

Species

Newsletter of the Species Survival Commission
IUCN—The World Conservation Union
Number 31-32, June 1999–December 1999



1949 ♦ 50 YEARS OF CONSERVATION ♦ 1999

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 technical and scientific counsel to biodiversity conservation projects throughout the world. Commission members also serve as resources to governments, international conventions, and conservation organizations.

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Arabian oryx in honor of Lieutenant-Colonel C.L. Boyle. Boyle started Operation Oryx in 1963 as a joint effort of FPS and SSC. Its outstanding success in reintroducing the species into Oman and Jordan was the crown jewel of Boyle's career as a conservationist (see "In Memoriam" on page 27).

**Species* has a new editor. Submissions should be addressed to Michael Klemens, *Species* Editor, Wildlife Conservation Society, Metropolitan Conservation Alliance, 68 Purchase Street, 3rd Floor, Rye, New York 10580, U.S.A. Fax: (914) 925-9164; e-mail: specieseditor@wcs.org.



SPECIES SURVIVAL COMMISSION

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The SSC—Operations and Plans

From the Chairman

This edition of *Species* marks the 50th anniversary of the formation of the Species Survival Commission within IUCN—The World Conservation Union. Both the Commission and the Union have gone through a number of transformations in the intervening 50 years, but the fundamental premise of working to conserve the diversity of life on Earth has remained. As we begin the next phase of our work, we are once again turning our attention to the most effective way of meeting the challenges of that fundamental premise of our existence.

When the Commission was started 50 years ago, it was at least in part due to the growing realization of the times that resources, especially living natural resources, are not limitless. A small cadre of people came together to promote a wider application of the concepts of conservation. Compared to the situation 50 years ago, the concept of conservation is certainly better established in the mind of the public, especially in the developed world. But it is still a concept more often honored in the breach, rather than fully integrated in the decision-making of governments and the public. Consumption of resources is high, and growing in most cases, and the diversity of life is being squeezed.

In the developing world, where the challenges of rapidly growing populations and development aspirations combine to place heavy demands on all forms of resources, the challenges can be even more acute. Governments have begun to pay more attention to conservation issues, and environmental issues generally, as development plans run into environmental limits—either directly or as a result of market pressures.

The attention of governments brings new challenges as well. International environmental law has developed at a rapid pace in the last 25 years. There are a growing number of multilateral environmental agreements now in place, and more contemplated at the regional level. For IUCN and the SSC, that means more fora in which to put our point across to governments, more legal instruments to use to gain



their acceptance of the conservation actions that are needed to protect species at risk. Taking up these opportunities requires us to present our information in new ways, moving beyond the description of a species and the threats that it might face to management prescriptions at an ecosystem level.

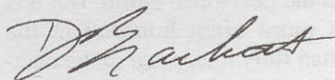
At the same time, the role of civil society in managing biodiversity is becoming better recognized. That presents another opportunity, at a very different scale of activity. As local communities gain (or regain!) responsibility and accountability for management of local species, the ability to learn from local knowledge systems and incorporate such knowledge with the results of scientific investigation becomes an increasingly valuable skill. We also have to be able to present our conservation information and management prescriptions in ways useful to civil society.

From the global level to the community level, it has become a conservation truism to say "think globally, act locally," but that is an everyday occurrence for the SSC as we celebrate our 50th anniversary. Doing so successfully will require us to further develop our ability to share information in a timely way. We need to pursue this on two fronts: improving the representation of our membership around the globe, with an increasing emphasis on recruiting young scientists working in the South, and improving our technical capacity to share information in ways that makes it easily accessible to all.

As we expand the membership of the Commission, and as we become more and more involved in providing advice to the global conventions, we need to deal with the changing expectations of volunteerism. The Commissions of IUCN are built on the premise of individual experts coming together in volunteer association to contribute to conservation. We want those who make management decisions to use the products of our association, but our structure makes it hard to deliver the products on the schedule or with the quality assurance that governments, in particular, demand. Individual members and host institutions are also being pressed to devote less time to volunteer activities as the conservation "business" becomes more market oriented as well.

Increasing recognition of interconnection in the environment has led to increased attention to an ecosystem approach on the part of governments and the intergovernmental community. While this is to be encouraged, it has also led to long arguments about what constitutes an ecosystem and to the devaluation of species information on the part of some. The SSC must remain a vital part of IUCN, and IUCN must recognize that knowledge about species will remain the bedrock on which conservation action will be based. But that cannot be in a solely reactive, protectionist mode. Human populations are increasing, and human demands for food and an increased standard of living will continue. In addition to advocating the strict protection of species in need of such protection, we must also work to deliver a sound understanding of the factors influencing sustainability of uses for other species.

The path forward for the SSC is now being considered in the development of our new Strategic Plan. I encourage you to read carefully the information on page 15, and to make your comments known.



David Brackett

Message from the Director General

Dear SSC Members and Friends of IUCN:

I would like to join you in the celebrations of the 50th anniversary of SSC. Such anniversaries provide an opportune moment to review and learn from history, as well as to define the future. Following the example of SSC, the IUCN Council organized a retreat in April to define a vision for IUCN. While you are developing a strategic plan, IUCN is also working on its overall strategic plan as we head toward the 2nd World Conservation Congress in Amman. It is important that we join efforts, taking advantage of the emerging synergies as we work to define our collective agenda for biodiversity conservation. I know that the broader Union will continue to draw on the good work achieved at the meeting in Djerba.

The diversity, dynamism, and dedication of SSC members have impressed me greatly. Together, this network represents an unmatched regional and global force for environmental stewardship, based on a vast capital of knowledge and expertise spanning diverse values and cultures in some 140 countries. Through the SSC network, IUCN has for 50 years provided a valuable forum for reliable scientific information and constructive debate. The Red Lists in particular continue to be a signature product for the Union as a whole and serve as a firm foundation as SSC looks to the future and moves in innovative directions.

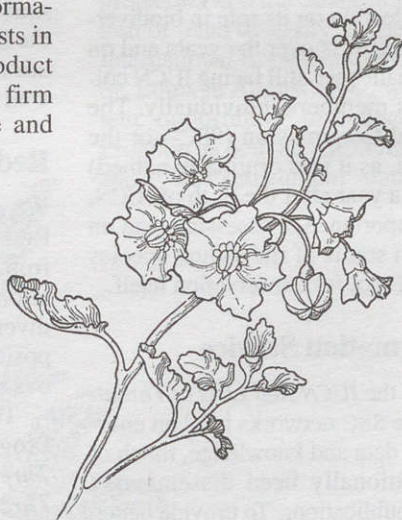
As a union, IUCN's first duty is toward its members, offering you a combination of services that add value to your work. To allow for increased interactions between the various parts of the Union, a special Task Team for Constituency Relations was established in May 1999. My hope is that it will enhance and strengthen our global networks.

Across IUCN's international secretariat, we look forward to hearing from and working with you. We would be very glad to receive your opinions directly at the address below.

With very best regards,

Maritta Von Bieberstein Koch-Weser

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SSC Office Report

Strategic Planning

SSC's strategic planning process has involved extensive consultation with important conservation stakeholders, including IUCN members. The process continued with a participatory workshop held in Djerba, Tunisia, in March, supported by CIDA, the MacArthur Foundation, and the MAVA Foundation. The Djerba workshop explored targets related to extinction rates, biodiversity loss, sustainable use, and mitigating environmental threats. Approximately 70 participants attended the workshop, ensuring that an impressive breadth of expertise and perspectives were represented, including broad taxonomic coverage, expertise with a wide range of ecosystems, and representation of key environmental organizations and partners. For a report of the workshop results, see the article on page 15.

IUCN's 50th Anniversary

In 1998 IUCN celebrated its 50th anniversary with festivities at the place of its formation—Fontainebleau, just outside of Paris—and a sobering self-reflection on its role in biodiversity conservation efforts over the years and on the significant challenges still facing IUCN collectively and its members individually. The Species Survival Commission (SSC—or the Survival Service, as it was originally named) was formed just a year after the birth of IUCN, validating the importance of assessing data on the conservation status of individual species as a fundamental tool for conservation itself.

Species Information Service

As illustrated by the *IUCN Red Lists of Threatened Species*, the SSC networks hold an enormous amount of data and knowledge, much of which has traditionally been disseminated through printed publications. To provide better, faster, and more easily available access to its information, SSC is increasingly devoting resources to developing electronic information

management systems. The Species Information Service (SIS), SSC's data management initiative, will support the needs of the Specialist Groups and enable SSC and its members to develop new products and services. The SSC Steering Committee, which met in June, identified development of SIS as SSC's highest priority.

The first phase of SIS development was completed in 1998, including creation and evaluation of a trial version of SIS software, designed as a tool to support the work of SSC Specialist Groups. The second version, currently under development, will be tested by several Specialist Groups that will populate the software with select data sets. A cross-section of Specialist Groups was selected to ensure as wide a range of data as possible; testing will be undertaken by the Primate, Mollusc, Lagomorph, Marine Turtle, and Mediterranean Island Plant Specialist Groups.

In the meantime, many fund-raising initiatives are being pursued by the network to support the full implementation of this initiative throughout the SSC. Approaches are being made by teams of dedicated SSC members to the European Union, National Science Foundation, and the U.K. and U.S. governments, as well as to many private donors.

Red List Program

We welcome Dr. Craig Hilton-Taylor, the new Red List Officer, to the SSC team. Funding from the U.K. government and from Conservation International's Centre for Applied Biodiversity Science (CABS) supports this position. Many thanks to both for their generous assistance.

The most significant outputs of the Red List Program in 1998 were the *IUCN Red List of Threatened Plants* and the *World List of Threatened Trees*. Concurrently, work began on the development of guidelines for applying the IUCN Red List Categories and Criteria at

national and regional levels, in accordance with a resolution adopted at IUCN's World Conservation Congress in 1996. The first meeting of the IUCN Red List Regional Application Working Group was held in October 1998 in Montreal, and the Group, under the able leadership of Ulf Gärdenfors, has developed draft guidelines that will be further refined through consultations involving SSC and IUCN constituencies.

The Red List Program Subcommittee of SSC's Steering Committee met at the end of the year in London to flesh out program priorities, including the ongoing review of the Criteria, and to develop the workplan of the new Red List Officer. Targets for IUCN Red List updates and taxonomic priorities were set and the IUCN Red Listing process, now much more rigorous than in the past, was clearly defined.

The Criteria Review process, which began with a scoping workshop in March 1998, continued with several follow-up meetings this year, including a workshop on using the criteria for marine species held in Japan in January, and a workshop to address issues related to population declines held in Australia in May. A further workshop on Criterion A was held in the U.K. at the end of June, and a summary of the findings will be developed at a final meeting immediately after the Criterion A workshop. The results are included in this edition of *Species*.



Plants Program

The Plant Conservation Subcommittee (PCS) met in Hermanus, South Africa, in September 1999. The goal of the meeting was to develop a comprehensive Plant Conservation Program, and this involved a logframe exercise that included working groups on conservation action, communications, and linkages. A "gaps analysis" was undertaken to note weaknesses and areas to be proactive in expanding the plants network. Better communication, both internal and external, were also a high priority. Listservs for all the PCS members, as well as all chairs and officers of the plant Specialist Groups, have been set up and have proven to be an effective mode of communication. A special edition of *World Conservation* (IUCN's quarterly journal) devoted to plants was also produced, largely through the work of the PCS. Fund-raising and projects were dealt with in a final plenary session. This meeting was also a useful precursor to the SSC Strategic Planning meeting, held last March.

A priority that emerged strongly was for SSC's Plant Program to be focused on Centres of Plant Diversity. The PCS saw this as providing a matrix for a wide range of initiatives, including Red Listing, Sustainable Use, database development, and linking with ecosystem protection and the quantification and description of plant diversity. It was decided that the International Botanical Congress, to be held in St. Louis in August 1999, would be an excellent opportunity to launch an SSC Plant Program as both an SSC 50th anniversary item and a "new millennium" initiative.

Continuing Support to CITES

Coordinated by the SSC Wildlife Trade Program, IUCN held a workshop in October 1998 in Hong Kong to develop guidelines for CITES Scientific Authorities on the Making of Non-Detriment Findings. Article IV of the CITES Treaty requires that exports of species listed in CITES Appendix II be allowed only if the export is deemed "nondetrimental" to the long-term survival of that species. The IUCN workshop considered the practical challenges for making such findings to help identify pragmatic methods to improve implementation of the Treaty. The workshop also identified needs for capacity transfer to encourage cooperation between CITES and Parties to the Convention on Biological Diversity (CBD). Though Article IV is a pillar of the Convention, this workshop was the first concerted attempt in the 25-year history of CITES to look at non-detriment findings and determine how to make them effective. Participants in this important workshop included wildlife managers, biologists, government CITES officers and representatives from the CITES Secretariat, and staff from SSC, IUCN, TRAFFIC, and WWF.

Also in October 1998, following a request from the African members of the CITES Standing Committee, IUCN facilitated the third Dialogue of the African Elephant Range States in Arusha, Tanzania. Discussion at this meeting centered around implementation of CITES decisions regarding elephants and on increasing interregional cooperation for elephant conservation.

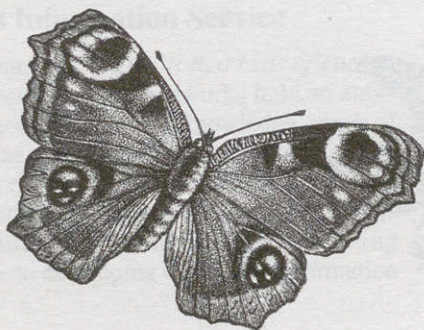
The SSC continues to contribute to the development of a monitoring system for the illegal killing of elephants (MIKE), as mandated by the CITES Parties in Harare. SSC has been intensively involved in a joint effort of the

CITES Secretariat, TRAFFIC, and IUCN to assist the Parties to CITES in implementing the decisions of the Harare meeting regarding reopening of limited legal trade in ivory under certain strict conditions. A draft proposal for the system was presented to the CITES Standing Committee in March 1998. The Standing Committee directed SSC to continue its work on developing MIKE, and an implementation proposal was submitted to the CITES Secretariat in November 1998. At the Standing Committee meeting in February 1999, IUCN/SSC was asked to continue providing technical assistance as the Parties move forward with development and implementation of MIKE.

Policy Advice and Conservation Guidelines

One of SSC's strengths is the ability of the volunteer network to gather information and use that information to create policies and ensure that they are distributed to those communities that will implement them. Many of these publications are available on the SSC Web site (<http://www.iucn.org/themes/ssc>)

- **IUCN Guidelines for Reintroductions.** Developed by the Reintroduction Specialist Group, these Guidelines outline appropriate procedures for reintroducing species into their former ranges. A grant enabled SSC to print and distribute 15,000 copies of this booklet to target audiences, including all IUCN members, IUCN Regional and Country Offices, Reintroduction Specialist Group members and recipients of their newsletter, members of the American Zoo and Aquarium Association (AZA), the International Union of Zoological Directors (IUDZG), and SSC's Steering Committee and all Specialist Group Chairs. SSC Steering Committee focal points for China, Russia, and the Middle East performed extensive outreach activities in these regions. Expanding beyond IUCN's three official languages (English, French, and Spanish), the booklets were also printed in Arabic, Chinese, and Russian. Requested feedback will aid a monitoring and evaluation program to establish the utility of this publication.



- **Draft IUCN Guidelines for the Placement of Confiscated Live Animals.** Also led primarily by the Reintroduction Specialist Group, these guidelines were circulated for review to all IUCN members in the spring of 1999. The guidelines include a decision-tree to identify the most appropriate method for dealing with confiscated species on a case-by-case basis. We hope to be able to finalize these guidelines by the end of the year.
- **Draft IUCN Guidelines for the Prevention of Biodiversity Loss Due to Biological Invasions.** Draft versions and revisions of these guidelines have been circulating since the World Conservation Congress in 1996. Following a planning meeting for the IUCN Global Initiative on Invasive Species in April, the Invasive Species Specialist Group has compiled a clearer, more concise version for final review by IUCN members.
- **Draft IUCN Policy Statement on Sustainable Use of Wild Living Resources.** Developed by SSC's Sustainable Use network with input from IUCN members, this policy statement is intended to be a short, concise document that defines the Union's overarching position on sustainable use. It was not conceived as a detailed elaboration of how to undertake sustainable use activities, and the target audience is the Union's Secretariat and its members. The third draft of the statement has been circulated to IUCN members for a final round of comments. It will be finalized and presented at the 2nd World Conservation Congress in 2000.
- **Action Plans for the Conservation of Species.** SSC's volunteers continue to put a significant amount of effort into the creation of Action Plans. SSC's 50th Action Plan was completed in 1998, and several Specialist Groups contributed to the conservation community by creating Action Plans, Occasional Papers, or Monographs. New publications produced this year include:
 - ✓ *Crocodiles: Status Survey and Conservation Action Plan, 2nd Edition*
 - ✓ *Hyenas: Status Survey and Conservation Action Plan*

- ✓ *North American Rodents: Status Survey and Conservation Action Plan*
- ✓ *Deer: Status Survey and Conservation Action Plan*
- ✓ *Bears: Status Survey and Conservation Action Plan*
- ✓ *Manejo y Uso Sustentable de Pecaries en la Amazonia Peruana*
- ✓ *Proceedings of the Twelfth Working Meeting of the IUCN/SSC Polar Bear Specialist Group, 3-7 February 1997, Oslo, Norway*
- ✓ *Sharks and their Relatives—Ecology and Conservation*

Creating the World Conservation Digital Library

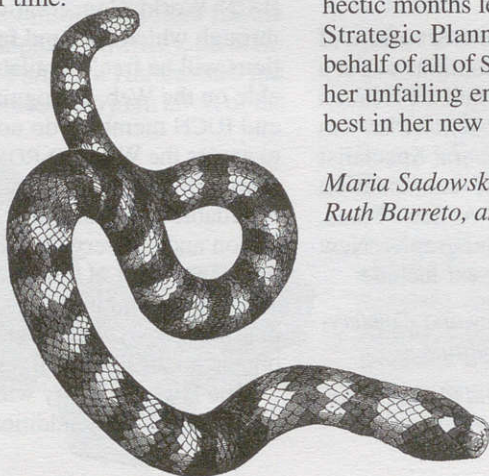
As a leading source of biodiversity conservation knowledge and expertise and as a provider of scientifically sound, authoritative information, IUCN provides a valuable service to the global conservation community. Nearly 300 titles are currently in print and the IUCN Library, in itself a unique entity, is the sole holder of more than 2,000 IUCN publications, documents, and reports.

Advances in publication technology and the World Wide Web present the opportunity for SSC and IUCN to quickly move beyond traditional print media to make their data, information, recommendations, and policies available to a wider audience. This will be possible through an exciting new initiative called the IUCN World Conservation Digital Library, through which past and future IUCN publications will be freely available and fully searchable on the Web. Recognizing that many SSC and IUCN members do not have the capacity to access the Web, CD-ROMs of IUCN publications will be offered to those who do not have affordable or reliable access. Expanded distribution and delivery services will be provided through the IUCN Publications Services Unit and Library and through Depository Libraries maintained by IUCN member and partner organizations in several regions of the world.

The Digital Library will provide a valuable research service in addition to offering access

to IUCN information, with IUCN publications posted as a comprehensive collection accessed from a single entry point. The variety of publications available online and the flexibility of the query system will result in a formidable addition to the world's information resources on conservation. IUCN Member States, government agencies, and nongovernmental organizations, its Commissions and Regional and Country Offices, and parties to environmental conventions and treaties (e.g., Ramsar, CITES, the CBD) will be able to immediately access information about the status of species, environmental law, protected areas, specific ecosystems, sustainable use, or any of the other topics on which IUCN is well-positioned to advise. Users of the World Conservation Digital Library will be able to quickly move to the precise publications, sections, paragraphs, photographs, or maps within all IUCN publications that match their query.

Preliminary planning and a conceptual workshop were undertaken in 1998. Plans are now underway for a release of a prototype version of the World Conservation Digital Library late in 1999, in celebration of SSC's 50th anniversary year. The prototype will include the 50 Action Plans that the volunteers of SSC have created over the years along with these SSC and IUCN documents published in a digital format in 1999. It will also include metadata (extensive bibliographic detail) on all of IUCN's publications. Future versions of the Digital Library will include publications from other IUCN Programs, Commissions, and Regional and Country Offices, building up the Digital Library over time.



Herp Network Review

SSC recognizes the need to conduct an assessment of current and future needs in the SSC network as we graduate from a Declining Amphibian Populations Task Force to a Global Amphibian Specialist Group, and the need to support development of the reptile conservation network. This will involve consultation within the reptile/amphibian conservation world, including a workshop of experts to scope out the current issues in reptile/amphibian conservation and the best way forward for the SSC network. The workshop was held in June 1999 at the Smithsonian Institution in Washington, D.C. Results of the workshop will provide the foundation for continuing development of the herp network that can meet the needs of the SSC, as well as address emerging conservation issues for herps.

Secretariat News

Simon Stuart is now back in the office full-time and has returned to his normal manic pace of activity to ensure that the Species Program Secretariat provides as much assistance as possible to the SSC network. But as we welcome Simon back to the helm, we wish Susan Tressler much success as she leaves her SSC base to pursue further study and experience in field conservation in Latin America. Susan will continue to work for SSC part-time for the remainder of the year, with particular emphasis on fund-raising for our major SIS initiatives.

The Chair's office has been fortunate to have the able assistance of an intern during the hectic months leading up to and following the Strategic Planning workshop in Djerba. On behalf of all of SSC, we thank Wendy Irving for her unfailing enthusiasm and wish her all the best in her new work.

*Maria Sadowski, Sue Mainka,
Ruth Barreto, and Wendy Strahm*

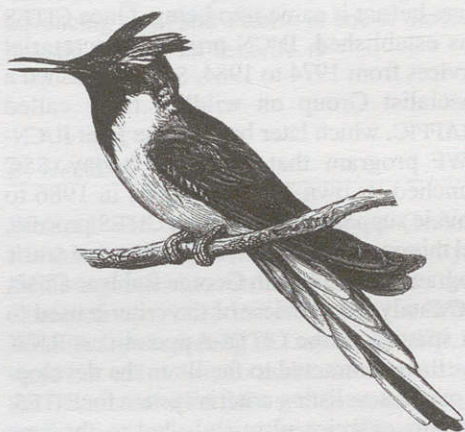
Happy Anniversary!

