was reintroduced to an area straddling the Arizona/New Mexico but human wolf conflict has become a major problem in this multi-use landscape and the wolf population is currently shrinking due to the number of removals. This project aims to provide accurate, balanced education about the effects of wolves and humans on each other and the environment.



Arabian leopard in the Republic of Yemen

SSC Cat Specialist Group

This project will focus on the conservation of the *Critically Endangered* Arabian leopard. Yemen is a key country for the survival of this species but very little is known about its current distribution and



conservation status. The project will involve a Rapid Assessment survey of Wada'a region and provide training for two Yemeni for further training in the field of wildlife monitoring and conservation.

Leopard conservation in Pakistan

SSC Cat Specialist Group

The common Leopard which had disappeared in many parts of its historic range in Pakistan is showing encouraging signs of recovery. However, this increase in numbers has also led to an increase human-leopard conflict. Leopard attacks on domestic livestock and people have led to widespread trapping, poisoning and shooting of leopards. The goal of this project is to reduce these conflicts in a number of ways including introducing training for women who work in the forest so they can minimize their risks and developing mechanisms for the compensation of livestock owners.

IUCN contributing to CITES CoP 14

The SSC and the Species Programme were both well represented at the 14th Conference of the Parties to the Convention on International Trade in Endangered Species (CITES) which took place in The Hague (the Netherlands) from the 3-15 of



June. Members of the IUCN delegation were heavily involved in both the build up to the conference, notably producing the analyses of the proposals to amend CITES appendices, and during the conference itself, as impartial technical advisors.

Dr Jane Smart, Head of the Species Programme commented, 'It was wonderful to see the SSC network in action in relation to the various agenda items. The technical knowledge provided clearly underpins the workings of the whole convention, and is at its heart'.

As a result of two weeks of discussion and negotiation several important decisions were made

to manage the trade in endangered species. In particular, a consensus was reached on the trade in ivory and a strong decision was taken to reject the raising of captive tigers for trade in tiger parts. Outcomes were mixed for shark fisheries and timber species with proposals to include spiny dogfish and porbeagle sharks on Appendix II rejected and most timber proposals withdrawn.

Dr Holly Dublin, the SSC chair reflected that despite being defeated on some issues there were other victories both small and large and that the SSC had emerged 'stronger than ever before in the eyes of the parties'.

Dr Sue Mainka, head of the IUCN delegation, welcomed an increasing recognition by parties of the connections between species trade and other issues such as effective governance, poverty reduction and sustainable livelihoods.

For more information see IUCN CITES CoP 14 website:

http://www.iucn.org/themes/ssc/our_work/wildlife_trade/citescop14/index_cites_2007.htm

One in six European mammals threatened with extinction

The first assessment of all European mammals, commissioned by the European Commission and carried out by the World Conservation Union (IUCN), shows that nearly one in every six mammal species is now threatened with extinction. The population trends are equally alarming: a quarter (27%) of all mammals has declining populations and a further 33% had an unknown population trend. Only 8% were identified as increasing, including the European bison, thanks to successful conservation measures.

Full story:

http://www.iucn.org/en/news/ archive/2007/05/22 pr european mammals.htm

Marine Summit calls for dramatic increase in ocean protection

The IUCN Marine Protected Area Summit held in April in Washington, DC, issued a strategy to counter escalating threats to the world's oceans. Experts warned that the Earth's oceans are being destroyed at a much faster rate than they are being protected.

As a key solution, the summit proposed to rapidly increase protection of the oceans and connect marine protected areas through corridors. These 'marine corridors' would allow marine species to recover and migrate under changing sea temperatures and sea chemistry. Currently, only 1%



of the oceans are protected, compared to over 12% of the Earth's land surface.

Full story:

http://www.iucn.org/en/news/ archive/2007/04/13_pr_marine_protected_ areas.htm

Threats to migratory sharks highlighted

Thirty-five species of migratory sharks and rays considered Threatened by the IUCN, also meet the criteria for listing under the Convention on Migratory Species (CMS), states a report submitted to the Scientific Council by the IUCN SSC Shark Specialist Group and the Shark Alliance. CMS listings encourage countries to work together on conservation agreements for species which migrate across their boundaries and could be especially beneficial for wide-ranging sharks given the current lack of shark fisheries management.