Reflections on 50 Years of Conservation

This special anniversary issue of *Species* celebrates SSC's rich history and 50 years of significant accomplishments. When IUCN was formed in 1948, the protection of endangered species was a major focus of concern. At a 1949 conference on the protection of nature, the Survival Service was established within IUCN "to work effectively towards assembling, evaluating, and disseminating information on all living species of fauna and flora that appear to be gravely threatened with extinction" (Coolidge, 1968). Harold Coolidge was appointed as the first Chair, and in 1956 the Survival Service was renamed the Survival Service Commission. A final name change in 1981 yielded the current appellation: Species Survival Commission.

In contrast to the changes to its name, the fundamental purpose of the Species Survival Commission has remained constant over the years. Gathering and disseminating information on the status of species has been the central activity of the Commission throughout its 50-year history. That this work remains relevant attests to the fact that IUCN showed great foresight in creating a Commission to provide the basic biological information on which conservation action must be based. SSC has systematically expanded its work beyond describing the plight of endangered species and continues to set ambitious targets to provide a more comprehensive assessment of how the world's species are faring.

In the early days, a system of data cards and literature reviews were used to generate SSC's information. Under the leadership of Leofric Boyle (see obituary in this issue of *Species*), this was supplemented by field surveys and consultation with a growing network of species experts. In the 1960s, Sir Peter Scott established a series of volunteer Specialist Groups to more efficiently capture expert knowledge, and the data card system evolved into the well-known *IUCN Red Data Book* series, and later under Grenville Lucas, the *IUCN Red Lists of*



Threatened Species. The formation of international expert networks to pool and analyze biological information for the benefit of conservation action and policy has come to be a vital feature of IUCN. Access to this type of independent technical expertise has made many of IUCN's achievements possible and has contributed to its standing as a respected conservation organization.

SSC's network has expanded significantly over the last 50 years. This growth has recently accelerated, with membership roughly doubling since the 1994 IUCN General Assembly in Buenos Aires. The breadth and number of Specialist Groups has grown accordingly. There are currently 110 Groups ranging from the Fungi Specialist Group to the Palm Specialist Group to the Chiroptera Specialist Group. Because of this increased capacity, SSC has been able to contribute to conservation debates on a growing number of issues, such as captive breeding, sustainable use, and alien invasive species. This has been accomplished through a variety of mechanisms, such as the SSC Action Plan publications series. Beginning in 1986, SSC has produced a total of 50 Action Plans that not only describe species status, but outline priorities for concrete conservation action.

The growth of SSC's volunteer network has also enabled participation in a wide range of international fora, including a major role in the development of the Convention on International Trade in Endangered Species (CITES). At the 1963 IUCN General Assembly, SSC called for the establishment of CITES—10 years before it came into being. Once CITES was established, IUCN provided secretariat services from 1974 to 1984. SSC established a Specialist Group on wildlife trade called TRAFFIC, which later became the joint IUCN-WWF program that we know today. SSC launched its own Trade Program in 1986 to provide support services to the CITES process, and this continues to be a major thrust of SSC's program. In 1992, with George Rabb as Chair, SSC catalyzed a review of the criteria used to list species on the CITES Appendices. IUCN was then contracted to facilitate the development of a new listing criteria system for CITES, and this exercise ultimately led to the new IUCN Red List Categories and Criteria.

Over its history, the flexibility of the network and capacity to mobilize around emerging issues has allowed SSC to undertake a diverse array of activities. They have included convening workshops, undertaking field projects, raising money for and carrying out research, providing scientific advice and services to other conservation organizations (including government agencies and IUCN members), publishing guidelines and synopses of best practices, and supporting international conventions—all on a volunteer basis. Fifty years of such remarkable contributions are well worth celebrating!



Some Long-Time SSC Members Reflect Upon Their Experiences

By Richard Fitter

I first attended an SSC meeting in 1961 by invitation of the then-Chair, Lt.-Col. C.L. Boyle, who died aged 100 last March. In 1963, after the Nairobi meeting, I became a full member, then a member of the Steering Committee, and finally, after the San Jose meeting in 1988, my late wife Maisie and I both became Honorary Members. We thus had the great good fortune to serve under the whole of Peter Scott's outstanding chairmanship. I was in at the beginning of *Species*, which was edited for its first 12 issues by Maisie. I am sure she would be delighted, as I certainly am, by its progress. So it gives me great pleasure to see how the Commission progresses by leaps and bounds and must by now have the largest active membership of any conservation body in the world. ♦

By David R. Given

In the early 1970s I was traveling in Europe in search of herbarium types. I spent several days at the Geneva Botanic Gardens, where someone mentioned "this place up the lake where they do conservation!" So I took the train to Morges, walked up to the WWF/IUCN building, and knocked on the front door, asking, "How do I get involved?" This resulted in a very informative morning with Duncan Poore, at that time IUCN's Chief Ecologist, and things went on from there: involvement in IUCN's mountain strategy workshop in New Zealand in 1976, the Cambridge rare plant conference in 1980, and the IUCN GA in New Zealand in the same year, collaborating on New Zealand's Red Data Book and my first commercial book on rare plants the following year, about this time chairing the Pteridophyte Specialist Group, being later invited by George Rabb to join the Steering Committee, and then the Executive by David Brackett. What sort of messages does this tell me? One thing comes through very clearly to me, and that is that I was personally encouraged and nurtured by several different people who took time to talk,

explain and encourage. It was people, and not the organization, system, or bureaucracy, that got me involved and has anchored me in SSC since.

During the time of my association with SSC, the organization has gone from being a relatively simple organization to becoming far more complex. There have often been criticisms of this progression, but it is a natural reflection of the increasing complexity of conservation issues. No longer does one simply "save species" by just getting one's foot muddy and hands dirty and setting up a preserve or shifting individuals to a new site. Inevitably, there will be a network of stakeholders to be consulted; people want to ask questions about economic benefits, costs, and trade-offs; there are contrasting and sometimes conflicting philosophies involved, such as the contrast between strict preservationism and sustainable use approaches; and we are realizing that conservation has important human community aspects. In the 1960s and early 1970s, conservation biology did not exist as a recognized discipline, and the term "biological diversity" did not exist before the late 1980s. Today the catch-cry is on the one hand for "strategic alliances and partnerships," and on the other for "action on the ground," perhaps reflecting the possibility that, as in most organizations, we have made things too complex for simple human minds.

The Plant Advisory Group was not strictly within SSC but was a precursor to the present SSC Plants Program. The Group was jointly set up to provide advice to and a focus for plant conservation involving the partnership of WWF and IUCN. I met with the PAG on several occasions as an observer and to report back to the Group on progress with "Principles and Practice of Plant Conservation." I have sharp memories of those meetings, but especially of the example they set by meeting in "interesting places" and their emphasis not only on core committee business but also on seeing the biodiversity of the region where the meeting was being held. Thus, I have very vivid memories of meeting in Colombia near Medellin and also of flying to Pasto and taking a taxi down to La Planada reserve on the Pacific slope of the Andes. Then there was the extraordinary PAG

field trip to Tenerife in 1986, when the undreamed-of happened: it rained and the local airline went on strike, stranding the Group overnight on an island where the local hotels did not want to know about the problem! I can still in my mind see Gren Lucas lighting matches to read the plant labels in the gloom of advancing night and a storm in one of the local botanic gardens on Tenerife. ♦

By Hemanta R. Mishra

While I was a graduate student (Natural Resource Management) at the University of Edinburgh, the late Sir Peter Scott, the then-Chair of the SSC, invited me to a World Wildlife Fund meeting in London in 1970. He went out of his way to make me aware about the richness of wild flora and fauna of my own motherland—the Himalayan Kingdom of Nepal. As the Chair of SSC, he also asked me to serve as a member of the SSC. Those days there were hardly any SSC members from developing countries. Peter also pointed out the plight of many species of wild flora and fauna in Nepal. His generous gestures restored my confidence and made me feel proud of my motherland. It also provided me with a great challenge. I could not wait to finish my studies and return home.

I returned to Nepal and created its first national park, the Royal Chitwan National Park, using the data and information provided by the SSC, including the Red Data Book. The flag species we used to generate awareness was the great one-horned Asian (Indian) rhinoceros. Then the population of rhinos was less than 100. Thanks to science-based facts and intervention provided by the SSC, the rhino population in Nepal is now over 500. Late in the 1990s, with support and encouragement of the SSC Asian Rhino Specialist Group, I even moved more than three dozen rhinos to a second home in Royal Bardia National Park.

SSC was also instrumental in the launching of Operation Tiger in the early 1970s. Though the tiger is still an endangered species, without the SSC's timely intervention, it may have already been extinct by the 1990s. In Nepal,

as early as 1973, SSC support, particularly its Cat Specialist Group, and intervention also galvanized the support of the Smithsonian Institution and the World Wildlife Fund for a long-term study of the tiger, its habitat, and its prey species. The project is still continuing under the aegis of Nepal's own King Mahendra Trust for Nature Conservation and has expanded its activities to include other species.

One of my proudest moment was hosting Sir Peter Scott in my own country. At our invitation, he and Mrs. Scott visited us in Nepal in 1980 and released the first captive-bred Gharial crocodile in the wild. In the 1970s, there were less than 100 of these reptiles in the wild. With a program supported by the SSC's Crocodile Specialist Group and by the Frankfurt Zoological Society, a captive breeding program was launched in Nepal. More than 300 of these endangered species have now been restocked in nature.

I have been very active with the SSC for nearly three decades, including serving on its Steering Committee. I have had a successful career in saving species and their habitat. This has included several gold medals from the King of Nepal and the J. Paul Getty Conservation Prize. Throughout my career, I have depended upon the network of SSC members, particularly in the various Specialist Group, all of whom have volunteered their time. In the process, I have also gained many friends from different cultures and different parts of the world. SSC has not only helped me to expand my knowledge on animals and plants, but also appreciated and value human life and our diverse cultural patrimony.

I find SSC a science-based, in-country-based action oriented watchdog. It has effectively provided a voice to the voiceless. It has also brought back from the brink of extinction many of the world's rare and endangered species and catalyzed international conventions. Yet, SSC still has daunting challenges and monumental tasks in the next millennium. ♦

By Lady Philippa Scott

My one achievement with regard to SSC is (with Ralph Daly) to have persuaded the Sultan of Oman to donate 1.5 million Swiss francs to SSC in 1990. I am very proud of that success! I would like to put on record—because I was there—that my husband Sir Peter Scott invented the Red Data Books in spite of considerable doubts from the powers-that-be at that time that the scheme would be feasible. The Commission was desperately short of funds when he took over as Chair. He was responsible for setting up the Specialist Groups, which proved to be immensely successful and provided an interesting incentive toward fundraising, as well as supplying and updating the records for the Red Data Books. ♦



By Simon Stuart

My experience with SSC goes back to January 1986, when I was recruited as IUCN's Species Program Officer. Up until that time, the SSC Secretariat had consisted of one professional person (the Executive Officer), one Administrative Assistant, and a Secretary. My position was completely new, funded by a donation from WWF (that SSC continues to receive, on an annual basis, to this day). For my first seven months, the Executive Officer was Bob Scott. Bob was an American citizen who had a long history in wildlife management. He was well-known for his razor-sharp mind and deep understanding of conservation issues. In particular, he had deep insights into sustainable use, and I learned an enormous amount listening to his wise commentaries on some of the controversial issues involving sustainable use that were confronting the SSC. Bob was also famous for his pipe, and the smoky haze that filled his office was maintained by his dynamic successor, Steve Edwards. It is now many

years since IUCN banned smoking in offices, and rumor has it that even Steve has given up the fight and has joined the ranks of the ex-smokers.

SSC's Administrative Assistant back in 1986 was Patricia Chable. Patricia had been with SSC for 10 years, and she had an encyclopedic knowledge of all things to do with the Commission. In those days, SSC, with just 1,200 members, was still a bit of a club. Many people knew many of the others well. The Commission still had annual meetings, which were more like gatherings of the clan than attempts to address and resolve specific conservation issues. These were tremendously enjoyable social occasions, and much useful work was done on the sides. All that is left of these meetings now is the SSC meeting held just before each IUCN World Conservation Congress. But the nature of these meetings is totally different from the ones that still took place in the 1980s. The big SSC gathering at each Congress is a slick, professional event compared to the old days. Specialist Group presentations are now supported by all the latest technological gimmicks. We have round tables to address major issues and training sessions to bring SSC members up to speed on communications or how to use the Red List Criteria. This is a far cry from the free-for-all of the former annual meetings.

In January 1986, only one SSC Specialist Group had a staff officer. This was Raoul du Toit, Executive Officer of the African Elephant and Rhino Specialist Group. There were many fewer Specialist Groups at that time, and the general level of activity was much lower. The growing number of Groups, from about 70 in the mid-1980s to around 110 today, has been matched by the growing number of SSC members overall (from 1,200 to over 7,000); the growing number, quality, and sophistication of our publications (to over 50 Specialist Group newsletter titles today); the growing influence of SSC in CITES; the growing prominence of the Red List, etc.

The supporting secretariat has also grown considerably and has been characterized by staff who seem content to stay for long periods of time. Amie Brautigam joined a few months after I did in 1986. Linette Humphrey joined in 1987, Doreen Zivkovic in 1988,

Mariano Gimenez Dixon in 1991, Susan Tressler in 1992, and Wendy Strahm in 1993, to give a few well-known names. SSC now has entire programs of work: the Wildlife Trade Program; the Red List Program; the Species Information Service; the Invasives Initiative; PHVA and CAMP workshops; the Digital Library, etc. The redevelopment of the Red List Criteria seems to have done more than anything else to galvanize the network. If there is one way to sum up the changes, I would say that there has been a continuous trend to increasing professionalism, increasing objectivity, and increasing scientific rigor within the SSC. And linked to this has been an increasing level of overall activity. Back in 1986, the SSC had no coherent program of work, and no strategic plan. Now, in 1999, SSC's new strategic planning process is being hailed as one of the most advanced in all of IUCN.

However, although SSC has clearly changed beyond all recognition, and is no longer a cosy little club, the extraordinary commitment of its members remains the thing that keeps it relevant and at the cutting edge. SSC is the place where you can meet some of the most interesting people in the world; people with extraordinary levels of knowledge; people with razor-sharp minds; people prepared to devote huge amounts of time; people whose commitment to the cause is total; and some of the world's greatest conservation tacticians. While it is easy to look back at the old days and wonder how we managed to survive in such an ad hoc manner, it was, of course, the commitment of the SSC members that made the Commission relevant then and keeps it relevant now (more so than all our new professional approaches, useful though they may be).

However, as I look back over nearly 14 years with SSC, there are two people who stand out, and to whom we must all be particularly grateful. The first is George Rabb, whose gifted leadership of the SSC for seven crucial years did more than anything to bring us into a new age, and to new prominence. And the second is Ralph Daly of Oman, who secured the largest ever donation of money to the SSC Specialist Groups, in memory of Sir Peter Scott, which served to bring many Specialist Groups to a much higher level of activity than had ever been possible before. ♦

My SSC connection began in the late 1980s, when Sir Peter Scott came to China with a delegation of IUCN and WWF. It was the first contact between China and both institutions. I was most impressed by IUCN's Red Data Books, which I thought of as a vital and basic work for species conservation. I immediately started to work on China's Red Data Book of Animals, completed and published in 1998. I mention this as there have been few links between SSC and my work on China's Red Data Book, although I have been a member of SSC for such a long time. SSC has paid little attention and has no real actions focused on linking with China or the northeast Asian region. I believe SSC should cultivate more active relations with a developing country with megabiodiversity such as China, and through this it will make a greater contribution to world conservation. Having said this, I should still emphasize that SSC has been the leading organization in species conservation, especially through its action planning by various Specialist Groups. I sincerely hope that SSC will make an overall evaluation of the status of species in different parts of the world and make a review of the programs in the years to come based on the result of such an evaluation. Thus SSC could make more targeted and real contributions to lead and influence global species conservation.

More real efforts to work together with experts at the regional level will be vital in the coming years. In addition, more efforts to assist countries to implement CITES and CBD should be considered. For those activities, databases and information systems are an essential tool. I wish to see, in the future, more sessions or workshops to allow SSC members to exchange information about regional problems and possible solutions. This is my understanding of the benefits of IUCN's "regionalization" and "decentralization" policy.

I heartily congratulate SSC on its 50th anniversary and wish SSC a further bright future in the next century in biodiversity conservation. Thanks to Sir Peter, Gren Lucas, George, and David for their hard work and great and historical contribution to SSC and IUCN. ♦

Some 25 years of memories come flooding back in a torrent. Vicuñas, elephants, turtles, rhinos, whales, pandas, crocodiles, kangaroos, primates, Red Data Books, early CMC and computers; IUCN of a bygone era; SSC with "then young" and exciting pace makers. They and the times were exciting, dynamic, and argumentative, but friendly.

IUCN and SSC were both growing in size at an unprecedented pace, but unfortunately the more they grew, the more distant they became from one another. Money was always a problem as we lurched from penury to penury.

Looking back, it seems that IUCN with its remote council was destined to become the political wing of the world conservation movement while SSC became the body truly concerned with the all important fieldwork on species. Vast amounts of good science and sound data on species were imperative for the political wing to move forward. Fortunately, both IUCN and SSC were well aware of this and contrived in a most brilliant fashion to eventually harness the efforts of more than 7,000 volunteer, highly skilled specialists through Specialist Groups.

I look back with fond memories of traveling down the pioneer SSC trail, with many brilliant and often amusing colleagues. The true tales cannot yet be told, but those also interested in culinary pursuits might implore Wayne King to divulge his recipe for macaroni and cheese, perfected while surveying the remnant crocodile populations of the Solomon Islands with me. The crocs have never been the same, and we are still laughing. ♦

SSC Strategic Planning Gathers Momentum

The Djerba Workshop

As SSC marks its 50th anniversary and looks ahead to the new millennium, the Commission has renewed its strategic planning process, approaching this as an opportunity to set clear conservation goals and develop concrete mechanisms for achieving them.

The ongoing strategic planning process has involved extensive consultation of important conservation stakeholders, including IUCN members. A participatory workshop was held in Djerba, Tunisia, in March, supported by CIDA, the MacArthur Foundation, and the MAVA Foundation. The Djerba workshop was ambitious and dynamic, exploring targets related to extinction rates, biodiversity loss, sustainable use, and mitigating environmental threats. Approximately 70 participants attended the workshop, ensuring that an impressive breadth of expertise and perspectives were represented, including broad taxonomic coverage, expertise with a wide range of ecosystems, and representation of key environmental organizations and partners.

Key results of the workshop include consensus on a vision and goal for SSC:

- **Vision**

A world that values and conserves present levels of biodiversity, within species, between species, and of ecosystems.

- **Goal**

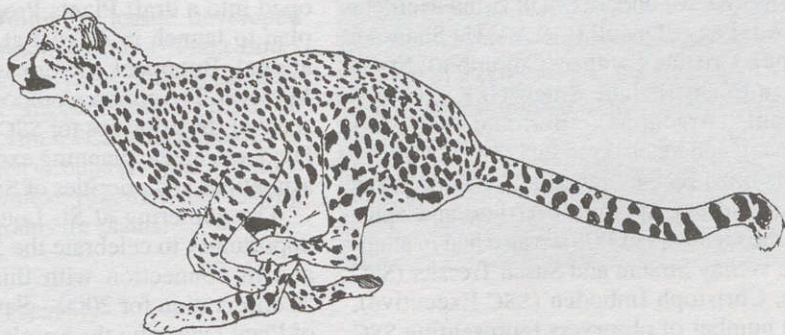
The extinction crisis and massive loss in biodiversity are universally adopted as a shared responsibility, resulting in action to reduce this loss of diversity within species, between species, and of ecosystems.

Next Steps

A significant effort was also put into beginning to draft strategic objectives, and brainstorming possible outputs and activities for SSC that actively contribute to this goal and vision. Next steps involve the need for SSC's Executive Committee to make some tough choices and provide some much-needed focus, so that the resulting plan will be realistic but still contain exciting and compelling elements that the broader volunteer network will be able to rally around and support.

Results of the upcoming Executive Committee discussions and drafts of the SSC Strategic Plan will be posted on SSC's Web site (iucn.org/themes/ssc). We encourage all SSC members to periodically review this work-in-progress and provide feedback as the Plan evolves. The new Strategic Plan should reflect your vision of what SSC should be and what it should strive to achieve.

*Ruth Barreto
Special Assistant to the Chair*



Developments in SSC Plant Conservation: The Plant Conservation Subcommittee



The Plant Conservation Subcommittee of SSC is charged with promotion and coordination of the SSC's plant conservation work and with development of a plant program for the Commission. Its current members are David Given (Chair, New Zealand); Jameson Seyani (Deputy Chair, U.K./Malawi); Abdulaziz Abuzinada (Saudi Arabia); David Bramwell (Spain); Alan Hamilton (U.K.); Hector Hernandez (Mexico); Toby Hodgkin (Italy); Clive Jermy (U.K.); Mike Maunder (U.K.); Brien Meilleur (U.S.A.); Peggy Olwell (U.S.A.); He Shan-An (China); Cristian Samper (Colombia); Stella Simiyu (Kenya); Jane Smart (U.K.); Carlos Villamil (Argentina); Bertrand von Arx (Canada); and Peter Wyse Jackson (U.K.).

The most recent annual PCS meeting was held in Hermanus, South Africa, and apart from the members of PCS we also had in attendance Wendy Strahm and Susan Tressler (SSC staff), Christoph Imboden (SSC Executive), and a number of observers representing SSC

Specialist Groups and strategic partners. Professor Brian Huntley and the National Botanical Institute provided very generous logistical and financial support of the meeting.

An important output of the Hermanus meeting was a modified logical framework analysis and the preliminary development of a decision tree, which follows from a vision document developed at the previous meeting in Miami. A small executive group is being developed into a draft Plants Program, which we plan to launch in August at the XVI International Botanical Congress in St. Louis, Missouri. The program proposal has taken into account the priorities for SSC set at the recent Djerba strategic planning exercise, as well as aspirations and priorities of Specialist Groups.

The gathering at St. Louis is seen as an opportunity to celebrate the 50 years of SSC, and in connection with this a symposium "Conservation for 2000—Saving the Centers of Plant Diversity: the Species Survival Com-

mission of IUCN Plants Program.” (See the box on the right.) The organizers for this are David Given, Brien Meilleur, and Jane Smart, and the abstract for the symposium is included in the box below. Speakers will be Jane Smart and David Bramwell, Brien Meilleur, Cristian Samper, David Given, Alan Hamilton, and Wendy Strahm. As well, at St. Louis the PCS will be holding its next meeting following the Congress.

What do we see as important elements of an SSC Plants Program? The overall goal is that the extinction crisis is acknowledged as a global problem and the current rate of loss of plant species is reversed. The objectives include sound and mutually beneficial collaboration with strategic partners; ensuring that sound interdisciplinary scientific information underpins decisions and policies affecting plant diversity (priorities include red listing, geographic centers of plant diversity, conservation of wild crop relatives, and integrated use of the Species Information System and BCIS); advocating modes of production and consumption that promote the conservation of native plant diversity and are adopted by users of plant resources; a focus for conservation research and training across disciplines by the scientific community; and SSC members and other parts of IUCN working together in integrated and synergistic manners to ensure that the needs of plants are fully recognized.

We want to see that SSC's plants policy recommendations, guidelines, and advice are valued, adopted, and fully implemented by relevant audiences. This includes promotion of a “Top 50 campaign” coordinated with Specialist Groups, underpinning of plant conservation by an integrated philosophy, promotion of training as one of the principal methods for capacity-building in lesser developed countries, and development of a “Plant-Link” initiative that integrates plant, animal, and ecosystem messages and programs. Within the objectives and priorities, PCS will be looking to work with Specialist Groups and organizations outside SSC to achieve practical and lasting conservation programs for plants.

David R. Given
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E-mail: givend@ibm.net

Symposium Abstract

Conservation for 2000: Saving the Centers of Plant Diversity (the IUCN Species Survival Commission Plants Program)

The Species Survival Commission of IUCN is developing a Plant Program for the first years of the new millennium. This program has a particular focus on global centers of plant diversity, several of which are featured in this symposium as case studies. Although plants have been perceived as often being of lower priority than some charismatic animals in conservation programs, their profile has been raised through publication of a global survey of diversity centers and of the first global Plant Red List in 1998.

The overall aim of the SSC program is to prevent the loss of species through conservation of habitats, implementation of habitat level restoration, the involvement of complementary off-site programs, and increasing awareness of plant diversity issues. This must involve partnerships and better networking, not only within the World Conservation Union (IUCN) family, but between many different agencies from local to global level. Important components of such a program include information management, the application of sound conservation biology, attention to the value of biodiversity, basic research and monitoring, and creation of a professional training capacity. The symposium presents strategic issues and principles, case studies of critical regions, and a view forward into the new millennium.

Donations to the SSC

We extend our sincere thanks to the many donors who have assisted the work of the SSC—particularly those governments, government agencies, and organizations that have been loyal supporters of our network over the years.

SSC has made great progress in many of its programs this year with the assistance of the following donors:

Communications

- Chicago Zoological Society
- Council of Agriculture (COA), Taiwan
- IUCN–World Conservation Fund for Innovation for development of the World Conservation Digital Library
- Wildlife Conservation Society (WCS)
- World Wide Fund for Nature (WWF)

Marine Program, including Red Listing Activities for Marine Species

- Center for Marine Conservation, Washington, D.C.
- U.S. State Department

Publications Program

- Chicago Zoological Society
- Council of Agriculture (COA), Taiwan
- Department of the Environment Transport and the Regions (DETR), United Kingdom
- National Fish and Wildlife Foundation (NFWF), Washington, D.C.
- World Wide Fund for Nature (WWF)

Red List Program, including Criteria Review, Training, and National Level Guidelines

- Center for Marine Conservation, Washington, D.C.
- Conservation International's Center for Applied Biodiversity Science (CABS), Washington, D.C.
- Department of the Environment Transport and the Regions (DETR), United Kingdom
- Environment Australia

- Finnish Ministry of the Environment
- German Ministry of the Environment (BMZ)
- Global Guardian Trust, Japan

Species Information Service (SIS)

- Anonymous Donor, U.S.
- Margo T. Marsh Foundation, U.S.

SSC Steering Committee Conference

- National Research Council for Scientific and Technological Development of Brazil (CNPq)
- Sociedade Civil Mamiará, Brazil
- Wildlife Conservation Society, U.S.

Strategic Plan 2000

- Canadian CIDA
- MAVA Foundation, Switzerland
- The John D. and Catherine T. MacArthur Foundation, U.S.

Wildlife Trade Program

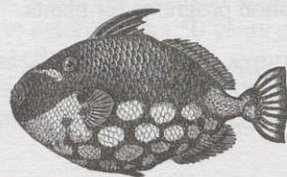
- Council of Agriculture (COA), Taiwan
- The Charles H. Darwin Initiative, United Kingdom, for work on reptile censuses and capacity building in Togo
- U.S. State Department

Travel

- British Airways
- Chicago Zoological Society

CITES Processes

- CITES Standing Committee, for development of MIKE, a monitoring system for the illegal killing of elephants, to be developed with technical input from the African and Asian Elephant Specialist Groups
- The Swiss Government for support provided for the 11th Conference of the Parties

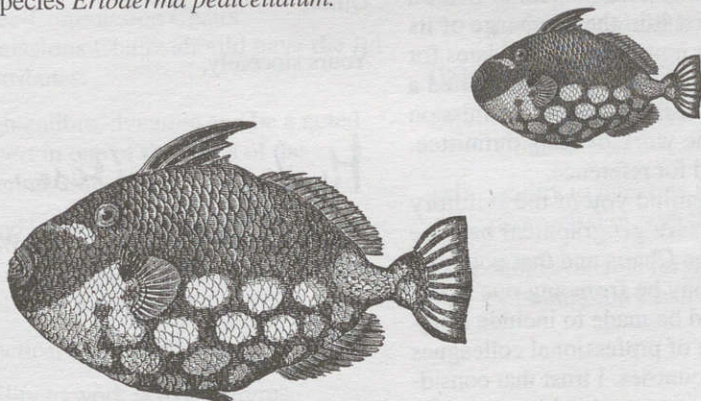


Donations to SSC Specialist Groups

We would also like to express our appreciation for those individuals and organizations that provide support to our 110 Specialist Groups. Following are some of the many donors that help SSC accomplish its conservation mission:

- **Stiftung Avifauna Protecta (SAP)**, an IUCN member organization that provided a grant to the Grouse Specialist Group, enabling the inclusion of the Chinese grouse as a key species in a study of the wildlife conservation in the Gannan Tibetan Autonomous State of southern Gansu Province.
- **The Pittsburgh Zoo Conservation Fund**, which provided a grant to the Tapir Specialist Group to undertake education and conservation work with the mountain tapir in Ecuador, and the **Columbus Zoological Park**, which provided a grant to the Tapir Preservation Fund to continue its important work on tapir conservation.
- **The People's Trust for Endangered Species, the Born Free Foundation, Landesbund fuer Vogelschutz, and the Licaone Fund**, which provided support for the development and publication of *Ethiopian Wolf: Status Survey and Conservation Action Plan*.
- **The Central Avalon Coalition in New Zealand**, which has provided substantial support to the Lichen Specialist Group for surveying the rare and endangered epiphytic lichen species *Erioderma pedicellatum*.
- **The American Orchid Society**, which provided substantial support to establish and maintain the offices of the Orchid Specialist Group Secretariat.
- Donors to the Crocodile Specialist Group, particularly the **"Big Bull Crocs"** and **"Friends of the Crocodile"** groups whose donations have totaled more than U.S. \$300,000 over the last 10 years:
 - ✓ Japan, JLIA—Japan Leather and Leather Goods Industries Association, CITES Promotion Committee, and All Japan Reptile Skin and Leather Association
 - ✓ Mainland Holdings, Ltd., Papua New Guinea
 - ✓ Heng Long Leather C. Pte Ltd., Singapore
 - ✓ Reptilartenschutz, Germany
 - ✓ Singapore Reptile Skin Trade Association
 - ✓ Crocodile Farmers Association of Zimbabwe
 - ✓ Roggwiller Tannery of Louisiana and TCIM, France

Maria Sadowski
Communications and Fundraising Associate
IUCN Species Survival Commission



Nominations for Chairs of IUCN Commissions

To All Members of IUCN Commissions

15 July 1999

Dear Colleague:

The Statutes of IUCN (Part V, Article 27) provide that the Chairs of IUCN Commissions shall be elected by the World Conservation Congress. Regulation 34 to the Statutes further provides that nominations of candidates for the Chairs of each Commission shall be made by the Council after considering suggestions made by the members in Category A and Category B, and by the members of that Commission.

When considering possible candidates for the position of Chair of a Commission, Commission members are asked to keep in mind that the individual concerned must not only have the relevant professional expertise, but also the time, personal commitment and if at all possible institutional resource support to make it possible to carry out the very onerous duties of a Commission Chair. Creative leadership, vision and dynamism are important qualities for a potential Commission Chair if the voluntary networks concerned are to be motivated and able to contribute to implementing the mission of the Union.

The Council has established a Search Committee to assist it in the discharge of its responsibilities for nominating candidates for election by the Congress and has identified a series of desired qualifications for Commission Chairs to guide the work of the Committee. This list is attached for reference.

May we also remind you of the statutory requirement to ensure geographical balance among Commission Chairs and that not more than two Chairs may be from any one State. Every effort should be made to include a significant proportion of professional colleagues from developing countries. I trust that consideration will be given to establishing a gender balance among IUCN's Commission Chairs.

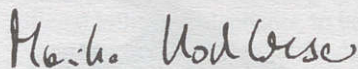
The Chairs of Commissions elected at the World Conservation Congress (Amman, Jordan, 4-11 October 2000) will serve from the close of the Congress until the close of the next ordinary session of the following Congress. In addition to directing the activities of their Commissions, Chairs serve as voting members of the IUCN Council.

In accordance with Part VI, Article 42 of the Statutes, members of Council may not hold the same office consecutively for more than two terms. A list of the Commission Chairs currently in office indicating those who have served a full term and those who may be re-elected is given below. I should emphasize that even when the current Chair is eligible for re-election, it is necessary for a new nomination to be made.

Commission Members are invited to send in their suggestions for the Chair of the Commission on which they serve to Dr. Wren Green, IUCN Councillor and Chair of the Council Search Committee-Commission Chairs at IUCN Headquarters in Gland, Switzerland by 15 January 2000 at the latest (and well before if possible). A statement from the potential candidates that they are willing to serve if elected, should accompany your suggestions together with brief biographical information.

We very much appreciate your attention to this important aspect of the governance of the Union.

Yours sincerely,



Maritta R. von Bieberstein Koch-Weser
Director General

Current Commission Chairs

Commission	Current Chair	No. of terms served at commencement of World Conservation Congress	Observations
Ecosystem Management	Prof. Edward Maltby U.K.	1 term	Eligible for re-election
Education and Communication	Dr. Frits Hesselink Netherlands	2 terms	Not eligible for re-election
Environmental Law	Prof. Nicholas Robinson U.S.A.	1 term	Eligible for re-election
Environmental Economic and Social Policy	Dr Tariq Banuri Pakistan	1 term	Eligible for re-election
Protected Areas	Prof. Adrian Phillips U.K.	2 terms	Not eligible for re-election
Species Survival	Mr. David Brackett Canada	1 term	Eligible for re-election

Desired Qualifications For Commission Chairs

At the 50th Meeting of the IUCN Council held on 26-28 April 1999, the Council agreed on the following criteria to guide the Council Search Committee-Commission Chairs.

Commissions Chairs should have the following attributes:

- (i) high-calibre, dynamic and be a noted expert in one of the fields of the Commission
- (ii) good knowledge of IUCN
- (iii) network of contacts around the world and networking skills
- (iv) practical experience
- (v) ability to work across cultures, disciplines, north-south
- (vi) leadership qualities—able to give vision, sense of direction and inspiration
- (vii) effective chair of meetings
- (viii) strategic planning and organizational management skills
- (ix) good communicator
- (x) experience with the concerned Commission
- (xi) ability to integrate the work of the Commission with that of the Union
- (xii) time available for the full discharge of Commission Chair's duties

The World Conservation Digital Library: Sharing 50 Years of Conservation Expertise with the World

An Initiative of IUCN's Species Survival Commission, Information Management Group, and Publications Services Unit

As a leading source of biodiversity conservation knowledge and expertise and provider of scientifically sound, authoritative information, IUCN holds a unique niche in the global conservation community. For 50 years, IUCN has been collecting and analyzing massive amounts of data on a broad range of topics concerning the status of the world's biodiversity, and it has been publishing results in a wide array of documents.

IUCN has nearly 300 titles currently in print, and the IUCN Library, in itself a unique entity, is the sole holder of nearly 2,000 IUCN publications, as well as many documents and reports. Additionally, the IUCN Regional and Country Offices undertake localized publishing programs comprising region-specific data and information. The outputs of the Commissions, the Regional and Country offices, and Programs form a substantive information resource, with more than 10,000 volunteers contributing technical knowledge and data. IUCN publications constitute a collection that is unique in scope and coverage; it is the only organization that provides guidelines, strategies, legal advice, conservation assessments, and other tools on key issues towards policy making for nature conservation. Unfortunately, access to the compendium of knowledge is limited.

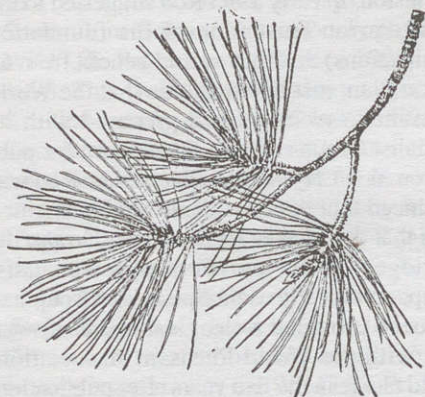
The World Conservation Digital Library will make IUCN publications freely available and fully searchable on the Web. CD-ROMs of the collection will be available to those who do not have affordable or reliable Internet access. Expanded distribution and delivery services will be provided through IUCN's Publications Services Unit and Library, and through Depository Libraries maintained by IUCN member and partner organizations in several regions of the world.

The World Conservation Digital Library will provide a valuable research service. In addition to offering access to data and information, all IUCN publications will be posted as a comprehensive collection accessible from a single entry point. The variety of publications available on-line and the flexibility in queries will result in a rich addition to the world's information resources on conservation. IUCN Member States, government agencies, and non-governmental organizations, its Commissions and Regional and Country Offices, and parties to environmental conventions and treaties (e.g., Ramsar, CITES, the CBD) will be able to immediately access information about the status of species, environmental law, protected areas, specific ecosystems, sustainable use, and many other topics on which IUCN is well positioned to advise. A land manager in the Pacific Rim, a field researcher in Sri Lanka, a government official in the U.S., a development agency working in Mozambique, or a university student in Venezuela will be able to search through the entire compendium of IUCN's publications for a common theme, author, or region. They will be able to move quickly to the precise publications, sections, paragraphs, photographs, or maps within all IUCN publications that match their query.

The World Conservation Digital Library was conceived early in 1998. With the development of the IUCN Web site, the IUCN Knowledge Network, and the on-line World Conservation Bookstore, IUCN had already developed capabilities to utilize emerging electronic technologies to improve the flow of information within IUCN and to the outside world and to increase IUCN's services to its Members. Concurrently, IUCN Commissions and Programs have been enhancing services to their constituencies with the development of electronic resources such as SSC's Species Information Service (SIS), the PARC Initiative (Protected Areas Resource Centres) of the World Commission on Protected Areas (WCPA), the Economics Services Web site, and links to the Biodiversity Conservation Information System (BCIS).

By December 1999, and marking SSC's 50th anniversary as a conservation powerhouse, the Digital Library Team plans to have a working library in place on the Web. The first entry point into the Digital Library would be at the meta-data level, which will contain extensive bibliographic information and indexes on all 2,000 publications in the IUCN Library. The second level would contain the text, maps, and photographs from all 50 SSC Action Plans. This includes information on species from crocodiles to dragonflies to orchids to cactuses to cats to wild sheep to seals to pheasants—nearly 6,500 pages of species data, all of which will be available for the first time in a format that will allow for searches by region or keyword. Significantly, nearly one-quarter of SSC's Action Plans are currently out of print, as are many IUCN publications, particularly those from developing countries. Publications will be added to the Digital Library over a longer time frame, with each successive posting adding information and more fully filling in details on issues affecting the conservation of biodiversity.

It would have been difficult to envision the possibilities of the World Conservation Digital Library even a few short years ago. IUCN takes great pride in making 50 years of expertise and information immediately available and accessible for anyone with a computer. It truly is a milestone in information sharing. ♦ *Contributed by Maria Sadowski, Communications and Fundraising Associate.*



Sustainable Use Initiative

Since the inception of SSC's Sustainable Use Initiative (SUI) six years ago, one of its major accomplishments has been to move the idea of sustainable use from a concept toward a practical tool for the management of wild renewable natural resources. This success is due in large part to the global network of Sustainable Use Specialist Groups (SUSGs) comprised of practitioners, policymakers, and academics. SUSGs form the practical and scientific backbone of the Initiative. From three groups in 1997 to 14 groups (and growing) in 1999, the growth of the SUSGs has provided the vehicle for our achievements to date.

SUI's mission is, in part, "to improve our understanding of the social and biological factors that enhance the sustainability of uses of wild living natural resources." To this end SUI has produced a number of key products. Reports include "Factors Enhancing Sustainability," while publications include the SUI Technical Series. Latterly, the SUI Web site has come on-line. All these products are designed to offer IUCN members, policymakers, and scientists access to the concepts, experiences, and realities of sustainable use. The work of the SUI has also been undertaken through a series of strategic and subject-specific workshops. The SUI plays a major role in disseminating the reality of sustainable use through living examples such as the CAMPFIRE program in Zimbabwe and the critically acclaimed play, "Guardians of Eden." Policy advice to the GEF and other development assistant agencies is also part of our work. The SUI is working toward sustainable use of renewable natural resources being a key element of sustainable development strategies in the coming millennium. A central expression of our work to date and our aspirations for sustainable use in the future is found in the IUCN Policy Statement on Sustainable Use, which will be presented at the 2nd World Conservation Congress. ♦ *Contributed by James Oglethorpe, Managing Editor, SUI.*

Rod Hall MBE

In March 1999 one of conservation's most remarkable "back-room" people stepped down as voluntary coordinator of the British Airways Assisting Conservation scheme. After more than 15 years of great imagination and energy, Rod Hall returned to having "just" one job, that of a BA ground engineer at London's Heathrow Airport.

Rod Hall qualified as an aeronautical engineer at Portsmouth in the south of England in the mid-1960s, after which he moved to Heathrow in 1968 to work for BOAC. As BA underwent substantial reorganization in the early 1980s, there was little time anywhere outside select circles for conservation issues, and even less tangible support. Nonetheless, this was the time that the British Airways Assisting Nature Conservation scheme was established. Having been devastated by the sight of oiled waterfowl on a holiday in Alaska, Rod helped conservation projects whenever he could during the very early 1980s with support from key personnel within the airline. In 1983 he spent three months studying the blue duck in New Zealand on a Churchill Fellowship, and this was the specific catalyst for the start of the BAANC scheme. As a full-time engineer, Rod's major problem was access to office facilities, such as ticketing, telex, and fax, and the support of other staff, especially Colin Gray in the Foreign and Government Department at BA, was crucial.

Initially the scheme sought to use empty BA cargo space to transport animals in breeding programs and to move essential equipment to where it was needed. Right from the start the emphasis was on helping agencies where BA support could make a real difference, typically smaller organizations and where local people were involved.

In 1985 it was realized that not everyone that sought or deserved support could be helped and so a group of foundation organizations was created with which BAANC would seek to establish long-term partnerships. This included organizations as varied as Jersey Wildlife Preservation Trust, the Wildfowl and Wetlands Trust, Botanical Gardens Conservation International, Zoo Outreach India, and the World Pheasant Association. The idea of

dealing almost exclusively with these organizations was that true partnerships would be built, both improving communications between these groups and having reliable contacts to provide the feedback that is crucial to any such support scheme.

By now training of people was emerging as a key activity of many of the foundation organizations, and BAANC began to use empty seats in off-peak periods to fly people around the world, either to be trained, or to give specialist training *in situ*. As a shift engineer Rod was able to use his "time off" to make the arrangements that were necessary: he had great flexibility, but this led to an astonishing workload. Many of the conservation colleagues who flew into or out of Heathrow would have met Rod, and any visitor to his "home office" cannot but have been left reeling by the amount of conservation work that he undertook.

In 1990 BA formed an Environment Department and the scheme (now renamed British Airways Assisting Conservation) fell under its auspices. Rod continued to work at evenings after early shifts, in the mornings before late shifts, and at weekends managing the foundation organizations on behalf of the Environment Department.

The idea behind BAAC is very much the idea behind SSC—networks of people and organizations working together for conservation can achieve much more than any one alone. One striking example of where the two organizations worked together, and with other organizations, is about to reach a successful conclusion. In early 1995 Rod suggested to the World Parrot Trust (one of his foundation organizations) that they would benefit from an Action Plan, just like the three that the World Pheasant Association had prepared with its Specialist Groups and BAAC support, for publication in IUCN's Action Plan series. Rod was convinced that the considered action-oriented plans that the Megapode Specialist Group; the Partridge, Quail, and Francolin Specialist Group; and the Pheasant Specialist Group had produced provided a clear statement of what they, with the World Pheasant Association, should tackle in the five years after publication.

This discussion with the World Parrot Trust led to a meeting near London in mid-1995 to

which BAAC support allowed for many of those keen to see a parrot Action Plan and greater cooperation between parrot conservationists. Although not all of the issues that had surrounded the first attempt to produce an IUCN parrot Action Plan were resolved there and then, this "Parrot Summit" was a significant step forward. Several further challenges arose during the following three-and-a-half years, but BAAC's support from start to finish has matched the willingness of parrot and conservation organizations to see an agreed plan for the world's parrots. Perhaps it is fitting that Rod Hall stepped down a few weeks after this plan was finally agreed upon and entered the production phase.