Full story:

http://www.iucn.org/themes/ssc/news/2007_articles/migratory-sharks.htm

Freshwater fish thrown a lifeline by global conservation experts

The plight facing freshwater fishes was tackled by some of the world's leading conservationists at a week long gathering in March. Many of the world's 14,000 freshwater fish species are in difficulty because of climate change, over-fishing, pollution, damming and habitat destruction. In a global effort to tackle these problems, Chester Zoo, UK, hosted a five day meeting of the IUCN SSC Freshwater Fish Specialist Group (managed jointly by IUCN and Wetlands International) where experts united to pull together action plans to identify and monitor the situation, publicize the work in progress and develop a global strategy for fish conservation.

Full story:

http://www.iucn.org/themes/ssc/news/2007_ articles/freshwater_fish.htm

New ape population, environments and surveys database

The new Ape Populations, Environments and Surveys (APES) database, was launched in March, and can be accessed on the APES website at http://gis.eva.mpg.de. It is a joint initiative of the Max Planck Institute for Evolutionary Anthropology in Leipzig and the IUCN SSC Primate Specialist Group. The APES database aims to provide the information needed for long-term management and conservation strategies to save the great apes. It will provide an

accurate global picture of the distribution and status of all great apes, and will undoubtedly become a valuable tool for all those working to conserve and protect the world's remaining wild ape populations.

Twenty coral reef fishes threatened with extinction

Twenty species of grouper, a globally important group of 162 coral reef food fishes, are threatened with extinction unless management or conservation measures are introduced. This was the conclusion of a panel of twenty experts from 10 countries at a recent conservation summit convened to assess the status of groupers worldwide. Groupers are the basis of the multi-million dollar live reef fish trade centred in Hong Kong and the most valuable commercial fishes in the fresh fish markets of the tropics and sub-tropics.

Full story:

http://www.iucn.org/en/news/archive/2007/03/6_coral_reefs.htm

More oceanic sharks added to the IUCN Red List



Oceanic whitetip shark, Carcharhinus longimanus

More oceanic or 'pelagic' sharks are being added to the IUCN Red List of Threatened Species based on the findings of an international workshop, convened by the IUCN SSC Species Survival Commission (SSC), that examined the conservation status of these highly migratory sharks against Red List criteria. Shark scientists stressed the vulnerability of these species to overfishing and concluded that several species are now threatened with extinction on a global scale.

Full story:

http://www.iucn.org/en/news/archive/2007/02/22_pr_sharks.htm



MacArthur Foundation to assess climate change threats and fund responses

Recognizing that global warming is occurring and threatens biodiversity conservation, the John D. and Catherine T. MacArthur Foundation will invest \$5 million over three years to identify and mitigate the threat from global climate change on species in the most diverse ecosystems of the planet. MacArthur President Jonathan Fanton announced support for eight initial projects that respond to the pressures placed on species and their habitats as a result of climate change.

Full story:

http://www.iucn.org/en/news/archive/2007/02/13 climate change.pdf

Carcass of *Critically* **Endangered** whale found in fishing nets off Japan's coast

A *Critically Endangered* Western Pacific Gray Whale has recently died off the Pacific coast of Japan after becoming trapped in fishing gear. This is the fourth Western Gray Whale, all female, known to have been killed in this manner on the Pacific coast of Japan in the last two years. The Western Gray Whale population consists of about 120 individuals, of which only 25 to 35 are reproductive females. According to a population projection prepared by the World Conservation Union's Western Gray Whale Advisory Panel, this rate of loss of females will, if continued, lead to extinction of the population with high probability.