He leaves BAAC with the scheme's value appreciated much more throughout the rest of the airline and with BA's profile higher in the conservation world than it has ever been. The scheme is innovative now, let alone 16 years ago, and has allowed many organizations to develop considerably and many partnerships to establish. The ultimate beneficiary is the natural world. While Rod himself takes a well-earned rest in his beloved garden, we look forward to continued partnership between BAAC and the conservation world. ♦ *Contributed by Phil McGowen.*

Legal Protection of Bats in Sarawak, Malaysia

The Parliament of the Malaysian state of Sarawak in Borneo unanimously passed the Wild Life Protection Ordinance 1998 in May 1998. This Ordinance includes a major initiative that legally protects all bats in Sarawak. This means that bats cannot be hunted, captured, and sold. It is also illegal to offer bats for sale or claim to be offering them for sale. Under the new ordinance, bats cannot be imported or exported.

Domestic possession of bats or any part or derivative is only legal when held in accordance with the terms and conditions of a license issued under the Wild Life Protection Ordinance 1998. The Sarawak Forest Department, as administrator of the Ordinance, will

not be issuing any licenses for possession as it intends to protect all bats. The penalty for contravening this ordinance is a fine of Malaysian Ringgit 10,000 (U.S. \$2,500 or British Pounds 1,400) and imprisonment of one year.

With the new initiative, a license is also needed for the sale and use of all mist nets. The penalty for selling mist nets without a license is imprisonment for three months and a fine of Malaysian Ringgit 1,000 (U.S. \$250 or British Pounds 140). Penalties for illegal use of mist nets is imprisonment for six months and a fine of Malaysian Ringgit 2,000 (U.S. \$500 or British Pounds 280).

This landmark change was unanimously approved by the Sarawakian Parliament as it recognizes the very important roles bats play as flower pollinators and seed dispersers. Their roles in reducing insect pests is also slowly being understood by the farming community. Sarawakian tourism has also long benefited from bats as they form part of the wildlife draw in some national parks. The evening dispersals of 1.8 million *Tadarida plicata* from Deer Cave at Mulu National Park is considered one of the best wildlife spectacles in Borneo.

Apart from the legal protection, the Sarawak Government has also issued several press releases to the general public on the protected status of all bats; carried out conservation education programs with rural communities living near roosts on the legal protection of bats; stopped illegal hunting of bats by having enforcement and patrolling teams at known hunting sites; controlled the amount of cartridges that can be purchased by gun owners each month; and reduced sales of bats at markets by enforcing the new laws.

Borneo has over 95 species of bats, making it one of the few bat species-rich areas in the world. In terms of Old World fruit bats alone, Borneo has 18 species, ranking it the fourth highest in terms of the world score for megachiropteran bat diversity. Bornean bats range from tiny animals weighing about 3.5 gm (thick-thumbed pipistrelle, *Glischropus tylopsus*) to those over over 1,100 gm (large flying fox, *Pteropus vampyrus*). In fact, the large flying fox is also the biggest bat in the world. ♦ *Contributed by Melvin Gumal and Paul Racey.*

Deforestation Endangers Freshwater "Lobsters" in Paraguay

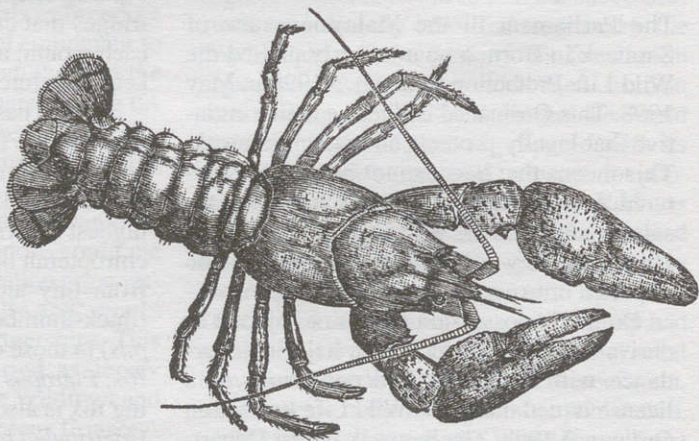
Crustaceans of the genus *Aegla* are unique in many respects. They are the only members of the large decapod crustacean group Anomura (which includes hermit crabs and other marine relatives) found in freshwater, and they occur exclusively in temperate South America. Commonly called aeglid "crabs," these creatures technically are not crabs, nor are they true lobsters. They are instead members of their own family, the Aeglididae, whose nearest relatives are among the strictly marine galatheid "squat lobsters" or possibly the hermit crabs, all of which are also marine or semi-terrestrial.

There is growing evidence that suggests that these endemic crustaceans are seriously endangered throughout their range in Paraguay, primarily due to the effects of deforestation. John Kochalka collected specimens of *Aegla* in 1985 in a cool, clear stream in the headwaters of the Rio Tebicuary (Departamento Itapua), in a deep, forested canyon in southern Paraguay, on the northwestern face of the Cordillera San Rafael. The specimens were small; local natives said that they were larger two years earlier, before deforestation began, and confirmed that these crustaceans always disappeared within two or three years after the start of deforestation. Two years later (1987) there were no aeglids present at this site, and they are presumed to have become extirpated within three or four years of deforestation. The same author returned to this region in 1998 and,

despite intensive searching, failed to find *Aegla* at two nearby sites where deforestation was also occurring.

Because of extensive deforestation that has occurred throughout Paraguay, it is possible that these crustaceans are extinct throughout all of their former habitats in this country. If not, they are certainly endangered. This is all the more tragic because the specimens collected in 1985 appear to belong to an undescribed species, a species that may now no longer exist. Thus, we have an endangered (or possibly extinct) species that has yet to be described, and there is no reason to doubt that similar losses will occur everywhere that there is deforestation in temperate South America. Losses of aeglid crabs will affect not only the stream microhabitat but other fauna as well, as they constitute part of a food web involving local food fishes and predatory birds. Aeglid crabs can be used as bioindicators of stream health because some species are found only in clear, well-oxygenated and fast-flowing river or stream systems. Thus, loss of the aeglids reflects overall loss of these unique habitats and the biodiversity contained therein.

The conservation status of aeglid crabs in other South American countries where they occur—Brazil, Uruguay, Chile, and Argentina—is uncertain and should be considered a high priority for evaluation and conservation. ♦
Contributed by John A. Kochalka, Joel W. Martin, and Denton Belk.



In Memoriam

Lieutenant-Colonel C.L. Boyle died on March 21, 1999, 12 days after his 100th birthday. I first met him in 1952, two years after he had retired from his distinguished military career to become Honorary Secretary of the Society for the Preservation of the Fauna of the Empire, which was a founding member of the International Union for the Protection of Nature. His modernization of the Society (now Fauna and Flora International) included renaming the *Journal of the S.P.F.E.* as *Oryx* and incidentally recruiting me to its Council in the unfamiliar guise of an expert on British mammals (the Society has always left birds to the specialist bird societies).

He remained in charge of the FPS until 1963, when I succeeded him. One of his most important accomplishments was to arrange for the introduction into Parliament of a Bill that became the Animals (Restriction of Importation) Act 1964 and was familiarly known as "Boyle's Law." This arose out of a resolution at the IUCN General Assembly at Warsaw in 1960 and was one of the first national measures anywhere in the world to protect endangered species.

In 1958, at the Athens G.A. of what had now become IUCN, Boyle succeeded Harold Coolidge of the U.S.A. as Chair of what was then the Survival Commission. At the Nairobi G.A. in 1963, he handed the baton on to Peter Scott. During his tenure he started a card index of 34 mammals then considered threatened—an advance on the 14 threatened mammals reported to the IUCN Technical Conference at Lake Success, N.Y., 1949. SSC meetings were infrequent at that time, and my own introduction to the SSC was to be co-opted by Boyle at an ad hoc meeting during an international bird conservation conference at Stavanger, Norway, in 1961.

Operation Oryx, which began the rescue of the Arabian oryx, then not quite extinct in the wild, was started by Boyle in 1963 as a joint effort of the FPS and SSC, largely funded by the

infant World Wildlife Fund. Its outstanding success (until the recent renewed ravages of unnamed poachers in Oman) in securing the reintroduction of the species to the wild in Oman and Jordan was undoubtedly the crown jewel of Boyle's career as a conservationist.

His many distinctions included the Order of the Golden Ark and a British O.B.E. He was also an Honorary Member of the SSC and a Vice-President of Fauna and Flora International. ♦ *Submitted by Richard Fitter.*

Cynthia Giddy, past Chair of the Cycad Specialist Group, stalwart of the CITES Plants Committee, author of *Cycads of South Africa* (first published in 1974 with two subsequent printings) and numerous other articles, and great champion of cycad conservation, died tragically with her husband of 42 years following a car accident caused by a drunken driver, June 16, 1998. Now, a year following her death, she is still greatly missed by her family, friends, and the conservation community.

Her daughter Caitlin wrote, "Her great passion for the last 27 years was championing the cause of cycads, by campaigning furiously against the illegal trade in wild plants. She lobbied for legislation governing the trade and ensuring the survival of endangered species, and testified against people prosecuted for illegal possession of cycads."

In 1991 she won the Natal Parks Board's Conservator of the Year Award, and in 1993 she was honored as a world authority on cycads by the International Rolex Awards for Enterprise.

Her contributions to the work of the SSC and to cycad conservation have been significant, and it is with great sadness that we record her untimely passing. She was a warm and generous person, and a magnificent warrior for cycad conservation. ♦ *Submitted by Wendy Strahm, IUCN Plants Officer.*

IUCN Guidelines for the Prevention of Biodiversity Loss Due to Biological Invasion

1. Introduction

Biological diversity faces many threats throughout the world. One of the major threats to native biological diversity is now acknowledged by scientists and governments to be biological invasions by alien species. The impacts of invasive species are immense, insidious, and usually irreversible. They may be even more damaging to species and ecosystems on a global scale than the loss and degradation of habitats. For millennia, the natural barriers of oceans, mountains, rivers and deserts provided the isolation essential for unique species and ecosystems to evolve. In just a few hundred years these barriers have been rendered ineffective. Human trade and travel, accompanied by intentional and unintentional introductions, have inadvertently ended millions of years of biological isolation and created major ongoing problems that affect developed and developing countries alike.

The scope and cost of biological invasions is global and enormous, in both ecological and economic terms. Invasive species are found in all taxonomic groups: they include introduced viruses, fungi, algae, mosses, ferns, higher plants, invertebrates, amphibians, reptiles, birds and mammals. They have invaded and affected native biota in virtually every ecosystem type on Earth. Hundreds, probably thousands of extinctions, especially on islands, have been caused by alien invasives. The ecological cost is the irretrievable loss of native species and ecosystems. The economic costs run into many billions of dollars annually. Arable weeds reduce crop yields and increase costs, invasives in ballast water disrupt marine and freshwater systems, weeds degrade catchment areas and freshwater ecosystems, tourists and homeowners unwittingly introduce alien plants into wilderness and natural areas, while pests and pathogens of crops, livestock and forests reduce yields and increase control costs. Environmental pollution and habitat

destruction provide new conditions in which alien invasive species can thrive and climate change, for example, extends the range of disease carrying organisms such as mosquitoes.

The goal of these guidelines is to prevent further losses of biological diversity due to the deleterious effects of alien invasive species. The intention is to assist governments and management agencies to give effect to Article 8 (h) of the Convention on Biological Diversity, which states that:

"Each Contracting Party shall, as far as possible and as appropriate:

...(h) Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species."

These guidelines draw on and incorporate relevant parts of the 1987 IUCN Position Statement on Translocation of Living Organisms. They are more comprehensive in scope than the 1987 Translocation Statement, which they complement. The relationship to other relevant guidelines, the *IUCN Guidelines for reintroductions*, is elaborated in Section 8.

These guidelines are concerned with preventing biodiversity loss due to alien biological invasions. They do not address the issue of genetically modified organisms, although many of the issues and principles stated here could apply. Neither do these guidelines address the economic (agricultural, forestry, aquaculture), human health and cultural impacts of alien invasive species.

2. Context

Major global forces are combining to help alien species to travel vast distances to new habitats where habitat degradation has improved their chances of becoming established and developing into invasive species. The globalization and growth in the volume of trade and tourism, coupled with the emphasis on free

trade, provides more opportunities than ever before for species to be spread accidentally and deliberately. Customs and quarantine practices, developed in an earlier time to guard against human and economic diseases and pests, are inadequate safeguards against species that threaten native biodiversity.

The degradation of natural habitats, ecosystems and agricultural lands that has occurred throughout the world has made it easier for alien species to establish and become invasive. Many invasives are "colonizing" species that benefit from the reduced competition that follows habitat degradation. As global climate change occurs it will be a significant factor assisting the spread and establishment of invasive species. Also, the information that could alert management agencies to the potential dangers of new introductions is not known, or is not widely shared or available in an appropriate format for many countries to take prompt action, assuming they have the resources, necessary infrastructure, commitment and trained staff to do so.

Few countries have developed the comprehensive legal and institutional systems that are capable of responding effectively to these new flows of goods, visitors and "hitchhiker" species. Many citizens, key sector groups and governments have a poor appreciation of the magnitude and economic costs of the problem. As a consequence, responses are too often piecemeal, late and ineffective. It is in this context that IUCN has identified the problem of alien invasive species as one of its major initiatives at the global level.

Nowhere is the problem more acute than on islands in general, and for small island countries in particular. Acute problems also arise in other isolated habitats and ecosystems, such as in Antarctica. The physical isolation of islands over millions of years has favored the evolution of unique species and ecosystems. As a consequence islands and other isolated areas usually have a high proportion of endemic species (those found nowhere else) and are centers of significant biological diversity. Isolation has also meant island species are especially vulnerable to more aggressive competitors and predators from continental areas.

As a consequence of the effects of invasive species, hundreds, even thousands of species, have gone extinct in the past few centuries on islands and many more are threatened with extinction. It is important to turn this isolation of islands into an advantage by improving the capacity of island governments to prevent the arrival of alien species with better knowledge, greater management capacity, quarantine and customs systems that are capable of identifying and intercepting alien invasive species, and improved legal frameworks.

These guidelines address four substantive elements of the *alien* biological invasion problem that can be identified from this wider context. These are:

- understanding and awareness;
- the management response;
- legal and institutional needs;
- knowledge and research issues.

While the four elements are all important, these particular guidelines focus most strongly on aspects of the management response. They reflect the urgent need to spread information on management that can quickly be put into place to prevent invasions and eradicate or control established invasives. The other elements, particularly the legal and research elements, will require longer-term strategies to accomplish the necessary changes.

3. Definition of Terms

"Biological diversity" (biodiversity) means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.

"Native species" (indigenous) means a species, subspecies, or lower taxon, occurring within its natural range and dispersal potential (i.e., within the range it occupies naturally or could occupy without direct or indirect introduction or care by humans.)

“Alien species” (non-native, non-indigenous, foreign, exotic) means a species, subspecies, or lower taxon occurring outside of its natural range and dispersal potential (i.e., outside the range it occupies naturally or could not occupy without direct or indirect introduction or care by humans) and includes any part, gametes or propagule of such species that might survive and subsequently reproduce.

“Invasive species” means an alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity.

“Introduction” means the movement, by human agency, of a species, subspecies, or lower taxon (including any part, gametes or propagule that might survive and subsequently reproduce), outside its historically known natural range, within the same country or in another country.

“Unintentional introduction” means an introduction made as a result of a species utilizing humans or human delivery systems as vectors for dispersal outside its natural range. (The introduction is incidental to the main transaction taking place (often trade), but may have major environmental consequences.)

“Intentional introduction” means an introduction made deliberately by humans, involving the purposeful movement of a species outside of its natural range and dispersal potential. (Such introductions may be authorized or unauthorized.)

“Natural ecosystem” means an ecosystem not perceptibly altered by humans.

“Semi-natural ecosystem” means an ecosystem which has been markedly changed by human actions, but which is a self-sustaining ecosystem.

“Biosecurity threats” means those matters or activities which, individually or collectively, may constitute a biological risk to the ecological welfare, or to the well-being of humans, animals or plants, of a country.

“Reintroduction” means an attempt to establish a species in an area which was once part of its historical range, but from which it has been extirpated or become extinct. (From *IUCN Guidelines for Re-Introductions*)

“Government” includes regional cooperating groupings of governments for matters falling within their areas of competence.

4. Objectives

- To increase awareness of invasive species as a major issue affecting native biodiversity in developed and developing countries and in all regions of the world.
- To encourage prevention of invasive species introductions as a priority issue requiring national and international action.
- To minimize the number of unintentional and unauthorized introductions.
- To ensure that intentional introductions, including those for biological control purposes, are properly evaluated in advance, with full regard to potential impacts on biodiversity.
- To encourage the development and implementation of eradication and control campaigns and programs for invasive species, and to increase the effectiveness of those campaigns and programs.
- To provide a framework for legislation and international cooperation to prevent the introduction of, to promote the eradication of, and to control invasive species.

5. Understanding and Awareness

5.1 Guiding Principles

- Understanding and awareness, based on information and knowledge, are essential for establishing alien invasive species as a priority issue which should and can be addressed.
- Better information and education, and improved public awareness of invasive

issues by all sectors of society is fundamental to preventing or reducing the risk of unintentional introductions.

- Control and eradication of invasive species is more likely to be successful if supported by informed and cooperating local communities and appropriate sector groups.
- Relevant information and research are vital prerequisites to understanding and awareness. (See section 9.)

5.2 Recommended Actions

1. Identify the specific interests and importance of different sectors and communities with respect to invasive species issues and target them with appropriate information and recommended actions. Specific communication strategies for each target group will be required to help reduce the risk of biological invasions. The general public is an important target group to be considered.
2. The wide availability of easily accessible, current and accurate information is a key component of awareness raising. Information may be in manuals, databases, scientific journals and other publications. (See section 9.)
3. Importers and exporters of goods, as well as of species, are key target groups for information/education efforts leading to better awareness and understanding of the issues, their role in prevention, possible solutions and penalties. The private sector should be encouraged to develop and follow best practice guidelines and monitor adherence to guidelines, in preference to facing negative sanctions or penalties . . . (Refer to sections 6.2 and 6.3).
4. Information and recommended actions for travelers, both within country and between countries, is an important priority, preferably prior to the start of journeys. Raising awareness of how much human travel contributes to invasive problems can improve behavior and be cost-effective.
5. As eco-tourism travel grows in volume, it is important to raise awareness of how to prevent the unintentional transport of alien

plants (especially seeds) and animals into ecologically vulnerable island habitats, or into lakes, mountain areas, wilderness areas, isolated forests and inshore marine ecosystems. Any intentional release of plants or animals in these areas should also be discouraged.

6. Staff training for quarantine, border control or other relevant facilities needs to include awareness of the larger context and threats to biological diversity, in addition to the practical training for aspects like identification and regulation. (See section 6.2.)
7. Communication strategies should be built into the planning phase of all prevention, eradication and control programs. By ensuring that effective consultation takes place with local communities and all affected parties, most potential misunderstandings and disagreements can be resolved or accommodated in advance.

6. Prevention

6.1 Guiding Principles

- Preventing the introduction of invasive species is the cheapest, most preferred option and should be given the highest priority.
- Act rapidly to prevent the introduction of potential alien invasives, even if there is scientific uncertainty about the long-term outcomes of the potential invasion.
- Given the unpredictability of the impacts on biological diversity of many alien species, any intentional introductions and efforts to identify and prevent unintentional introductions should be based on the precautionary principle.
- The intentional introduction of alien species should only be permitted if the positive effects of the introduction are likely to outweigh its actual and potential adverse effects. This principle is particularly important when applied to isolated habitats and ecosystems, such as islands or centers of endemism.

- The intentional introduction of an alien species should only be considered if no native species is considered suitable for the purposes for which the introduction is being made.
 - Biological invasions act as "biological pollution" that can negatively affect development and quality of life. Hence part of the regulatory response to the introduction of invasive species should be the principle that "the polluter pays" where "pollution" represents the damage to native biological diversity.
 - Biological invasions can significantly affect national development. Legal and institutional frameworks should comprehensively address the full range of biosecurity threats faced by each country.
 - Islands, including isolated ecosystems such as lakes and mountain ecosystems, are especially vulnerable to biological invasions, either from within a country or from outside, and should be accorded the highest priority for action, especially for prevention initiatives, and particularly when significant biodiversity values are at risk.
2. Measures that would assist this goal include: elimination of incentives that facilitate the problem; legislative sanctions for introductions of alien species unless no fault can be proved; internationally available information on alien invasive species that threaten biological diversity, by country or region, for use in border and quarantine control as well as in analysis of risk levels and prevention, eradication and control activities. (See section 9.)
 3. An indicative, non-exclusive list of pathways of unintentional introductions includes: tourism, shipping, ballast water, fisheries, agriculture, construction projects, ground and air transport, forestry, horticulture, landscaping, the pet trade aquaculture and game farming.
 4. Quarantine and border control regulations and facilities should be in place and staff trained to intercept alien species of known or likely risk to native biological diversity. Quarantine and border control regulations should not be premised on narrow economic grounds that primarily relate to agriculture and human health, but on the unique biosecurity threats each country is exposed to.

6.2 Unintentional Introductions

1. National and international trade and tourism are major pathways for the unintentional movement and establishment of alien species. Unintentional introductions are perhaps the most difficult types of movement to identify, control and prevent. Contracting parties to the Convention on Biological Diversity, and in fact all countries, should work with the wide range of relevant international trade authorities and industry associations, in particular the World Trade Organization (WTO), with the goal of significantly reducing the risk that trade will facilitate the introduction of invasive species. Similarly on a regional level, there are many trade organizations and agreements in which countries participate. These should be examined to minimize or eliminate unintentional introductions that are caused by their actions.
5. Border control legislation and procedures should consider the risks of unintentional introductions associated with certain types of goods or packaging. Appropriate fines, penalties or other sanctions should be in place to apply to those responsible for unintentional introductions through negligence and bad practice.
6. Legislative provisions and institutional arrangements should also be in place to address threats to biological diversity by both unintentional and intentional introductions across biogeographical boundaries within one country.
7. The activities of companies dealing with transport or movement of living organisms should be subjected to the biosecurity regimes established by governments in the exporting and importing countries. Their activities should be subjected to appropriate levels of monitoring and control.



8. In the event that unintentional introductions occur, the need to take rapid and effective action to eradicate or contain the species concerned requires that certain provisions are already in place. These include legislative provisions, clear administrative procedures and accountabilities, and the operational and resource capacities that are required for rapid and effective action.
9. For island countries with high risks and high vulnerabilities to invasive species, more holistic approaches to biosecurity threats and better resourcing of quarantine and border control operations, including greater inspection and interception capabilities are the most cost-effective options for governments seeking to prevent costly control of invasive species.
10. The discharge of ballast water has led to unplanned and unwanted introductions of harmful aquatic organisms, including disease bacteria and viruses, in marine and freshwater systems. Ballast water is now regarded as the most important vector for trans-oceanic and inter-oceanic movements of shallow-water coastal organisms.

Initiatives need to include: better ballast water management practices; improved ship design; development of national ballast water programs; research, sampling and monitoring regimes; information to port authorities and ships' crews on ballast water hazards. The dissemination of international guidelines and recommendations should be actioned, as appropriate, such as the International Maritime Organization, at the national, regional and international level. Legislative provisions and institutional arrangements should be in place to provide the basis for the control of ballast water problems and implementation of guidelines.

11. Large engineering projects, such as canals, tunnels and roads that cross biogeographical zones, can lead to the mixing of flora and fauna that were previously separated and the disturbance of local biological diversity. Legislation requiring environmental impact assessment of such projects should require an assessment of the risks associated with unintentional introductions of invasive species.

6.3 Intentional Introductions

1. The legislative framework of most countries rarely treats intentional introductions in a holistic manner, that is, considers all environments and all organisms likely to be introduced, and instead is usually oriented around sectors, such as agriculture. Consequently the administrative and structural arrangements are usually inadequate to deal with the entire range of incoming organisms, the implication for the environments into which they are being introduced, or with rapid responses to emergency situations. As part of any legislative reforms governments should establish an appropriate institutional mechanism such as a "biosecurity" agency or authority. (Refer to section 10.)
2. The role of the biosecurity agency, or other institutional mechanism, is to reach decisions on whether proposed introductions should be allowed, to develop import and release guidelines and, where appropriate, to set specific conditions.
3. Effective evaluation and approval processes are of the utmost importance. As part of the evaluation process before coming to a decision on introducing an alien species, an environment impact assessment and risk assessment should be carried out (see Appendix A and 6.4).
4. In some cases, specific experimental trials (e.g., to test the food preferences or infectivity of alien species) should be conducted as part of the assessment process. Such trials are often required for biological control proposals and the appropriate protocols for such trials should be followed.
5. The evaluation process allows for the likely environmental impacts, risks, costs (direct and indirect, monetary and non-monetary) benefits, and alternatives, to have been identified and assessed by the biosecurity authority in the importing country. It is then in a position to decide if the likely benefits outweigh the possible disadvantages. The public release of an interim decision, along with related information, should be made with time for submissions from interested parties before the biosecurity agency made a final decision.
6. It may be appropriate to impose conditions. In addition, monitoring regimes are often necessary.
7. In the absence of appropriate legislative provisions and institutional arrangements to control introductions of alien species, exporters and importers should be encouraged to meet best practice standards to minimize any risks associated with trade as well as containing any accidental escape that may occur.
8. Intentional, but unauthorized introductions may occur either with illegal intent (smuggling) or through ignorance. Governments should develop criminal penalties and civil liability for consequent eradication or control costs of unauthorized intentional introductions.
9. As well as the efforts that are required at global and regional levels to reduce the risk that trade will facilitate unintentional introductions (section 6.2) there are also opportunities to improve international instruments and practices relating to trade that affect intentional introductions. For example, the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are addressing the implications invasive species may have on the operation of the Convention. Similar initiatives should be made with respect to relevant international trade authorities and industry associations.

6.4 Risk Assessment Framework

This refers to the identification of the relevant risks associated with a proposed introduction and to the assessment of each of those risks. Assessing risk refers to looking at the size and nature of the potential adverse effect as well as the likelihood of it happening.

7. Eradication and Control

7.1 Guiding Principles

- Act rapidly to eradicate or control new alien invasive species, even if there is scientific uncertainty about the long-term outcomes of the invasion.
- Eradication of new or existing alien invasive species is preferable and is more cost effective than long-term control, particularly for new cases. It should not be attempted however, unless it is ecologically feasible and has the necessary financial and political commitment to be completed.

7.2 Early Detection and Rapid Response

1. The best opportunities for eradicating or containing an invasive species are in the early stages of invasion, when populations are small and localized. These opportunities may persist for a short or long time, depending on the species involved and other local factors.
2. Early detection of new introductions of potentially invasive species is therefore important, combined with the capacity to take rapid follow-up action to eradicate or contain. Sufficient resources and expertise need to be mobilized and activated quickly. Procrastination markedly reduces the chances of success. Local knowledge and awareness can be used to detect new invasions. Depending on the situation, a country's response might be within the country, or may require a cooperative effort with other countries.
3. Lack of scientific or economic certainty about the implications of a biological invasion should not be used as a reason for postponing eradication, containment or other control measures.

7.3 Eradication

1. Where it is achievable, eradication is the best management option for dealing with invasive species. It is much more cost effective

financially than ongoing control, and better for the environment. Technological improvements are increasing the number of situations where eradication is possible, especially on islands. The criteria that need to be met for eradication to succeed are given in Appendix B.

2. Eradication methods should be as specific as possible with the objective of having no long-term effects on non-target native species. Some incidental loss to non-target species may be an inevitable cost of eradication and should be balanced against the long-term benefits to native species.
3. The persistence of toxins in the environment should not occur as a result of eradication, but the use of toxins that are unacceptable for long-term control may be justified in brief and intensive eradication campaigns. The costs and benefits of the use of toxins need to be carefully assessed in these situations.
4. Methods for removing animals should be as ethical and humane as possible, but consistent with the aim of permanently eliminating the invasive species concerned.
5. Priority should be given to eradicate invasive species on islands and other isolated areas that contain a high percentage of endemic species, are centers of endemism, have high levels of biodiversity or large numbers of threatened endemics, and sites where a new invasion has occurred and is not yet entrenched.
6. Significant benefits will be achieved for biological diversity by eradicating alien mammalian predators (e.g., rats, cats, dogs, mustelids) from islands and other isolated areas with important native biota, such as endemic bird species. Similarly, eradication of feral and alien mammalian herbivores (e.g., rabbits, sheep, goats, pigs) can achieve significant benefits for native plant and animal species when they are under threat from these animals.

7. Eradication problems are often complex, especially those involving feral mammals or a group of plant invaders, and it is appropriate to seek expert advice. It may be appropriate to adopt a multidisciplinary approach as recommended in the *IUCN Guidelines for Re-introductions*.
8. Given that interest groups may oppose eradication for ethical or self-interest reasons it is important to include a comprehensive consultation strategy and develop community support for any proposed eradication as an integral part of the project.
4. Limitation of spread is an appropriate strategy when eradication is not feasible, but only where the range of the invasive is limited and containment within defined boundaries is possible. Regular monitoring outside the control boundaries is essential, with quick action to eradicate any new outbreaks.
5. Sometimes a long-term reduction of invasive numbers to insignificant levels can be achieved with one action or set of actions. The best examples come from the successful introduction of biological control agent(s). These are the "classical" biological control programs. Any intentional introductions of this nature should be subject to appropriate controls and monitoring. (See sections 6.3, 10 and the Appendix A.) Exclusion fencing has been used to good effect as a control measure in some circumstances.

7.4 Control Strategies

1. Unlike eradication, control is an ongoing activity that has different aims and objectives. While there are several different strategic approaches that can be adopted they should have two factors in common. First, the outcomes that are sought need to be scientifically valid, clearly articulated, and widely supported. Second, there needs to be management and political commitment to spend the resources required over time to achieve the outcomes. Badly focused and half-hearted control efforts waste resources which might be better spent elsewhere.
2. The first step should be to prioritize the invasive species problems according to desired outcomes. This should include identifying the areas of highest value for native biodiversity and those most at risk from invasives. This analysis should be responsive to advances in control technology and should be reviewed from time to time.
3. A formal control strategy should be drawn up which includes identifying and agreeing to the prime target species, areas for control, methodology and timing. The strategy may apply to parts of, or a whole country and should have appropriate standing as, for example, the requirements of Article 6 of the Convention on Biological Diversity ("General Measures for Conservation and Sustainable Use"). Such strategies should be publically available, be open for public input and be regularly reviewed.
6. Multiple action control uses several approaches at once. For example, integrated pest management uses biological control agents coupled with various physical and chemical approaches at the same time. As techniques improve it is important to increase the exchange of information between scientists and management agencies, not only about invasive species, but also about control methods.

7.5 Defining the Desired Outcomes of Control

The relevant measure of success of control is the response in the species, habitat or ecosystem that the control aims to benefit. It is important to concentrate on quantifying and reducing the damage caused by invasives, not concentrating on merely reducing numbers of invasives. Rarely is the relationship between pest numbers and their impacts a simple one. Hence estimating the reduction in the density of the invasive species will not necessarily indicate an improvement in the wellbeing of the native species, habitat or ecosystem that is under threat.

7.6 Choosing Control Methods

1. Control methods should be socially, culturally and ethically acceptable, efficient, non-polluting, and should not adversely affect native flora and fauna, human health and well-being, domestic animals, or crops. While meeting all of these criteria can be difficult to achieve they can be seen as appropriate goals, within the need to balance the costs and benefits of control against the preferred outcomes.
2. Specific circumstances are so variable it is only possible to give broad guidelines of generally favored methods: specific methods are better than broad spectrum ones; biological control agents may presently often be the most realistic choice compared to physical or chemical methods, but require rigorous screening prior to introduction and subsequent monitoring; physical removal can be an effective option for clearing areas of *alien* invasive plants; chemicals should be as specific as possible, non-persistent, and non-accumulative in the food chain; organochlorine compounds should not be used; control methods for animals should be as humane as possible, consistent with the aims of the control.

7.7 Invasive Game Species and Feral Species

1. Some invasive species have acquired positive cultural values as food or fiber or for hunting or fishing opportunities, but cause severe damage to native biodiversity. The result can be conflict between management objectives, interest groups and communities. In these circumstances it takes longer to work through the issues, but resolution can often be achieved through public awareness and information campaigns about the damaging impacts of the invasives, coupled with consultation and adaptive management approaches that have community support. Risk analysis and environmental impact assessment may help to develop appropriate courses of action and solutions.

2. One option for managing hunting conflicts on public land is to designate particular areas for hunting while carrying out more stringent control to protect biodiversity values elsewhere. This option has limited application to situations where there is high value attached to the alien species and very localized biological diversity values that need protection.
3. Feral animals can be some of the most aggressive and damaging alien species to the natural environment, especially on islands. Despite any economic or genetic value they may have, the conservation of native flora and fauna should always take precedence where it is threatened by feral species. In some circumstances the removal of a representative number of the feral animals to captivity or domestication is a management option.
4. The authorized or unauthorized release of, or not taking due care to prevent the escape of, domestic animals that are known to cause damage as feral animals should be strongly discouraged. It is appropriate for governments to develop legal penalties to deter such releases and escapes in circumstances where costly economic or damaging ecological consequences can follow.

8. Links to Reintroduction of Species

8.1 Guiding Principle

- Successful eradications and some control programs can significantly improve the likely success of reintroductions of native species and therefore provide opportunities to reverse earlier losses of native biological diversity.

8.2 Links to Reintroductions

1. An eradication operation that successfully removes an invasive species, or a control operation that lowers it to insignificant levels, usually improves the conditions for native species that occupy, or previously occupied that habitat. This is especially true on many oceanic islands. Eradications are

often undertaken as part of the preparation for reintroduction(s).

2. The IUCN Guidelines for Re-introductions (May 1995) were developed to provide "...direct, practical assistance to those planning, approving or carrying out reintroductions." These guidelines elaborate requirements and conditions, including feasibility studies, criteria for site selection, socio-economic and legal requirements, health and genetic screening of individuals, and issues surrounding the proposed release of animals from captivity or rehabilitation centers. They should be referred to as part of the planning of eradication or control operations where reintroductions might be an appropriate and related objective. They should also be referred to concerning the importance of reviewing any reintroduction proposal.
3. The socio-economic considerations that apply to eradication and control operations largely apply to reintroductions as well, namely the importance of community and political support, financial commitment and public awareness. This makes it cost-effective to combine consultation over the eradication objective with proposals to reintroduce native species. It has the added advantage of offsetting the negative aspects of some eradications (killing valued animals) with the positive benefits of reintroducing native species (restoring heritage, recreation or economic values).

9. Knowledge and Research Issues

9.1 Guiding Principle

- An essential element in the battle against alien invasive species at all levels (global, national, local) is the effective and timely collection and sharing of relevant information and experiences, which, in turn, assist advances in research and better management of such species.

9.2 Recommended Actions

1. A primary requirement is the development of an adequate knowledge base to address the problems of alien invasive species worldwide. Although a great deal is known about many such species and their control this knowledge remains incomplete and is difficult to access for many countries and management agencies.
2. Governments and management agencies should contribute to the development of a global database (or linked databases) of all known alien invasive species, including information on their status, distribution, biology, invasive characteristics, impacts and control options. "Black Lists" of invasive species should be developed at the national, regional and global levels. In addition to "Black Lists", a more precautionary approach involving the prescreening of all new species proposed for import should be adopted.
3. National and international research initiatives are needed to improve knowledge of the following: ecology of the invasion process, including lag effects; better predictive powers on which species and groups of species are likely to become invasive and under what conditions; characteristics of invasive species; impacts of global climate change on invasive species; existing and possible future vectors; ecological and economic losses/costs associated with introductions of alien invasive species; sources and pathways caused by human activity.
4. Improvements in prevention require the development of, and dissemination of better methods of excluding or removing alien species from traded goods, ballast water, personal luggage, aircraft and ships.
5. Further management research is required on: effective, target-specific, humane and socially acceptable methods for eradication or control of invasive species; early detection and rapid response systems; development of monitoring techniques; aggregating and effectively disseminating information.

6. Better use of information and experiences need to be made by governments and agencies to promote wider understanding and awareness of invasive species issues. There need to be strong linkages between the actions taken under Sections 5 and 9.

10. Legal and Institutional Needs

10.1 Guiding Principles

- A holistic legal and institutional approach by each country to their biosecurity threats, with appropriate commonality between regulatory approaches to alien species, is a prerequisite to long-term success against introduction of invasive species at national and global levels.
- Effective responses by institutions require clear accountabilities, full operational coverage of all aspects relating to actual and potential issues concerning alien invasive species, and effective integration between the institutions and areas of responsibility.

10.2 Recommended Actions

1. Governments should have in place a biosecurity authority or agency with appropriate functions and powers to control intentional introductions of alien species, including biological control agents.
2. There should be legislation in place which provides that no alien species may be introduced without an approval, consent, or permit from the relevant biosecurity agency or authority.
3. Governments should also be able to prevent, where appropriate, unauthorized introductions into new areas within a country.
4. Whether or not a biosecurity authority or agency is created with the above functions and powers, all relevant agencies should be coordinated to ensure that all appropriate interests and resources are brought to bear on the prevention, eradication and control of alien invasive species.
5. All governments should review their legislative provisions, institutional structures and administrative responsibilities to ensure that all aspects of alien invasive species issues are appropriately assigned, monitored and actioned.
6. The functions of existing governmental agencies or authorities, such as border control and quarantine services, should be strengthened and broadened so as to control both intentional and unintentional introductions of alien species.
7. Governments should accord high priority to developing national strategies and plans for responding to their particular invasive species problems within the wider context of national strategies or plans for the conservation and sustainable use of biological diversity (Article 6, Convention on Biological Diversity).
8. The need for governments to develop criminal penalties and civil liability with respect to intentional, but unauthorized introductions was covered in Section 6.3. Establishing commonalties for liability for illegally instigating harmful introductions could be an issue for consideration at the regional and international levels.
9. Agreements between countries, on a bilateral or multilateral basis, could be developed and used to prevent trade in certain alien species (including the prevention of export out of a country where they may well be native), with a focus on particularly damaging invasive species. Existing agreements should be reviewed and modified to take into account the movements of alien invasive species and their negative effects on biological diversity and other values.
10. In accordance with Principle 21 of the Stockholm Declaration on the Human Environment and Principle 2 of the Rio Declaration on Environment and Development, States have the responsibility "to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States."

11. Special care should be taken to prevent invasive species from crossing the borders of neighboring countries. Mechanisms should be developed between neighboring countries for information exchange, including intelligence alerts, and consultation and rapid responses in the event of such species crossing territorial borders.
12. Appropriate assistance and technology transfer should be provided to developing nations to prevent or combat biological invasions which have serious ecological as well as economic consequences and to assist capacity building for managing invasive species.

11. Role of IUCN

Recommended Actions

1. IUCN should play a significant role in the global efforts to combat alien invasive species. Given its particular strengths in the conservation and management of biodiversity all components of IUCN should support the IUCN Global Initiative on Invasive Species. IUCN should maintain and develop links and cooperative programs with other organizations involved in this issue, including international organizations such as United Nations Environment Program, Food and Agricultural Organization, Scientific Committee on Problems of the Environment, World Trade Organization, and work with Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
2. IUCN regional networks should play a significant role in raising public awareness at all levels on the issues of invasive species, the various threats to native biological diversity and the economic implications, as well as the options for control.
3. The IUCN Invasive Species Specialist Group (ISSG) of the Species Survival Commission (SSC) should, through its international network, continue to collect, organize and disseminate information on invasive species, prevention and control methods, and ecosystems that are particularly vulnerable to invasion.
4. The separate work of IUCN/SSC on identifying species threatened with extinction and areas with high levels of endemism and biodiversity should be supported. This work is valuable when assessing invasion risks, priority areas for action, and for practical implementation of these guidelines.
5. The ongoing work of the ISSG should be supported, including the following actions: the development and maintenance of a list of expert advisors on control and eradication of invasive species; expansion of the invasive species network; production and distribution of newsletters and other publications.
6. IUCN, in association with other cooperating organizations, should take a lead in the development and transfer of capacity building programs (e.g., infrastructure, administration, risk and environmental assessment, policy, legislation), in support of any country requesting such assistance or wishing to review its existing or proposed alien invasive species programs.
7. IUCN should take an active role in working with countries, trade organizations and financial institutions (e.g., World Trade Organization, World Bank, International Monetary Fund, International Maritime Organization) to ensure that international trade and financial agreements, codes of practice, treaties and conventions take into account the threats posed to biological diversity and the financial costs and economic losses associated with alien invasive species.
8. The ISSG should assist the IUCN Commission on Environmental Law in the development of guidelines which would assist with the development of legislation to prevent the introduction of alien invasive species and to mount monitoring, eradication and control programs.
9. The ISSG should proceed with the development of regional databases on alien

invasive species and work with other cooperating organizations to ensure efficient and timely dissemination of the current information to all requesting parties.

12. Bibliography and Related Information

12.1 References

The principles and text of these guidelines are partially based on, or sourced from the following important documents:

Translocation of Living Organisms. IUCN Position Statement, 1987. IUCN, Gland, Switzerland.

IUCN Guidelines for Re-introductions. 1995. IUCN, Gland, Switzerland.

Code of Conduct of the Import and Release of Exotic Biological Control Agents. United Nations Food and Agriculture Organization, 1995. FAO, Rome, Italy.

Harmful Non-indigenous Species in the United States. U.S. Congress, Office of Technology Assessment, OTA-F-565, 1993. U.S. Government Printing Office, Washington DC.

Chairman's Report. Norway/UN Conference on Alien Species. The Trondheim Conference on Biodiversity. 1-5 July 1996. Norwegian Institute for Nature Research, Trondheim, Norway.

Guidelines for Preventing the Introduction of Unwanted Aquatic Organisms and Pathogens from Ship's Ballast Water and Sediment Discharges. International Maritime Organization (IMO) Resolution A.774(18)(4.11.93) (Annex)

In addition there are numerous international codes of practice, treaties, conventions and agreements relating to the prevention, introduction, transport, control or eradication of alien species that are relevant to governments and management agencies.

13. Acknowledgements

IUCN gratefully acknowledges the dedication and efforts of the Invasive Species Specialist Group (ISSG), the Commission on Environmental Law (CEL), and other experts on invasive species whose collaborative work has made the production of these guidelines possible.

Appendix:

A. Some points to be included when evaluating a proposal/application for introduction

Generic questions in the EIA process concerning impacts on the environment should include the following:

- Does the proposed introduction have a history of becoming invasive in other places? If yes, it is likely to do so again and should not be considered for introduction.
- What is the probability of the alien species increasing in numbers and causing damage, especially to the ecosystem into which it would be introduced?
- Given its mode of dispersal, what is the probability the alien species would spread and invade other habitats?
- What are the likely impacts of natural cycles of biological and climatic variability on the proposed introduction? (Fire, drought and flood can substantially affect the behavior of alien plants.)
- What is the potential for the alien species to genetically swamp or pollute the gene pool of native species through interbreeding?
- Could the alien species interbreed with a native species to produce a new species of aggressive polyploid invasive?
- Is the alien species host to diseases or parasites communicable to native flora or fauna, humans, crops, or domestic animals in the proposed area for introduction?

- What is the probability that the proposed introduction could threaten the continued existence or stability of populations of native species, whether as a predator, as a competitor for food, cover, or in any other way?

What are the possible negative impacts of any of the above outcomes on human welfare, health or economic activity?

B. Criteria to Achieve Eradication

- The rate of population increase should be negative at all densities. At very low densities it becomes progressively more difficult and costly to locate and remove the last few individuals.
- Immigration must be zero. This is usually only possible for offshore or oceanic islands, or for very new invasions.
- All individuals in the population must be at risk to the eradication technique(s) in use. If animals become bait- or trap-shy, then a subset may no longer be at risk to those techniques.