Full story:

http://www.iucn.org/en/news/archive/2007/02/01_pr_gray_whale.htm

Jane Smart appointed new Foreign Member of the Royal Swedish Academy of Agriculture and Forestry

Dr Jane Smart will be the first foreign member of the Royal Swedish Academy of Agriculture and Forestry from an international environmental protection organization. The Academy already has a number of foreign members in the forestry and agriculture sectors but with its increasing commitment to environmental protection they have been searching for member active in international conservation. With her brilliant career in several international conservation organizations and extensive knowledge of environmental protection Jane Smart will be a valuable asset to the Academy.

Full story:

http://www.iucn.org/themes/ssc/news/2007_articles/jane_smart_award.htm



IUCN Species Programme Updates

Biodiversity Assessment Unit

Global Mammal Assessment (GMA)

Staff difficulties in the GMA Team and a delicate situation with the University of Virginia, which is the main financial supporter of GMA staff, has resulted in a considerable amount of time lost over the last few months. A new workplan for completing the GMA has had to be prepared. This involves completing all the data input and reviewing and checking for consistency by the end of December 2007, with the data being made publicly available in the 2008 IUCN Red List (a small number of mammal species are being updated on the 2007 IUCN Red List, in agreement with Specialist Groups). Two successful GMA workshops have been held in the past six months: one on Southern Cone mammals; and another on cetaceans. The Mesoamerican workshop which was originally set for March has been postponed due to insufficient funding.

European Mammal Assessment

The IUCN Species Programme and IUCN Regional office for Europe (RofE) completed a comprehensive regional-level assessment of all terrestrial and marine mammal species in Europe. The published report and website were released on 22 May 2007, World Biodiversity Day (see 'Publications' in *End Notes* section).

Global Reptile Assessment (GRA)

The focus of the GRA has been on the completion of the North American and Mexican species accounts, with a view to including all the species endemic to this region on the 2007 IUCN Red List. Preliminary data collection has been completed for the Philippines, and a review workshop was held on these species in April. The species from the Caucasus (including all of Turkey and Iran) are also ready for review, but the funds for this workshop are not yet fully in place. Data collection is also continuing in Melanesia, the former Soviet Union, and the Andes.

Global Amphibian Assessment (GAA)

The main emphasis has been on the book entitled *Threatened Amphibians of the World*, based on the GAA results, to be published with Lynx Ediciones in 2007. Texts and data are being checked and edited and the book should appear before the end of the year. Members of the IUCN SSCAmphibian Specialist Group have contributed 55 guest essays to be included in the book.



Wood's Cycad, *Encephalartus woodii*, extinct in the wild

Plant Assessments

The GEF Plants Project: Botanical Gardens Conservation International (BGCI) has now stepped into this project which aims to carry out species assessments and identify important plant areas in 6 countries. The project received a boost through support from the Swedish framework funds to IUCN for a project assistant. This position is also providing network support to the plants network.

In January, UNEP and the GEF Secretariat announced that the Full Sized Project would not be re-pipelined. It was also stated at that time that the Project Development Fund B was on hold, although UNEP have since confirmed that the project can proceed. Despite these set-backs, progress has been made and country visits and workshops took place in Cameroon, Morocco and Madagascar in June.

Other plant assessments: The IUCN SSC Cycad Specialist Group has almost completed its reassessment and full documentation of all the cycad species. Work has also continued on the Critical Ecosystem Partnership Fund (CEPF) funded Caucasus and EasternArc endemic plant assessments (with a successful workshop being held in Kenya). Conservation International has provided funding to enable the IUCN SSC Palm Specialist Group to start work on assessing the palms on Madagascar and the western Indian Ocean islands. IUCN has applied for several grants for plant conservation: funding for a reassessment and full documentation of all of the conifer species; preliminary assessments of plants with support for Specialist Groups; and support for legume assessments in Africa; the results of these applications are not yet known.