- Monitoring of the species at very low densities must be achievable. If this is not possible survivors may not be detected. In the case of plants, the survival of seed banks in the soil should be checked.
- Adequate funds and commitment must continuously exist to complete the eradication over the time required. Monitoring must be funded after eradication is believed to have been achieved until there is no reasonable doubt of the outcome.
- The socio-political environment must be supportive throughout the eradication effort. Objections should be discussed and resolved, as far as practicable, before the eradication is begun.

Comments on the Guidelines should be sent to Wendy Strahm, Plants Officer, IUCN, Rue Mauverney 28, CH-1196 Gland, Switzerland; fax: +41 22 9990015; e-mail: was@hq.iucn.org. Or send comments to Maj de Poorter, SSC Invasive Species Specialist Group, c/o School of Environmental and Marine Sciences, University of Auckland, Tamaki Campus, Private Bag 92019, Auckland, New Zealand; fax: +64 9 3737042; e-mail: m.depoorter@auckland.ac.nz.



IUCN Red List Criteria Review Provisional Report: Draft of the Proposed Changes and Recommendations

1. Background to the Criteria Review Process

In 1994, IUCN adopted new criteria for assessing extinction risks to species, and these are now used for evaluating species for inclusion in IUCN Red Lists. Approximately 15,000 species were assessed using the new criteria for The 1996 IUCN Red List of Threatened Animals. Of these, 5,205 were listed as threatened with extinction. The relative objectivity of the new listings has made them an excellent tool for observing changes in status over time and for providing a more systematic and transparent approach to listing. The new method has attracted great interest from wildlife agencies and management authorities, as well as the media. Not surprisingly, there are also some difficulties with the new system, including the assessments of harvested species, long-lived species (such as elephants and marine turtles), and the status of some small and very narrowly distributed endemic plants and invertebrates.

At the World Conservation Congress (WCC) in Montreal in October 1996, SSC was mandated under WCC Resolution 1.4 to:

"within available resources, urgently to complete its review of the IUCN Red List Categories and Criteria, in an open and transparent manner, in consultation with relevant experts, to ensure the criteria are effective indicators of risk of extinction across the broadest possible range of taxonomic categories, especially in relation to:

- *marine species, particularly fish, taking into account the dynamic nature of marine ecosystems;*
- *species under management programs;*
- *the time periods over which declines are measured"*

Under the auspices of the IUCN/SSC Red List Program, SSC set up a Criteria Review Working Group lead by Georgina Mace. The task of

this group was to respond to the mandate given to SSC at the World Conservation Congress.

2. Outline of Criteria Review Process

The review has been conducted in stages as outlined below.

January–December 1997: Correspondence and seeking input from the members of IUCN and SSC.

January–February 1998: Planning for Scoping Workshop.

March 1998: **Scoping Workshop**, London, U.K. Funded by IUCN.

March–September 1998: Planning and fund-raising for activities outlined by the Scoping Workshop.

October 1998: **Regional Assessment Working Group** (Montreal, Canada) contributes views on regional assessments. Funding support from Canadian Wildlife Service.

January 1999: **Marine Workshop**. Tokyo, Japan. Funding from German Government. Also input from Japanese meeting on Risk Assessment.

May 1999: **Range Size, Habitat Areas and Dealing with Uncertainty Workshop**. Manly, Sydney, Australia. Funding from environment and technical agencies in New South Wales, Australia.

June 1999: **Criterion A Workshop**. Cambridge, U.K. Funding from Finnish Government.

July 1999: **Review Workshop**. Cambridge, U.K. Criteria Review Working Group met to discuss recommendations from all workshop reports, and provide final set of recommendations. Funding from Finnish Government.

August 1999: Publication in *Species*. Draft of revised criteria prepared and published in *Species* for circulation to all SSC members and circulated separately to all IUCN members.

August–November 1999: Correspondence and seeking input from the members of IUCN and SSC.

December 1999: Submission of re-drafted proposals to SSC Executive

February 2000: Submission of revised IUCN Red List Categories and Criteria to IUCN Council for approval

October 2000: Report outcome of Criteria Review to World Conservation Congress

3. Structure of the Review

The Criteria Review Working Group consists of 22 members, representing a wide range of animal and plant taxa, and including people with technical expertise in extinction risk assessment, as well as those with experience in applying the criteria. This group first met at the Scoping Workshop.

The workshops from January to July 1999 followed directly from specific issues outlined by the Scoping Workshop in March 1998. Participants at these workshops were selected to reflect technical and practical expertise in the areas being discussed. All workshops addressed specific issues and attempted to deliver recommended courses of action through analysis and discussion. In order to provide continuity and coherence to the process, at least 4–5 members of the Criteria Review Working Group attended each topic-based workshop. In addition, each member of the group was requested to attend at least one of the workshops.

Written reports on the workshops provide all the supporting arguments and documentation for the final outcome of the review as presented here. All the workshop reports adhere to a common standard, are comprehensive and will be available as a package along with the final report from the Criteria Working Group. Copies of all these reports will be made available via the IUCN web site (<http://www.iucn.org/themes/ssc/siteindx.htm>) or they can be

ordered directly from the IUCN Red List Program Officer (see address below).

Please note that the changes to the system recommended below are draft proposals. They probably require more work and, in some cases, testing. In particular, *they need constructive suggestions and input from you, especially those who have used the 1994 Red List Categories and Criteria*. Your comments along the following lines would be most helpful:

- Please indicate whether species you have assessed would have their status altered by the changes proposed. Is the change good or bad? Please indicate which species, under what criteria they were assessed, and what the specific problems were.
- Can you name any species where the criteria are not effective despite the revisions? Please state why it is that these species cannot be classified appropriately, and what changes would be needed in the criteria so that they could be.
- Are you unhappy or unclear about any of the proposed changes to the definitions or criteria, if so which ones?

Please send your comments on the revised Red List Categories and Criteria by October 31, 1999 to: Craig Hilton-Taylor, Red List Program Officer, IUCN/SSC U.K. Office, 219c Huntingdon Road, Cambridge, CB3 0DL, United Kingdom. Fax: +44-1223-277845; E-mail: redlist@ssc-uk.org or craig.hilton-taylor@ssc-uk.org

4. Recommendations from the Criteria Review Working Group

The Criteria Review Working Group examined all the recommendations put forward by each workshop including a number of issues that were only raised at the Scoping Workshop. After much discussion, and sometimes compromise, a final set of recommendations was agreed. A number of these recommendations relate to issues that are best dealt with by means of adequate guidelines for applying the criteria, referred to as “guidelines” throughout this document. The suggested contents of the

"guidelines" are not presented here. The recommendations that will involve changes to the *IUCN Red List Categories* booklet (IUCN 1994), especially to the Categories and Criteria, are presented in this section. The issues are dealt with in the order in which they appear in the red booklet. A brief outline of each issue is presented, followed by the current wording in the red booklet and then the proposed new wording.

1. Introduction

Issue

There is a need for a more explicit account of the role and purpose of the Red List (including the background and history to the current listing procedure). This should include an account of how a listing status should be interpreted, the relationship of the criteria to one another, their background in theoretical biology, and what they are and are not intended to indicate. The difference between measuring threats and assessing conservation priorities also needs to be expanded, as there are many people who interpret the Red List as a means of priority setting. The introduction was identified as one place where some of these issues should be dealt with in more detail; the remainder will be covered in the detailed guidelines.

Current Version

1. The threatened species categories now used in Red Data Books and Red Lists have been in place, with some modification, for almost 30 years. Since their introduction these categories have become widely recognized internationally, and they are now used in a whole range of publications and listings, produced by IUCN as well as by numerous governmental and non-governmental organizations. The Red Data Book Categories provide an easily and widely understood method for highlighting those species under higher extinction risk, so as to focus attention on conservation measures designed to protect them.
2. The need to revise the categories has been recognized for some time. In 1984, the SSC held a symposium, "The Road to Extinc-

tion" (Fitter & Fitter 1987), which examined the issues in some detail, and at which a number of options were considered for the revised system. However, no single proposal resulted. The current phase of development began in 1989 with a request from the SSC Steering Committee to develop a new approach that would provide the conservation community with useful information for action planning.

In this document, proposals for new definitions for Red List categories are presented. The general aim of the new system to provide an explicit, objective framework for the classification of species according to their extinction risk.

The revision has several specific aims: . . .

3. The proposals presented in this document result from a continuing process of drafting,...

Final Version

This final document, which incorporates changes as a result of comments from IUCN members, was adopted by the IUCN Council in December 1994.

4. In the rest of this document the proposed system is outlined . . . It is important for the effective functioning of the new system that all sections are read and understood, and the guidelines followed.

Recommendation

1. The IUCN Red List Categories aim to provide an easily and widely understood method for highlighting those species under higher extinction risk, so as to focus attention on conservation measures necessary for their protection. The general aim of the system is to provide an explicit, objective framework for the classification of species according to their extinction risk. The system is meant to flag extinction risk across the broadest range of species. Although the system places species into the threatened categories with a high degree of consistency, it is acknowledged that the criteria cannot take into account the life histories

of every species. In certain cases, the risk of extinction of a species may be under- or over-estimated.

2. This new Red List system was adopted in 1994, and it marked a major shift from a purely subjective to a more quantitative objective approach. Prior to 1994, the threatened species categories used in Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. The need to revise the categories had been recognized since 1984, when SSC held a symposium, "The Road to Extinction" (Fitter & Fitter 1987) which examined the issues in some detail. The current phase of development began in 1989 with a request from the SSC Steering Committee to develop a new approach that would provide the conservation community with useful information for action planning.

Since their adoption by IUCN Council in 1994 the IUCN Red List Categories have become widely recognized internationally, and they are now used in a whole range of publications and listings, produced by IUCN as well as by numerous governmental and non-governmental organizations. Such broad and extensive use revealed the need for a number of improvements and SSC was mandated by the 1996 World Conservation Congress (WCC Res. 1.4) to conduct a review of the system. This document presents the proposed revisions as recommended by the SSC Criteria Review Working Group. The revision has several specific aims: (as listed previously).

3. The proposals presented in this document result from a continuing process of drafting,
...

Version 2.3: IUCN (1994)

The IUCN Council adopted this version, which incorporates changes as a result of comments from IUCN members, in December 1994. The initial version of this document was published without the necessary bibliographic details such as ISBN number, etc., but these were included in the subsequent reprints in 1998 and 1999.

Proposed Version 3.0 IUCN/SSC Criteria Review Working Group

Following comments received, a series of workshops were convened to look at the Red List Criteria following which, changes were proposed.

Under References add:

IUCN (1994) *IUCN Red List Categories*. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland.

IUCN (1998) *Guidelines for Re-introductions*. Prepared by the IUCN/SSC Re-introduction Specialist Group. IUCN, Gland, Switzerland and Cambridge, U.K.

Gärdenfors, U., Rodríguez, J.P., Hilton-Taylor, C., Hyslop, C., Mace, G., Molur, S. and Poss, S. (1999) Draft Guidelines for the Application of IUCN Red List Criteria at National and Regional Levels. *Species* 31-32, pp. 58-70.

4. In the rest of this document the proposed system is outlined . . . It is important for the effective functioning of the new system that all sections are read and understood, and that the definitions and "rules" are followed.

II. Preamble

1. Taxonomic Level and Scope of the Categorization Process

Issue

Update this section as the Re-introductions Guidelines have been published.

Current Version

The criteria can be applied . . . The categorization process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (defined in the draft IUCN Guidelines for Re-introductions as " . . . an attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area").

Revised Version

The criteria can be applied . . . The categorization process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (defined in the IUCN Guidelines for Re-introductions (IUCN 1998) as "... an attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a species' historic range").

Figure 1. Structure of the Categories

Issue

The use of the Lower Risk subcategories is optional according to the rules. In reality, most assessors have recognized and used Near Threatened (LRnt) and Conservation Dependent (LRcd). A decision has been made to remove the LRcd subcategory altogether (see under Conservation Dependent below), and to simplify the system by making near threatened and least concern into categories. Consequently, these subcategories should be recognized as individual independent categories, and the tree showing the structure of the categories drawn accordingly. The tree it is also argued, although not strictly a hierarchy, should be redrawn to reflect the relative importance of the categories.

Current Version

(Next page, top figure)

Recommended Version

(Next page, bottom figure)

It is recommended that the current figure be replaced with something along the lines of that shown. However, a final decision on the exact layout has yet to be reached.

7. Uncertainty

Issue

Despite the fact that the notes accompanying the current criteria recognize the problem of

data uncertainty, there is no clear guidance on how to deal with it in either the assessment of species or the interpretation of listings. This is an important problem that constrains the use and interpretation of the Red List Criteria and Categories, and leads to irresolvable debates over particular issues. Many other problems with the criteria are related to this issue, e.g., the use of Data Deficient, the lack of criteria for Near Threatened, and the assessment of species whose status is known only from one small part of its range. New methods and approaches provide a better understanding of uncertainty and offer a way forward.

Current Version

The criteria should be applied on the basis of the available evidence on taxon numbers, trend and distribution, making due allowance for statistical and other uncertainties. Given that data are rarely available for the whole range or population of a taxon, it may often be appropriate to use the information that is available to make intelligent inferences about the overall status of the taxon in question. In cases where a wide variation in estimates is found, it is legitimate to apply the precautionary principle and use the estimate (providing it is credible) that leads to listing in the category of highest risk.

Where data are insufficient to assign a category (including Lower Risk), the category of "Data Deficient" may be assigned. However, it is important to recognize that this category indicates that data are inadequate to determine the degree of threat faced by a taxon, not necessarily that the taxon is poorly known. In cases where there are evident threats to a taxon through, for example, deterioration of its only known habitat, it is important to attempt threatened listing, even though there may be little direct information on the biological status of the taxon itself. The category "Data Deficient" is not a threatened category, although it indicates a need to obtain more information on a taxon to determine the appropriate listing.

Recommended Version

The nature of uncertainty

The criteria should be applied to a taxon based on the available evidence on its numbers, trend and distribution, making due allowance for sta-

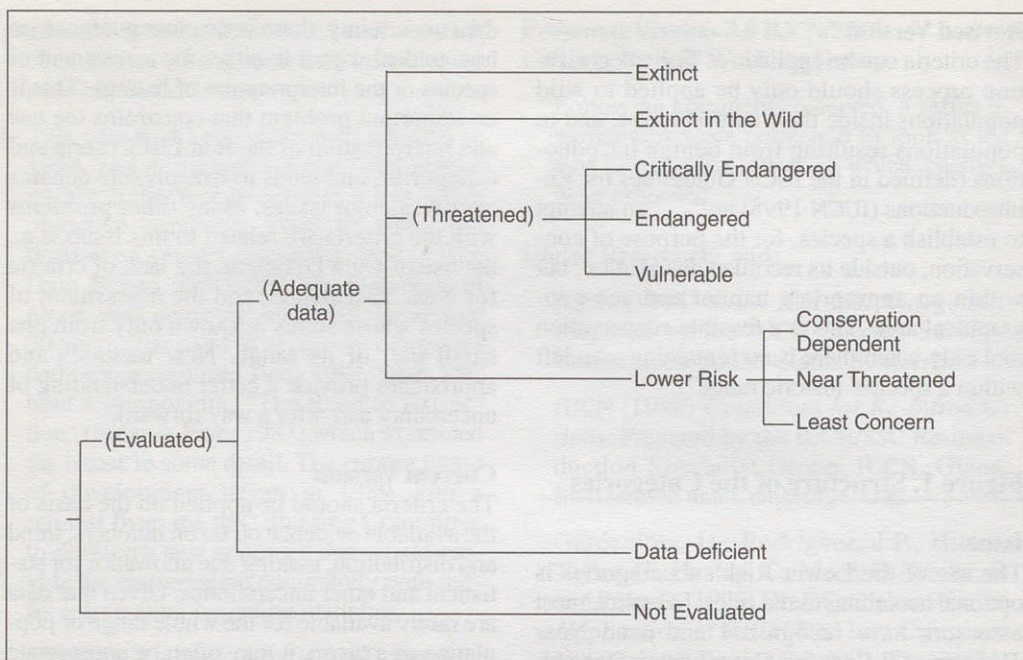


Figure 1. Structure of the Categories: Current Version

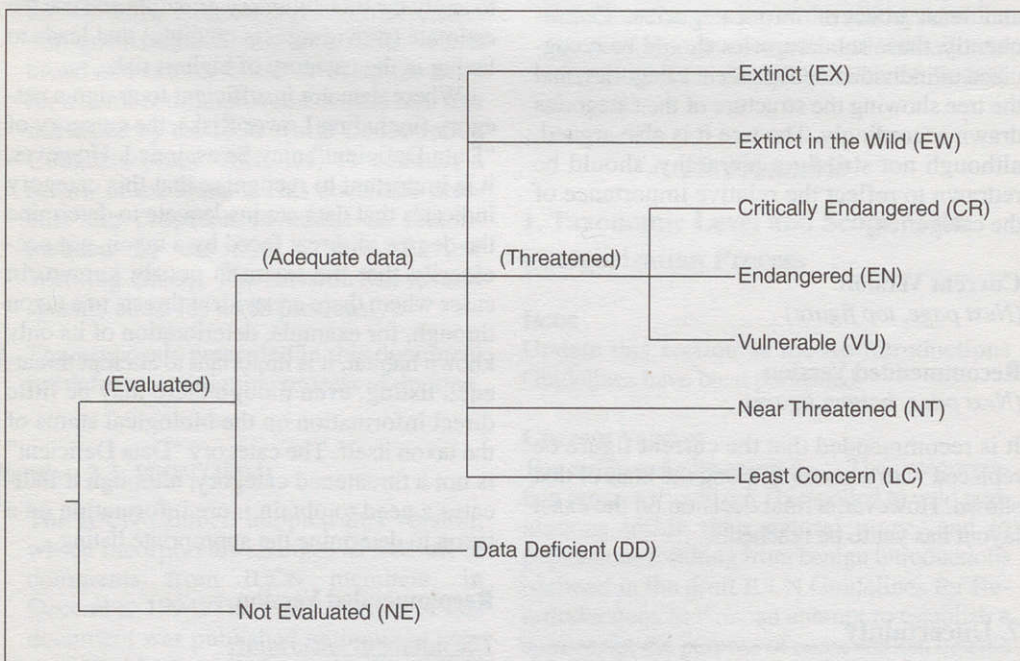


Figure 1. Structure of the Categories: Recommended Version

tistical and other uncertainties. These uncertainties arise from natural variability (resulting from the fact that species life histories and the environments in which they live are changing over time), measurement error (i.e., the variability in parameter values that results from inaccuracies in estimating them) and semantic uncertainty (i.e. a lack of precision in the definition of terms or a lack of consistency in different assessors usage of them). In cases where there are evident threats to a taxon through, for example, deterioration of its only known habitat, it is important to attempt threatened listing, even though there may be little direct information on the biological status of the taxon itself.

Estimating uncertainty

One of the simplest ways to represent uncertainty is to specify a best estimate and a range of plausible values. The best estimate itself might be a range, but in any case, the best estimate should always be nested within (included in) the plausible range. When data are very uncertain, the range for the best estimate may coincide with the range of plausible values. The plausible range might be based on confidence intervals, the opinion of a single expert, or the consensus opinion of a group of experts, and should be justified.

Attitudes to uncertainty

When interpreting and using uncertain data, preferences and attitudes towards risk and uncertainty may play an important role. Attitudes have two components. First, assessors need to consider whether they will include the full range of plausible values in assessments, or whether they will exclude extreme estimates from consideration (this is known as dispute tolerance). Second, assessors need to consider whether they have a precautionary or evidentiary attitude to risk (this is known as risk tolerance). A precautionary attitude will classify a taxon as threatened unless we are certain that it is not threatened. An evidentiary attitude will not classify a taxon as threatened unless there is strong evidence to support a threatened classification. Assessors should always apply a precautionary but realistic attitude to uncertainty when applying the criteria. All preferences and attitudes should be explicitly documented.

The assessment against the best estimate should lead to a single Red List Category. However, when the plausible range for each parameter is used in assessments against the criteria, the resulting range of categories will reflect the uncertainties in the data. The single category should always be listed, optionally accompanied by the plausible range of categories in the documentation.

Where data are so uncertain that any category is plausible, the category of Data Deficient may be assigned. Data Deficient should be used only rarely, in cases when almost nothing is known about a taxon or its habitat. However, it is important to recognize that this category indicates that data are inadequate to determine the degree of threat faced by a taxon, not necessarily that the taxon is poorly known. The category Data Deficient is not a threatened category, although it indicates a need to obtain more information on a taxon to determine the appropriate listing.

8. Conservation Actions in the Listing Process

Issue

Requires revision because of removal of Conservation Dependent category.

Current Version

The criteria for the threatened categories are to be applied to a taxon whatever the level of conservation action affecting it. In cases where it is only conservation action that prevents the taxon from meeting the threatened criteria, the designation of "Conservation Dependent" is appropriate. It is important to emphasize here that a taxon require [sic] conservation action even if it is not listed as threatened.

Revised Version

The criteria for the threatened categories are to be applied to a taxon whatever the level of conservation action affecting it. It is important to emphasize here that a taxon may require conservation action even if it is not listed as threatened.

11. Use at Regional Level

Issue

Although the IUCN Red List Categories and Criteria were designed for global species assessments, many people are interested in applying the system at regional, national or local scales. IUCN is addressing this through a separate process.

Recommendation

The paragraph under this should be replaced by the following:

The criteria are most appropriately applied to entire taxa at the global scale, however, they may be used at national or other regional levels following the "Draft Guidelines" prepared by the IUCN/SSC Regional Applications Working Group (Gärdenfors *et al.*, 1999).

III. Definitions

1. Populations

Issue

The Red List Categories do not use the generally understood definition for a population. Instead the term population is used (and defined) to refer to the entire set of individuals under evaluation, whether this is a species, subspecies or any other biological unit below the species level.

Current Definition

Population is defined as the total number of individuals of the taxon. For functional reasons, primarily owing to differences between life-forms, population numbers are expressed as numbers of mature individuals only. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used.

Recommended Definition

In the absence of any other suitable term, the current definition is slightly revised.

Population is defined as the total number of individuals of the taxon to be assessed.

For functional reasons . . . , population size is measured as numbers of mature individuals only. Note that the term population is used in a specific sense in the Red List Criteria that is different to its common biological usage.

2. Subpopulations

Issue

The Red List Categories do not use the generally understood definition for subpopulation. What are termed subpopulations here are generally referred to as populations.

Current Definition

Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little exchange (typically one successful migrant individual or gamete per year or less).

Recommended Definition

Subpopulations are defined as geographically or otherwise distinct groups in the population to be assessed between which there is little demographic or genetic exchange.

3. Mature Individuals

Issue

There are a number of life history variants which are not taken into account under the current definition, e.g., the case where there are extant mature individuals but no recruitment and the case where sex ratio is biased and the less common sex is the limiting one.

Current Definition

The number of mature individuals is defined as the number of individuals known, estimated or inferred to be capable of reproduction. When estimating this quantity, the following points should be borne in mind:

- Where the population is characterized by natural fluctuations the minimum number should be used.
- Four other bullet points follow (see booklet).

Recommended Definition

The number of mature individuals is the number of individuals known, estimated or inferred to be capable of producing offspring that reach reproductive age. When estimating this quantity, the following points should be borne in mind:

- Where the population is characterized by natural fluctuations use a lower estimate. In most cases this will be much less than the mean.
- Mature individuals that cannot produce new recruits should not be counted (e.g., densities are too low for fertilization or reproductive conditions are not met)
- *The other four bullet points remain the same.*

4. Generation

Issue

Generation length is used as a surrogate for turnover in the assessment of taxa. All time-based measures in the criteria need to be scaled for the different rates at which taxa survive and reproduce and generation time is used to provide this scaling. The current definition has been widely misunderstood, and there are also difficulties when dealing with very long-lived species and with variation in generation length under harvesting, with environmental changes and between the sexes. When this issue was discussed it became clear that the different methods for estimating generation length were too complex to include in the definition but these have been drafted for inclusion in the "guidelines".

Current Definition

Generation may be measured as the average age of parents in the population. This is greater than the age at first breeding, except in taxa where individuals breed only once.

Recommended Definition

Generation length reflects the turnover rate of breeding individuals in a population i.e., the average age of parents of the current cohort (e.g. newborn individuals in the population).

Generation length is greater than the age at first breeding, except in taxa that breed only once. Where generation length varies under threat, the more natural, i.e., pre-disturbance, generation length should be used. Generation length can be estimated in many ways.

5. Continuing Decline

Issue

The current definition does not take into account episodic or catastrophic declines.

Current Definition

A continuing decline is a recent, current or projected future decline whose causes are not known or not adequately controlled and so is liable to continue unless remedial measures are taken. Natural fluctuations will not normally count as a continuing decline, but an observed decline should not be considered to be part of a natural fluctuation unless there is evidence for this.

Recommended Definition

A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic) whose causes are not known or not adequately controlled and so is liable to continue unless remedial measures are taken. Fluctuations will not normally count as continuing declines, but an observed decline should not be considered as a fluctuation unless there is evidence for this.

11. Location

Issue

Assessors are using location to be equivalent to the place where a taxon is found. However, this may not be appropriate as the intention behind the use of the term in the criteria was for location to define a set of individuals facing the same threat.

Current Definition

Location defines a geographically or ecologically distinct area in which a single event (e.g. pollution) will soon affect all individuals of the

taxon present. A location usually, but not always, contains all or part of a subpopulation of the taxon, and is typically a small proportion of the taxon's total distribution.

Recommended Definition

Location defines a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a species is affected by more than one threatening event, location should be defined by considering the most serious plausible threat.

12. Quantitative Analysis

Issue

Users have generally interpreted a quantitative analysis (in Criterion E) to mean a population viability analysis (PVA), which for most species is not feasible. However, the current definition does allow for a broader interpretation and the analysis of risk of extinction even when little is known about the biology of the species concerned. Sometimes, especially when the threats are of large effect but unpredictable, it may be preferable to make an assessment using Criterion E, rather than Criterion A2. The definition should be rephrased to make it clearer what is permitted.

Current Definition

A quantitative analysis is defined here as the technique of population viability analysis (PVA), or any other quantitative form of analysis, which estimates the extinction probability of a taxon or population based on the known life history and specified management or non-management options. In presenting the results of quantitative analyses the structural equations and the data should be explicit.

Recommended Definition

A quantitative analysis is defined here as a form of analysis which estimates the extinction probability of a taxon based on known life history, habitat requirements, threats and any

specified management options. Population viability analysis (PVA) is one such technique. Quantitative analyses should make full use of all relevant available data. In a situation in which there is limited information, such data as are available can be used to provide an estimate of extinction risk (for instance, estimating the impact of stochastic events on habitat). In presenting the results of quantitative analyses, the assumptions (which must be appropriate) and the data used must be documented.

IV. The Categories

Issue

The qualitative definitions for the threatened categories tend to overstate the predictive accuracy of the system. They also do not adequately convey to the general reader the fact that it is the criteria that determine listing in the threatened categories and that this evaluation requires a scientifically based assessment. The difficulty is how to phrase them without using quantitative terms but still convey a sense of urgency.

Critically Endangered (CR)

Current Definition

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria (A to E) . . .

Recommended Definition

A taxon is Critically Endangered when available scientific evidence indicates that it meets any of the criteria A to E (below), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

Endangered (EN)

Current Definition

A taxon is Endangered when it is not Critically Endangered, but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria (A to E) . . .

Recommended Definition

A taxon is Endangered when available scientific evidence indicates that it meets any of the criteria A to E (below), and it is therefore considered to be facing a very high risk of extinction in the wild.

Vulnerable (VU)

Current Definition

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria (A to E) . . .

Recommended Definition

A taxon is Vulnerable when available scientific evidence indicates that it meets any of the criteria A to E (below), and it is therefore considered to be facing a high risk of extinction in the wild.

Lower Risk (LR)

Issue

The system is made unnecessarily complicated by having this as a category with three sub-categories, two of which should logically not be placed here.

Recommendation

It is proposed that this category be dropped, but that the wording under it should be incorporated into the definitions of the Near Threatened and Least Concern categories.

1. Conservation Dependent (cd)

Issue

The current use of Conservation Dependent as an independent Red List Category of Lower Risk is not logically consistent as a taxon can also be both threatened and conservation dependent. In addition assessors have used this category in a variety of sometimes subjective contexts making it less useful than was hoped. Two logical options were discussed. First, Conservation Dependent could be used as a

flag under all the threatened categories but this did not appear a satisfactory solution as it would require many difficult judgements to be made about the effectiveness of conservation programs. Second, to remove this category.

Recommendation

Remove Conservation Dependent as a category, but encourage assessors to provide information in the documentation to indicate where continuing specific conservation actions are improving the status of a taxon.

2. Near Threatened (NT)

Issue

This category is increasingly being used more formally than was intended. At present it is very loosely defined so better guidance is required on when and how to use it. The development of criteria has been suggested, but this option would create many difficulties. The "guidelines" will provide practical and more consistent methods for determining when a species should be listed as Near Threatened. This might be where a taxon meets only some sub-criteria or where the range of plausible assessments includes a threatened category and Least Concern. In addition this category would include some taxa that previously would have been listed as Conservation Dependent.

Current Definition

Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.

Recommended Definition

Taxa which have been assessed against the criteria but do not qualify for Critically Endangered, Endangered or Vulnerable now, but are close to qualifying for or are likely to become Vulnerable in the near future. Also included here are taxa which are the focus of a continuing taxon-specific or habitat-specific conservation program targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years. Such conservation programs must be described as part of the documentation requirements.

3. Least Concern (LC)

Issue

This category was provided to differentiate species that had been evaluated, and found not to be threatened. This gives the impression that one is required to conduct a formal assessment for blatantly common (weedy) taxa. From basic observations it can be easily seen that most of these extremely common taxa would not qualify for listing even though they have not been put through a formal assessment.

Current Definition

Taxa which do not qualify for Conservation Dependent or Near Threatened.

Recommended Definition

Taxa which have been assessed against the criteria and do not qualify for Critically Endangered, Endangered or Vulnerable and which also do not qualify for Near Threatened. Based on casual observation, extremely common taxa can be included in this category without having undergone a formal assessment against the criteria, provided the justification for this is fully documented.

V. The Criteria for Critically Endangered, Endangered, and Vulnerable

Criterion A

Issue

The current quantitative thresholds in the criterion do not scale well across all organisms and the rate under Vulnerable is thought to be too inclusive. In addition, the rates of decline do not take into account managed populations that are being harvested down to levels at which higher yield is attained, or dramatic declines that occurred in the distant past but are now halted or even reversed. Modeling also shows quantitative differences in extinction risk between types of decline that are irreversible e.g., through habitat loss, and reversible e.g., through density dependent responses to harvesting. The criterion also does not provide guidance on projecting into the future,

especially for long-lived species, where such assessments may be both unreliable and irrelevant. Greater clarity is also required on whether the criterion allows the use of a shifting time window for species where only small amounts of data are available.

Current Version

Vulnerable

A. Population reduction in the form of either of the following:

1. An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) index of abundance appropriate for the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
2. A reduction of at least 20%, projected or suspected to be met within the next ten years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.

The reduction thresholds change to 50% and 80% under Endangered and Critically Endangered respectively.

Recommendation

To change the sub-criteria under Criterion A. The proposed wording given here is for Vulnerable but it is the same for Critically Endangered and Endangered using different quantitative thresholds (*see table on next page*).

Vulnerable

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of $\geq 30\%$ over the last 10 years or three generations, whichever is longer, where the causes of the reduction are not demonstrably reversible, OR not clearly understood, OR may not have ceased, OR could recur, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate for the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
2. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is longer, where the causes of the reduction are: demonstrably reversible AND understood AND ceased AND unlikely to recur, based on (and specifying) any of (a) to (e) under A1.
3. A population size reduction of at least 30%, projected or suspected to be met within the next ten years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 30\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years), where the time period includes both the past and the future, AND the causes of reduction are not demonstrably reversible OR not clearly understood OR may not have ceased OR could recur, based on (and specifying) any of the (a) to (e) under A1.

Thresholds:

Sub-criteria	VU	EN	CR
A1, A3, A4	$\geq 30\%$	$\geq 50\%$	$\geq 80\%$
A2	$\geq 50\%$	$\geq 70\%$	$\geq 90\%$

Criterion B

Issue

There is a logical conflict between having fixed range thresholds and the necessity of measuring range at different scales for different species. Estimates of Area of Occupancy (AOO) are especially dependent on the scale of estimation. The current definition directs that AOO should be measured at a scale that is appropriate to biological aspects of the taxon. However, the AOO thresholds are fixed at a level that is too inclusive for groups of taxa in which a fine scale of range estimation is biologically appropriate. This could lead to over-listing of taxa within these groups. No solution has yet been found, but work is continuing on this issue.

Criterion C

Issue

Few taxa have data on both population size and decline rates at the necessary resolution to apply sub-criterion C1. There is also some overlap between Criterion A and C1. Removal of C1 would simplify the criteria and enhance parity with Criterion B, however, no resolution on this was reached and work is continuing. A second issue is that under sub-criterion C2b, all individuals have to be in a single sub-population. This is too exclusive and does not allow the listing of very skewed populations where a small number of mature individuals exist outside the main population. Criterion C also does not explicitly take into account extreme fluctuations in small populations.

Current Version

C. Population estimated to number . . . and either:

1. An estimated continuing decline . . .
2. A continuing decline, observed, projected or inferred, in numbers of mature individuals and population structure in the form of either:

- (a) severely fragmented (i.e., no subpopulation estimated to contain more than 50 mature individuals)
- (b) all individuals are in a single subpopulation.

Recommendation

To change the opening statement of the criterion and sub-criterion C2 under Critically Endangered, Endangered and Vulnerable to read as follows:

- C. Population size estimated to number . . . and either:
1. An estimated continuing decline . . .
 2. A continuing decline, observed, projected or inferred, in numbers of mature individuals and population structure in the form of either:
 - (a) severely fragmented (i.e., no subpopulation estimated to contain more than 50 mature individuals) OR at least 95% of mature individuals are in one subpopulation
 - (b) show extreme fluctuations.

Criterion D

Issue

Sub-criterion D2 under Vulnerable was intended to be used for species with very small distributions. However, the thresholds for area of occupancy and number of locations, although given as indicators, are frequently interpreted too literally. Some people have argued that the sub-criterion is too inclusive and results in massive over-listing, whereas others argue that it is too exclusive (for many marine species) and so is under-listing. The threats aspect needs to be emphasized more than the restricted distribution.

Current Version

- D2. Population is characterized by an acute restriction in its area of occupancy (typically less than 100 km²) or in the number of locations (typically less than 5). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming Critically Endangered or even Extinct in a very short period.

Recommended Version

- D2. Population with a very restricted area of occupancy such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period. Typically such taxa would have areas of occupancy in the lower 10% of those for comparable taxa.

Criterion E

Issue

The thresholds for extinction probability and the time period for which such analyses should be done are not appropriate for all organisms. There is also an inconsistency in giving generation times for CR and EN but not for VU. There is no guidance given on how to deal with projected extinction risks, as extinction rates may change over time.

Recommendation

A cap of 100 years should be placed under Endangered and Critically Endangered i.e., the latter would read:

Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or 3 generations, whichever is the longer up to a maximum of 100 years).

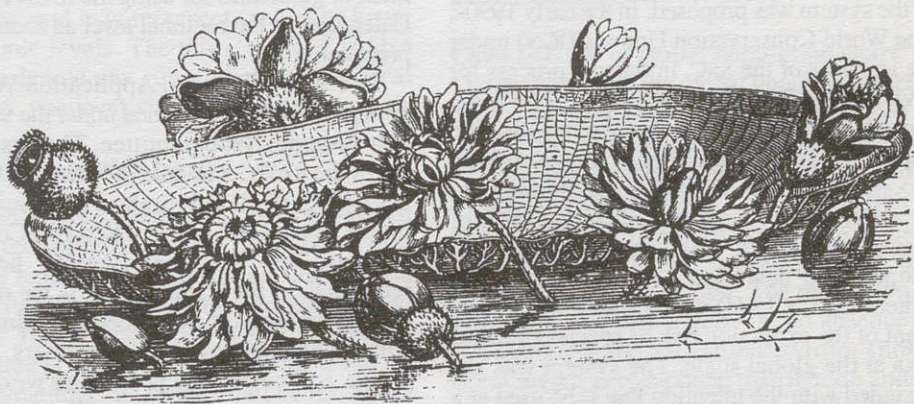
5. List of participants at the Criteria Review Workshop, Cambridge, U.K.

The following people attended the Criteria Review Working Group Workshop held in Cambridge, U.K., on July 1-2, 1999. Those marked with an asterisk (*) are members of the Criteria Review Working Group: Alberto Abreu, Resit Akçakaya*, Jonathan Baillie*, Nigel Collar*, Ulf Gärdenfors*, Kevin Gaston*, Craig Hilton-Taylor, Elodie Hudson, Bob Irvin*, David Keith*, Russell Lande*, Nigel Leader-Williams*, Charlotte Lusty*, Georgina Mace*, Larry Master*, Hiroyuki Matsuda, EJ Milner-Gulland*, Sanjay Molur*, Howard Powles*, André Punt*, Jon Paul Rodríguez*, Mary Seddon*, Alison Stattersfield*, Simon Stuart, John Wang, and Tetsukazu Yahara*.

6. Acknowledgements

Although this is not the final word on the Criteria Review Process, this is an opportune moment to acknowledge and thank the many external sponsors who have made the review possible. The Marine Workshop was sponsored by the German Ministry of the Environment and the Global Guardian Trust; the New South Wales National Parks and Wildlife Service and the New South Wales Scientific Committee sponsored the Range Areas and Uncertainty Workshop; the Criterion A and Criteria Review Workshops were sponsored by the Ministry for the Environment of Finland; and the Regional Applications Working Group meeting was funded by the Canadian Wildlife Service. We also thank all the SSC members, scientists and conservationists who have participated in the workshops and/or submitted comments on the Red List Categories and Criteria.

*IUCN/SSC Criteria Review Working Group
July 1999*



Draft Guidelines for the Application of IUCN Red List Criteria at National and Regional Levels

Background

Red Lists and Red Data Books are among the most widely used conservation tools available to conservationists world wide for focussing attention on species of conservation concern. These publications are essentially catalogues of threatened species where each entry consists of a species and a threatened category that provides an easily and widely understood method for highlighting those species under higher extinction risk. Prior to 1994, the threatened categories used in Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. The need to revise the categories had been recognized since 1984, when the Species Survival Commission (SSC) held a symposium, "The Road to Extinction" (Fitter and Fitter 1987). However, despite close examination of all the issues, no single revision of the system was proposed. In the early 1990s, The World Conservation Union (IUCN) under the auspices of the SSC, initiated a process for revising the Red List Categories. The main objective of this revision was to increase the objectivity and repeatability of the assessment process, as well as to develop quantifiable criteria that assign categories only on the basis of extinction risk. In 1994, the IUCN Council adopted the new Red List Categories and Criteria (IUCN 1994) which enable the assessment of the extinction risk of species or lower taxa at the global scale. The system was not designed with the intention that it be used at a sub-global level for the assessment of only a portion of the global population of a taxon. However, in many countries and regions, there is a strong desire to produce national or regional Red Lists based on comparable categories and criteria as used at the global level. The problem in applying the global system is that estimating extinction risk in a portion of a species' range may be different from the assessment of extinction risk at a global level, and the direct application of the existing criteria is not always possible.

The regional application issue was discussed at two SSC workshops held in Gland, Switzerland in March 1995 and in Cambridge, England in December 1995 (see Gärdenfors 1995), and by Gärdenfors (1996) and Gärdenfors and Kindvall (1999). It has also been discussed by several authors with reference to particular countries or regions, e.g., Avery *et al.* (1994), de Lange and Norton (1998), Maes and Swaay (1997), Palmer *et al.* (1997), Rodríguez and Rojas-Suárez (1995), Schnittler *et al.* (1994), Swaay *et al.* (1997). Recognizing the need for coherent criteria for the application of Red List categories at sub-global scales (e.g. sub-national, national or larger regions), the first World Conservation Congress held in Montreal in 1996, adopted a resolution (WCC Res. D. 1.25) that "Requests the SSC, within available resources, to complete the development of guidelines for using the IUCN Red List Categories at the regional level as soon as it is practicable..."

In 1998, a Regional Application Working Group (RAWG) was formed under the SSC Red List Program Subcommittee. The first meeting of the RAWG was held in Montreal, Canada in October 1998. This draft of the "Guidelines for the Application of IUCN Red List Criteria at National and Regional Levels," hereafter referred to as the "Guidelines," is the result of proposals made at that meeting, subsequent correspondence between members of the group, and comments at training workshops held in Canada and Australia. The Guidelines will be revised by the RAWG following the receipt of comments, a period of testing and a series of regional workshops. The revised Guidelines will also take into account the proposed changes to the Red List Categories and Criteria (Criteria Review Working Group 1999). A final version of the guidelines will be presented to the IUCN Council at the World Conservation Congress in October 2000.

This draft version provides IUCN and SSC members an opportunity to comment on the

Guidelines. We invite people to submit their comments and suggestions for amendments (preferably as well-formulated alternatives) to: Craig Hilton-Taylor, Red List Program Officer, IUCN/SSC U.K. Office, 219c Huntingdon Road, Cambridge, CB3 0DL, United Kingdom. Fax: +44-1223-277845, E-mail: redlist@ssc-uk.org or craig.hilton-taylor@ssc-uk.org.

Draft Guidelines

Introduction

The IUCN Red List Categories and Criteria are described in detail in a red booklet published recently (IUCN 1994), and reproduced in Baillie and Groombridge (1996), Oldfield *et al.* (1998) and on the IUCN/SSC Web site (<http://iucn.org/themes/ssc/siteindex.htm>). The Guidelines presented below require a thorough knowledge of the definitions and rules of the Red List Categories and Criteria. Familiarity with the publications mentioned above is therefore strongly recommended.

The Guidelines can be applied to any taxonomic unit at or below the species level. The term "taxon" in the Guidelines is used for convenience, and may represent species or lower taxonomic levels. The term "region" is also used to denote any sub-global geographical area (e.g., continent, country, state or province).

Summary of the Issues

Provided the regional population to be assessed is isolated from conspecific populations outside the region, the (global) Red List Criteria (IUCN 1994) can be used in a straightforward manner. The extinction risk of such an isolated population is identical to an endemic taxon. In these situations, the criteria can be used with unaltered thresholds at any geographical scale. However, if the criteria are applied to part of a population cut by a geo-political border, or to a regional population occasionally interchanging individuals with other populations beyond the border, the thresholds under Criteria A-D may no longer correspond to the extinction risk expressed in Criterion E.

Within a particular region, there will be a mixture of taxa with different distribution histories, ranging from being indigenous (native

to the area) since pre-human settlement to recently and purposefully introduced by people. Besides reproducing taxa, there will also be taxa that do not reproduce in the region but still utilize (and may be dependent upon) resources; they are visitors to the region. There may also be formerly native taxa that are now extinct in the region but which are still extant in other parts of the world. All these situations require recommendations on how they should be handled in regional Red List assessments.

The Red List Categories, whether used at the global or regional level, reflect the extinction risk of a taxon, but not necessarily a particular priority for conservation. This distinction will be even more important to realize and recognize at the regional level where the setting of conservation priorities should be viewed in a larger perspective.

Definitions

Benign introduction

An attempt to establish a taxon, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat and eco-geographical area (IUCN 1998).