Global Marine Species Assessment (GMSA)

The assessments of the endemic corals and seaweeds of the Galapagos have now been completed and are being submitted to the 2007 IUCN Red List. The results show the dramatic effects of ocean-warming on these species, with a number of possible extinctions. Work continues on the shark, skate and ray assessments, led by the IUCN SCS Shark Specialist Group, and a workshop on pelagic sharks took place in February. It is expected that the assessments of all species of chondryichthian fishes will be completed by the end of 2007. All groupers were assessed at a workshop held in February; most of these will appear on the 2008 Red List, though some might be included in the 2007 list. A workshop on all the reef-building corals, mangroves and seagrasses of the Caribbean, together with selected seaweeds from the region, was held in Dominica in March. Data collection is currently underway for: coastal fishes of the Eastern Tropical Pacific; Mediterranean fishes; reef-building corals of the Indo-Pacific; seagrasses of the world; and mangroves of the world. Workshops are planned on all of these for later in 2007 or early in 2008. If all goes according to plan, the following groups should be comprehensively assessed in time for the 2008 IUCN Red List: chondryichthian fishes; groupers; and reef-building corals (with a chance that mangroves and seagrasses might also be completed).

Communications

Communications is currently operating on a reduced capacity (40%) following staff departures in September, but a Communications and Marketing officer (60%) will start in July.

With the current limited resources, activities have focused on core products and activities; notably the production of the SSC newsletter *Species*, the monthly SSC E-bulletin, updating and maintaining the SSC website, overseeing publications (e.g. *Greek and Spanish Top 50*), providing guidance on the implementation of the IUCN visual identity, and co-ordinating the distribution of SSC publications following the closure of Publications Services Unit (PSU) in Cambridge (Dec 2006).

The new look *Species* has been well received and changing printer/distributor has made savings of over 50%. The Chair profiles featured in recent editions were greatly appreciated and over 90% of the profiles are now accessible on Specialist Group pages of the website. A Chairs' profile page will soon be available.

IUCN Publication Services still has funds available to distribute Action Plans from PSU and anyone wishing to obtain copies should contact Andrew McMullin (andrew.mcmullin@iucn.org).



The major focus of the freshwater assessments has been for Africa, the Mediterranean Basin and Europe.

Pan-Africa Freshwater Biodiversity Assessment

The EU funded Africa project has progressed well with the southern and western Africa regional assessments now nearing completion. A total of 2,800 species of fish, molluscs, dragonflies, crabs and plants have now been mapped and assessed. Regional reports for each assessment will be completed during the next six months. Four Case Studies are being implemented to demonstrate the process, including the Rusizi River Delta (Tanzania / DRC) and the Okavango Delta. The northern Africa assessment was initiated in February 2007 with a training workshop in Rabat, Morocco.

Global Freshwater Fish Assessment

Work continues on the development of a proposal for a Global Freshwater Fish Assessment with potential partnerships. A draft proposal for raising funds to complete global and regional assessments for freshwater fishes, molluscs, dragonflies, crabs, crayfish, and selected aquatic plants is now under development.

The Darwin Initiative project

The Darwin Initiative project (Strengthening propoor wetland conservation using integrated biodiversity and livelihood assessment) is now underway with two study sites in Tanzania (Rufiji Delta) and Cambodia (Stung Treng Ramsar Site) where a protocol for the integration of the three disciplines of 'biodiversity assessment', 'economic valuation' and 'livelihoods assessment' is being developed.

A draft 'toolkit' for this integration has been developed and is being tested through field survey at both study sites. It is intended that the integrated database for this information will eventually provide an optional 'expert level' module for attaching to the SIS DEM to assess the economic and livelihood values of species previously highlighted for further evaluation through the initial species assessments process. One recent setback to the project has been the premature closure of the Mekong Wetlands Biodiversity Project, our partner in the region. A new partnership with the IUCN Asia Hanoi Office has allowed the project work to continue in Cambodia.

Sampled Red List Index

A three-day Sampled Red List Index workshop for freshwater fish hosted by the IUCN SSC Freshwater Fish Specialist Group was held in March and almost all of the 750 species concerned have now been assessed and evaluated.



Identification of important sites of freshwater biodiversity

The Freshwater Biodiversity Assessment Unit continues to work on the development of methodologies for the identification of important sites of freshwater biodiversity. Input has been provided to the Key Biodiversity Areas (KBAs) manual which has been submitted to IUCN for publication in the series of Protected Areas - Best Practice Guidelines. Work is continuing on a draft manuscript on quantitative thresholds for application of site selection criteria for important freshwater sites of biodiversity.

Invertebrates

Invertebrates are mostly covered under the freshwater and marine assessments as well as the Sampled Red List Index which aims at increasing their coverage. A meeting of the Invertebrate Sub-Committee will take place at the beginning of October to look at this issue.

Red List Unit

Red List Update

Work is underway in processing submissions for the 2007 IUCN Red List of Threatened Species. At this stage it is difficult to determine how many new assessments or reassessments will go into the 2007 update. The launch of the 2007 Red List is scheduled for the second week of September (12th or 13th). Negotiations have started with the web developers in Canada for the update and in particular will be reviewing the inclusion of some new features and improvements on existing features (as recommended by the Biodiversity Assessment Sub-Committee (BASC) Users' Working Group). A key component of this is to modify the appearance of the site so that it is more in line with the new IUCN Visual Identity.

Workshops

The Red List staff provide considerable assistance and support to the Global Species Assessment projects and to the wider IUCN and SSC network. Staff have been involved in the following workshops: Turkey national Red List planning and training workshop - under the auspices of the IUCN Centre for Mediterranean Co-operation and the government of Turkey (December 2006), Cetacean assessment workshop (February 2007) [GMA], a North African Red List training workshop (February 2007) [Pan Africa Freshwater Species Assessment and the IUCN Mediterranean Office], Pelagic Sharks assessment workshop (February 2007) [GMSA], Red List training course - Manchester Metropolitan University MSc Conservation Course students (February 2007) and a Caucasus Plant Red Listing workshop (May 2007). A number of Red List training and species assessment workshops are planned for the second half of the year.

Through these workshops, the Red List unit staff are playing a direct role in species assessments for European mammals, and for all the endemic plant species being assessed through two projects funded by the Critical Ecosystem Partnership Fund in the Eastern Arc Coastal Forests and the Caucasus.

Red List Partnership

A meeting was held in Gland in early January to work on the next iteration of the Red List Partnership Agreement. It is hoped that a next iteration will be circulated to partners shortly.

It had been agreed to re-draft the Agreement redefining the role of the partnership (no longer to underpin all RL outputs, rather to implement and support parts of the SSC Strategic Plan); and a series of annexes will comprise MOUs with the Partners.

Administrative support

The Red List staff provide the secretariat for the Biodiversity Assessments Sub-Committee (BASC) and play key roles on the Users'Working Group and Classification Schemes Working Group (was the Authority File Task Force) under the BASC.

Petitions

During the year there have also been two petitions; one from the Forestry Commission in Guyana about the listing of the Greenheart (*Chlorocardium roodei*) and one concerning the status of the Olive Ridley Turtle (*Lepidochelys olivacea*). In both cases, the assessments are based on the 1996 version of the Red List Categories and Criteria, hence under the Petitions Process, the Red List Authorities concerned were requested to reassess these species and to provide the new assessments with all the supporting documentation within a specific time period. The Greenheart process is scheduled for completion in mid-October and the Olive Ridley by early November.

Species Trade and Use Unit (STUU)

CITES CoP 14

A major part of the Species Trade and Use Unit's work has been concerned with the preparations for and participation in the 14th Conference of the Parties for the Convention on the Trade in Endangered Species of Wild Fauna and Flora (CITES).

In preparation for CITES CoP 14, considerable efforts were put into raising funds for the joint IUCN/TRAFFIC project to analyse 'Proposals to amend CITES Appendices' in advance of CoP 14 in June 2007. This project was completed on time and 'The Analyses' were posted on the SSC website on the 30th March 2007. SSC Specialist Groups and other IUCN programmes and regions provide invaluable input into this process.



The Species Trade and Use Unit played a pivotal role in the organization of the 20 strong IUCN delegation attending the two week CITES CoP 14 in June. During the meeting IUCN, and in particular IUCN Species Survival Commission Specialist Groups, were specifically recognized both for their role in preparations for the meeting and also in their potential role in carrying out many of the CoP 14 decisions.

Sustainable Use Project

Funding has been raised through the University of Cambridge to continue work on the Sustainable Use Project, which aims to identify the factors that contribute to sustainable utilization of species through a quantitative analysis of case studies. Case studies from Asia will be collected and combined with those collected in the first Asia module for an analysis of factors influencing sustainable use in Asia.

Other issues

The STU Unit has been involved in the further development of the use component of the species assessments through the Classification Schemes Working Group of the BASC.

The Unit is working with IUCN RofE and TRAFFIC Europe on a project funded by the EC looking at the impacts of the use of stricter import regulations in the EC for trade in wild species.

Species Information Service (SIS)

Work is underway to move SIS to the next phase of development, that of redesigning, developing, and launching a suite of integrated species information management and Red List assessment tools. This suite of tools will be developed and launched in an iterative approach with the aim of initially providing a solution for basic Red List assessment data collection and collation tools, general species

information management tools for SSC Specialist Groups, and enhancements to the IUCN Red List website to improve searchability and incorporate spatial data exploration tools (interactive map tools). This major initiative will build upon, and replace, the SIS Version 1 combination of the Data Entry Module and the redesigned IUCN Red List web database to provide a unified, integrated data management system. Following the successful launch of these tools, modules for additional SSC needs will be developed and made available as resources permit.

The Species Programme, with the support of Oracle and the World Business Council on Sustainable Development (WBCSD), has recently initiated the Red List Corporate Support Group as an initiative to raise funds from private sector companies to support a major part of the tool development described above. This group, comprised of companies agreeing to support SIS with 10,000 USD per year for three consecutive years, will provide resources to help us realize a major part of SIS: integrated software and online information systems for managing species information and data within the SSC. Their focus on tool and infrastructure support will provide the SSC with a solid backbone with which we can develop bespoked modules and products in the future. In addition to supporting our network with infrastructure and tools, the group will be funding efforts to examine the applicability of IUCN's species data to the private sector and work to make the freely available species information within the SSC as usable as possible to businesses wishing to improve their environmental performance.

There are currently four companies committed to joining the group: Oracle, Chevron, Holcim, and Statoil; and several others showing considerable interest. An on-going follow-up campaign to the initial mailing (sent mid-February) is expected to result in an initial five companies signed up by June.

End Notes

Publications

European Mammal Assessment

The first assessment of all European mammals, commissioned by the European Commission and carried out by the World Conservation Union (IUCN), shows that nearly one in every six mammal species is now threatened with extinction. The population trends are equally alarming: a quarter (27%) of all mammals has declining populations and a further 33% had an unknown population trend. Only 8% were identified as increasing, including the European bison, thanks to successful conservation measures.

Press release:

http://www.iucn.org/en/news/ archive/2007/05/22_pr_european_mammals. htm

Full report:

bttp://ec.europa.eu/environment/nature/
conservation/species/ema/docs/ema_
publication.pdf

New International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants

An estimated 50,000–70,000 plant species are used in traditional and modern medicine throughout the world. However, unsustainable collection threatens the survival of many species and also the livelihoods that depend upon them. The IUCN SSC Medicinal Plant Specialist Group, in collaboration with the German Federal Agency for Nature Conservation, has been a key player in the development of an International Standard for Sustainable Collection of Medicinal and Aromatic Plants (ISSC-MAP). **Webstory:**

http://www.iucn.org/themes/ssc/news/2007_articles/medicinal_plant.htm

Full report:

bttp://www.floraweb.de/proxy/floraweb/MAP-pro/Standard_Version1_0.pdf

Top 50 Mediterranean Island Plants campaign booklet released in Greek and Spanish

An effective tool for raising conservation awareness, *The Top 50 Mediterranean Island Plants*, has just been translated into Greek and Spanish by the World Conservation Union (IUCN). The Union's first publication in Greek, it lays out a conservation strategy for a representative selection of the region's threatened plants, both eye-catching species, such as



the striking Casey's larkspur on Cyprus, as well as more inconspicuous plants, like the small yellow *Bupleurum kakiskalae* on Crete.

Top 50 Greek:

http://www.iucn.org/dbtw-wpd/edocs/2005-025-El.pdf

Top 50 Spanish:

http://www.iucn.org/dbtw-wpd/edocs/2005-025-Es.pdf

2007 African Elephant Status Report

The IUCN SSC African Elephant Specialist Group has released the African Elephant Status Report 2007 (AESR 2007). The latest report from the African Elephant Database, the AESR 2007 contains the most recent information on elephant population estimates and distribution at the site, national, regional and continental levels, including estimates generated up to the end of 2006.

Full report:

http://www.iucn.org/themes/ssc/sgs/afesg/aed/pdfs/aesr2007.pdf

Species staff changes

David Allen has just started as a Programme Officer with the Freshwater Biodiversity Assessment Unit of the Species Programme, based in Cambridge, UK. He has a BSc in Natural Resources Management, an MSc in Applied Ecology and Conservation (University of East Anglia, UK) and brings a wealth of experience gained in the UK and overseas (Australia and Thailand).

Dena Cator joins the Species Programme in the position of SSC Network Support Officer. She did her first degree in geography and went on to do an MSc in Environment and Development at the London School of Economics (UK). Dena is Canadian and has spent a good part of her career in British Columbia working on forestry issues. She



has also worked for IUCN previously as an intern in the Forest Programme when she organized a workshop at the Durban World Parks Congress.

Julie Griffin will be taking on a new role in the Species Programme as the second SSC Network Support Officer. Julie has worked for the Species Programme since January 2006 in the role of Junior Professional Associate (specializing in Communications) and then as the GEF Plants Project Co-ordinator. Julie holds both Swiss and American passports, has several years' experience leading wilderness courses and a degree in Environmental Science and Policy from Duke University (USA).

Lynette Lew, an Australian national, joins the Species Programme as Marketing and Communications Officer. Lynette originally studied for her Bachelor of Commerce (Marketing and Finance) in Sydney. She has six years experience working for Johnson and Johnson where she was senior brand manager for a very successful holiday skincare brand. She has worked in complex institutional environments is very keen to work in the environmental sector.

Anna McIvor finished her internship with Freshwater Biodiversity Unit on 12 January, after 14 months working on the Darwin Project looking into the integration of biodiversity, livelihoods and the economic value of wetland conservation at two sites in East Africa and Cambodia. We thank her for all her hard work and wish her every success in her future career.

Abigail Powell, the new Species Programme Junior Professional Associate, started at IUCN Headquarters in mid-January. Abigail has an MSc in Biodiversity, Conservation and Management from Oxford University (UK) and a biology degree from Durham University (UK). Before joining the Species Programme Abigail worked in Indonesia, studying coral reef ecology, and protected area management.

Wes Sechrest has recently left the Species Programme and we wish every success in his future employment. All Global Mammal Assessment enquiries mammal-related issues should now be referred to Jean-Christophe Vié, Mike Hoffman or Simon Stuart.

Nathalie Velasco left the IUCN Species Programme in April to take up a full time post in the Administration at IUCN HQ. Nathalie has been with the Species Programme for over four years and recently has been working tirelessly to complete the on-line Commission Registration. We wish her every success in her new job.

Shelly Vosse is the new George Rabb internship intern in the SSC Chair's Office in Cape Town. Shelly has a Masters in Conservation Ecology and much experience of local conservation issues in the Cape Town area. She is very keen to learn more about international conservation issues and IUCN work. Her email address is sscintern@iucn.org



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Page 17 Giant pearl mussel (Margaritifera

auricularia)

By Vincent Prié

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amphibius)

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Page 23 Houbara bustard (Chlamydotis undulate)

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longimanus)

By Jeremy Stafford-Deitsch

Page 29 Wood's cycad (Encephalartos woodii)

By John S. Donaldson

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