Class I-(III)V of global population share

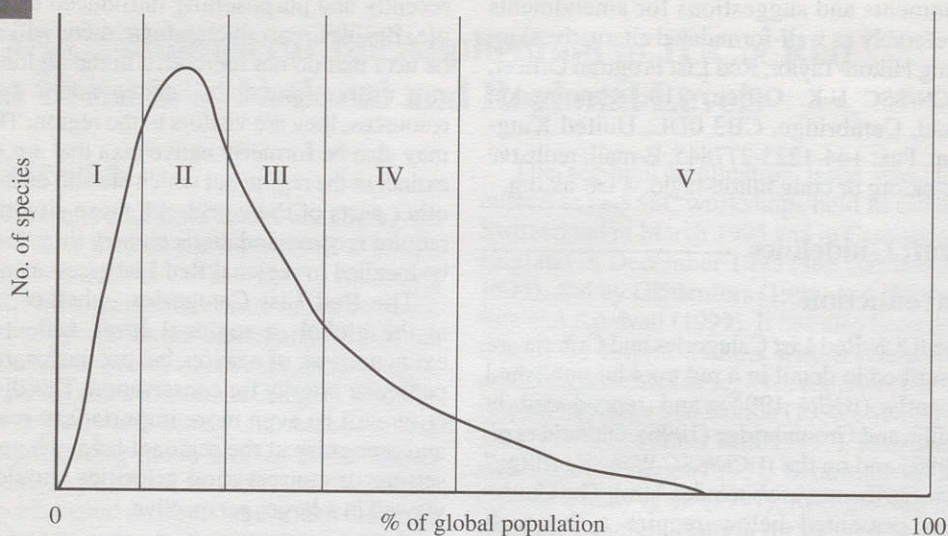
The proportion of the global population occurring within the study region is measured in three or five classes (see examples in Figure 1). The number of classes chosen is to be decided by regional assessors since the distribution of proportions will vary widely among regions.

Class I, indicates the lowest proportion, and classes III or V the highest. The proportion of total population size may, in the absence of good information, be estimated from known or estimated geographical distribution and/or suitable habitat. The delimitation of the classes will depend on the size of the region (i.e., how large a proportion of the global population of the taxon tend to occur within the region); and the width of classes need not to be identical. The percentages used to delimit the classes must be clearly stated in the regional Red List.

Conspecific populations

Populations of the same taxon found in different geographical locations.

1a



1b

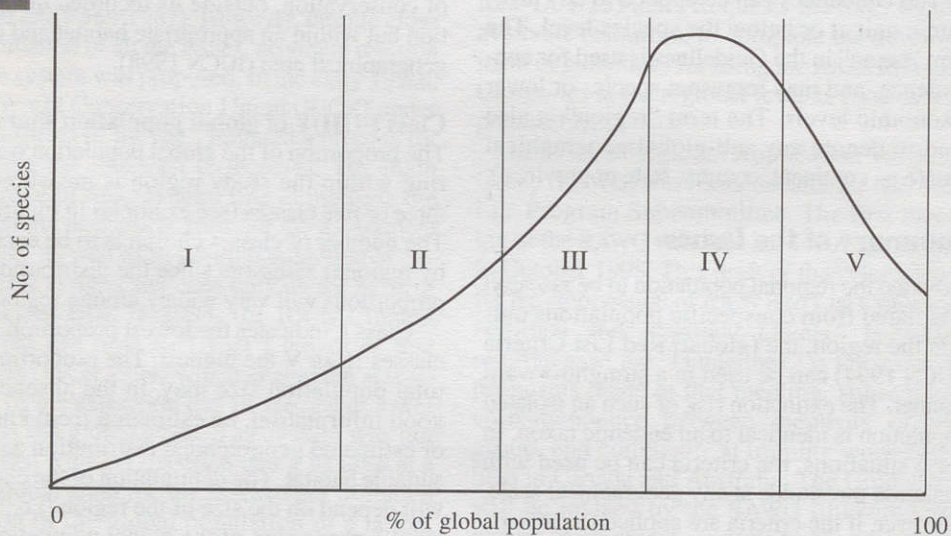


Figure 1. Examples of definitions of classes denoting global population share within two regions of different size. (a.) In a small region, most species tend to have a small share of the total population, while very few or none are endemic to the region. Therefore, to get an informative delimitation the classes must be skewed towards lower percentages. (b.) In a large region, most of the taxa tend to have a large proportion of the global population and many are endemic. Therefore, the classes must be skewed towards higher percentages. The percentages used to delimit the classes must be clearly stated in the regional Red List.

Current range

Present geographical distribution of the taxon.

Downgrading and upgrading

The process for adjusting the Red List Category of a regional population according to the decreased or increased risk of extinction.

Endemic taxon

A taxon is endemic to an area if it is found only there and nowhere else. It is a relative term. A taxon can be endemic to a small island, to a country or a continent.

Global population

Total number of individuals of the taxon living in the wild.

Isolated population

A population of the taxon that does not (or only exceptionally) exchange conspecific individuals or gametes with any other populations, and whose expected risk of extinction is therefore unaffected by other populations.

Natural range

The range of a taxon, *excluding* any portion that is the result of intentional or accidental introductions to the region or a neighboring region after the year 1800 or 1900, respectively. Taxa introduced intentionally before 1800 should also have developed local adaptations to be regarded as being within their natural range. The natural range includes areas where the taxon does not breed but regularly utilizes resources, such as feeding grounds or watering sites during migration, as well as wintering areas.

Propagule

Any live entity capable of dispersal and of producing a new mature individual, e.g., a spore, seed, fruit, egg, larva, part of or entire individual.

Region

Any sub-global geographical area, such as continent, country, state or province.

Regional assessment

Process for assessing the extinction risk of a regional population according to the guidelines given here.

Regionally Extinct (RE)

A taxon is Regionally Extinct when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or if a former visiting taxon, the last individual has died or disappeared from the region.

Regional population

The portion of the global population within the area being studied. This may comprise one or more subpopulations.

Rescue effect

Immigrating propagules result in a lower extinction risk of the target population.

Subpopulations

Subpopulations are defined (IUCN 1994) as geographically or otherwise distinct groups in the global population between which there is little exchange (typically one successful migrant individual or gamete per year or less).

Taxon

Any species or infra-specific taxon whose extinction risk is being assessed.

Vagrant

A taxon that occurs within the boundaries of the region only occasionally or, occurred during the 20th century. The region would therefore only have a very small share of the global population (i.e., Class I). See Visitor.

Visitor = visiting taxon

A taxon that does not reproduce within the region but regularly occurs within its boundaries. During any considerable period of the 20th century, the share of the global population in the region would have been at least Class II. See Vagrant.

Wild population

A population within its natural range where the individuals are the result of natural reproduction, i.e., not the result of human mediated

release, translocation or sowing. If, a population is the result of a benign introduction using individuals genetically similar to the original stock, the population is considered to be wild.

The Assessment

Taxa to be Assessed

The criteria should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (IUCN 1994). Taxa only marginally within the region should not be precluded from entering the assessment process. However, a taxon that occasionally breeds under favorable circumstances in the region, only to go extinct after a short period, should not be considered for the regional Red List. Similarly, a taxon that is currently expanding its distributional range outside the region and appears to be in a colonization phase within the region should not be considered for regional assessment until the taxon has reproduced within the region for several years.

Visiting taxa, i.e., taxa not reproducing within the Region but regularly visiting the country as migrants or wintering/summering populations, may be assessed against the Criteria.

The Categories

The IUCN Red List Categories (IUCN 1994) should be used unaltered at regional levels, with two exceptions:

1. Taxa extinct within the region but extant in other parts of the world should be classified as *Regionally Extinct (RE)*. A taxon is *Regionally Extinct* when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or, if a former visiting taxon, no individuals visit the region any more. Populations of long-lived individuals that currently have ceased to reproduce within the region because of poor or insufficient environmental conditions should not be classified as RE. The rationale behind this is that the environment might change and the remaining individuals might start to repro-

duce again. The classification of visiting taxa as RE will be determined by the assessors using information from any monitoring efforts devoted to the taxon within the region and the species' known faith to its breeding areas.

2. The category *Extinct in the Wild (EW)* should be assigned only to taxa that are extinct in the wild over their entire natural range, including the region, but extant in cultivation, in captivity, or as a naturalized population (or populations) well outside their historical range. If a taxon is (globally) *EW* but extant in a naturalized population within the region, the regional population should be viewed as result of a benign introduction and, consequently, assessed according to the Red List Criteria.

The Assessment Procedure

The regional assessment should be carried out in a two-step process. For the first step the global criteria are applied to the regional population of the taxon (as specified by IUCN 1994), resulting in a preliminary categorization. All data used in this initial assessment (e.g. number of individuals and variables relating to area, reduction, decline, fluctuations, subpopulations, locations, fragmentation, etc.) should be from the regional population, not the global population. In the second step, the occurrence of any conspecific populations outside the region that may affect the risk of extinction within the region should be investigated. If the taxon is endemic to the region or the regional population is isolated, the Red List Category defined by the criteria should be adopted unaltered. If, on the other hand, there are conspecific populations outside the region that are judged to affect the regional extinction risk, the regional Red List Category should be changed to a more appropriate level, to reflect the extinction risk as defined by Criterion E (see Figure 2). In most cases, this will mean downgrading the category met by the global criteria, since populations within the region may experience a "rescue effect" by populations outside the region (Hanski 1991, Hanski and Gyllenberg 1993). In other words, immigration from outside the region will tend to decrease extinction risk within the region.

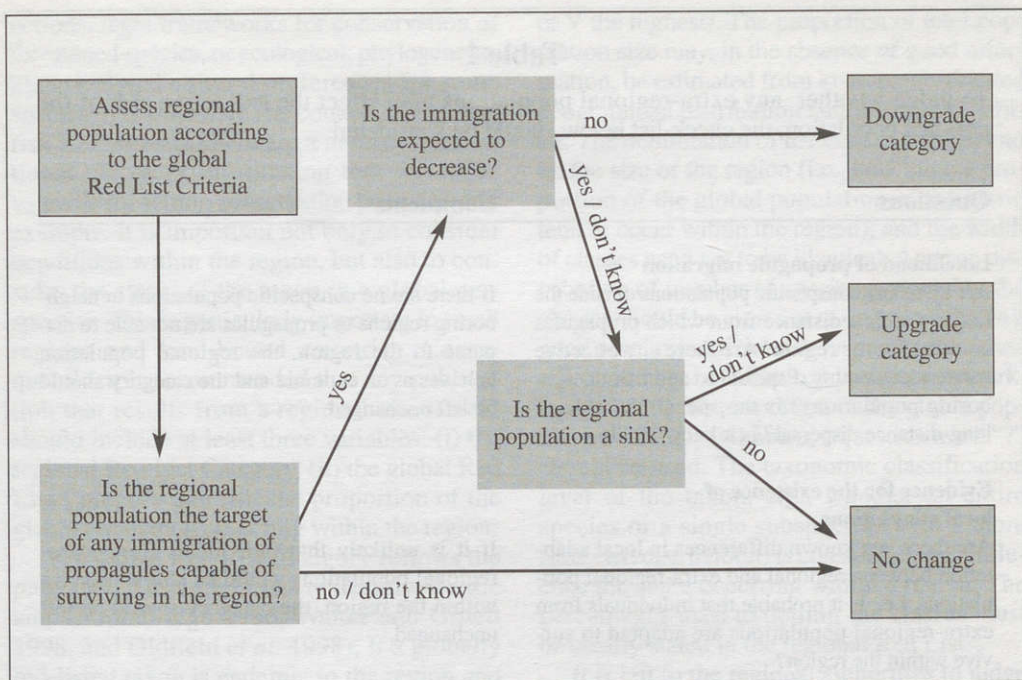


Figure 2. Conceptual scheme of the procedure for assigning an IUCN Red List Category at the regional level. The procedure for assigning the Regionally Extinct category is not included here. See Table 1 for further details on the procedure to be followed, especially in the second step.

Normally, such a downgrading will involve a one step change in category, e.g., moving the category from *Endangered* (EN) to *Vulnerable* (VU) or from VU to *Lower Risk Near Threatened* (LRnt). For expanding populations, whose global range barely touches the edge of the region, a downgrading of the category by two or more steps may be necessary. Conversely, if the population within the region is a demographic sink (Pulliam 1988) unable to sustain itself without migration from populations outside the region and the extra-regional source is expected to decrease, the extinction risk of the regional population may be underestimated by the criteria. In such exceptional cases an upgrading may be appropriate. If it is unknown whether extra-regional populations influence the extinction risk of the regional population, the precautionary principle should be exercised and the category met by the global criteria should be kept unaltered.

Adjustments can be made to all the Red List Categories except for *Extinct* (EX), *Data*

Deficient (DD), and *Not Evaluated* (NE), which must be used according to the rules (IUCN 1994). *EW* will in most cases be replaced by *RE*, following the section entitled *The Categories* above. The category *RE* should not be downgraded even if there are conspecific populations outside the region that may be the source of later recolonization.

Priorities for Conservation

Assessment of extinction risk and setting conservation priorities are two related but different processes. The assessment of extinction risk (such as the assignment of IUCN Red List Categories) generally precedes priority setting. The purpose of risk assessment is to produce a quantitative estimate of the likelihood of extinction of the taxon. Setting conservation priorities on the other hand often considers extinction risk, but also takes into account many other factors, such as availability of funds or personnel to carry out conservation

Table 1

To judge whether any extra-regional populations may effect the extinction risk of the regional population, the check-list below should be considered.

Questions	Comments
Likelihood of propagule migration Are there any conspecific populations outside the region within a distance from which propagules could reach the region? Are there any effective barriers preventing dispersal to and from neighboring populations? Is the species capable of long-distance dispersal? Is it known to do so?	If there are no conspecific populations in neighboring regions or propagules are not able to disperse to the region, the regional population behaves as an endemic and the category should be left unchanged.
Evidence for the existence of local adaptations Are there any known differences in local adaptation between regional and extra-regional populations, i.e., is it probable that individuals from extra-regional populations are adapted to survive within the region?	If it is unlikely that individuals from extra-regional populations would be able to survive within the region, the category should be left unchanged.
Availability of suitable habitat Are current conditions of habitats and/or other environmental (including climatological) requirements of the taxon in the region such that immigrating propagules are able to successfully establish themselves (i.e., are there inhabitable patches), or has the taxon disappeared from the region because conditions were not favorable?	If there is not enough suitable habitat and current conservation measures are not leading to an improvement of the habitat within a foreseeable future, immigration from outside the region will not decrease extinction risk and the category should be left unchanged.
Status of extra-regional populations How abundant is the taxon in neighboring regions? Are the populations there stable, increasing or decreasing? Are there any important threats to those populations? Is it probable that they produce an appreciable amount of emigrants, and will continue to do so for the foreseeable future?	If the taxon is more or less common outside the region and there are no signs of population decline and the taxon is capable of dispersing to the region and there is (or soon will be) available habitat, downgrading the category is appropriate. If the taxon is currently decreasing in neighboring regions, the "rescue effect" is less likely to occur, hence downgrading the category may not be appropriate.
Degree of dependence on extra-regional sources Are extant regional populations self-sustaining (i.e., have they shown a positive reproductive rate over the years) or are they dependent on immigration for long-term survival (i.e., are the regional populations sinks)?	If there is evidence that a substantial number of propagules regularly reach the region and the population still has a poor survival, the regional population may be a sink. If so, and there are indications that the immigration will soon cease, upgrading the category may be appropriate.

actions, legal frameworks for conservation of threatened species, or ecological, phylogenetic, historical and cultural preferences for some species over others. In the context of regional risk assessments, there are a number of additional pieces of information that would be valuable for setting conservation priorities. For example, it is important not only to consider conditions within the region, but also to consider the status of the taxon in a global perspective. This is particularly important in small regions and land-bound countries. Consequently, it is recommended that any publication that results from a regional assessment should include at least three variables: (i) the regional Red List Category, (ii) the global Red List Category and (iii) the proportion of the global population occurring within the region.

The global Red List Category follows the published IUCN Red Lists (currently, Baillie and Groombridge 1996, Walter and Gillett 1998, and Oldfield *et al.* 1998). If a globally red-listed taxon is endemic to the region and the regional assessors come to a different conclusion about the category than the global assessors, the appropriate Red List Authority should be contacted and the status of the taxon re-examined (the exact procedures for this will be announced by SSC in due course). If agreement is reached to change the global assessment, the new global category may be given in the regional Red List even if it will be published before the next update of the global IUCN Red List is due (the latter will be updated annually from 1999). If no agreement is reached, the parties may submit an appeal based on the Red List Criteria for judgement by the SSC Red List Program Standards Working Group. In both cases, the issues must be documented under the listing for the taxon concerned.

The construction of the global criteria, particularly Criterion A, may in some circumstances lead to cases where a taxon meets the criteria for being red-listed at the global, but not the regional level. Such taxa should be included in the regional Red List, and their regional category denoted as *LRLc*.

The proportion of the global population should be denoted in one of three–five classes (Class I indicating the lowest proportion, III

or V the highest). The proportion of total population size may, in the absence of good information, be estimated from known or estimated geographical distribution and/or suitable habitat. The delimitation of the classes will depend on the size of the region (i.e., how large a proportion of the global population of the taxon tend to occur within the region); and the width of classes need not be identical. An even distribution of number of species assigned to the classes should be aimed at in order to achieve a good resolution of the data. An uncertain classification may be followed by a question mark, e.g., “II?”. If the proportion of the global population is totally unknown, a question mark “?” should be used. The taxonomic classification level of the taxon, e.g., whether an entire species or a single subspecies (with a more restricted distribution) is considered, will influence the share occurring within a region. The percentages used to delimit the classes must be clearly stated in the regional Red List.

It is left to the regional authorities to judge how the three variables mentioned above (including the different taxonomic levels) should be accounted for in setting conservation priorities. Likewise, as mentioned above, the authorities may want to consider other variables in setting priorities. Such considerations are to a large degree region-specific, therefore they are not covered by the Guidelines.

Documentation and Publication

To facilitate the exchange of information between assessors in different regions and between regional and taxonomic Red List Authorities, it is recommended that all regional (and global) assessment exercises document their assessments in a specified way. The global documentation standards will be published by SSC in due course, but for the interim here are some guidelines for regional lists:

- An assessment must specify, e.g., in introductory sections in the published Red List, which taxa (organism groups) have been evaluated against the Red List Criteria. This should indicate whether every taxon, or just a fraction of the respective groups have been assessed.

- The scientific names in the Red List should be followed by the author and year of description. Wherever possible, the nomenclature in standard global lists should be followed. Any deviations should be noted and justified. If no standards are available, the taxonomic reference/s used should be cited in full. Synonyms may be given if relevant to the assessment.
- The Red List Categories followed by the criteria and sub-criteria met should be indicated using the English abbreviated forms, even if the Red List is published in a national language other than English.
- Visiting taxa that meet any of the categories LRnt, LRcd, VU, EN, CR, RE, EW, EX or DD, should preferably be listed in a separate section, but if they are included in a list among reproducing taxa, the documentation for the taxa should clearly indicate that they are visitors.
- The rationale (including any assumptions, inferences and projections) and all data used (including e.g., demographic, distributional, habitat, threat and conservation measures information if appropriate), for applying the criteria should be concisely documented under each taxon. This documentation would also include information about any uncertainties. The reasons for any change in status should also be noted in the documentation, and any downgrading or upgrading clearly indicated.
- All sources of information should be cited in full. If no sources are cited in the documentation, all statements will be attributed to the named assessor/s.
- The names and contact information for all those responsible for assessments should be specified. Similarly, two evaluators appointed by the Red List Authorities to evaluate each assessment should also be named.

A printed regional Red List is recommended to contain at least the columns presented in Table 2 on the next page.

In addition to a printed Red List, which is normally written in the national language(s), publication on the World Wide Web in English

(and the national language) is recommended. The web version could include more extensive documentation, as outlined above, than can be included in printed versions as seen in the example above. Web versions may also include the extensive listing and documentation of taxa assessed as *LRlc*. A publication on the web may become a particularly important tool in the process of transferring information from the regional to the global scale.

Discussion

New criteria are needed at regional level?

In discussions with people responsible for the preparation of national Red Lists, we have often heard that "it is necessary to change the criteria and thresholds for the IUCN Red List Categories when working at a national level". Two arguments are given for this opinion: "If we use the IUCN criteria, almost every species will enter the national Red List in a small country, and we do not have enough data from our country for applying the detailed criteria."

The first argument is partly a misconception and the result of confusion about geographical scale (i.e., area) and problems with divided populations (e.g., by national borders), or confusion of assessing extinction risk (that Red Lists should express) with determining conservation priority (that normally includes additional variables). A general change in thresholds for smaller regions, e.g., higher population numbers and larger areas, and a decrease in population decline values, would lead to an underestimation of extinction risk. The only appropriate way therefore is to make a taxon by taxon assessment based on the global criteria and considering whether the respective population is isolated (i.e., behaves as an endemic taxon) or is merely a part of a larger population. The smaller the region, the more common it will be that their populations will be shared with neighboring countries, requiring an adjustment of the Red List Category. The problem may, however, not be as large as first conceived because putative red-listed taxa very often do have a fragmented distribution (reducing interaction between subpopulations) due to habitat destruction. Problems will arise mostly in the cases of highly mobile organisms, such as birds, large

Table 2

Hypothetical Regional Red List showing an example of the potential layout and information to be included.

Taxon Name	Regional Red List Category	Global Red List Category	Proportion of Global Population	Documentation and Notes
<i>Aus australis</i> (Linnaeus, 1759)	VU A1b	LRlc	II	Andersen (1996) measured a 60% decline in traps since 1985 in southern subpop. Pop. still numerous close to the border: Downgraded from EN.
<i>Bus borealis</i> (Smith, 1954)	LRnt	NE	III	Population estimated at 10-20,000 indiv. and habitat probably decreasing. International distribution poorly known.
<i>Cus communis</i> (Alvarez, 1814)	EN A2c, B1+2c	DD	?	AOO estimated to 200 km ² . The forests currently under high pressure.
<i>Dus domesticus</i> (Liu, 1988)	VU A1b	LRlc	IV	Visitor. Young stages (estimated 30% of world pop.) spend summer months in Blue Bay (Fisheries Dep. 1983). Visiting population has decreased by ≈20% the last 10 yr.
<i>Eus ephemeris</i> (Szymczak, 1904)	CR C2a, D	VU A1c,e	I	Not seen for last 10 yr. but believed to survive with a small no. of scattered indiv. (Lilliput County board <i>in lit.</i>)
<i>Fus frugivorus</i> (von Schultz, 1805)	VU A2e	LRnt	II	Still numerous and widespread but fungal disease has struck pop. in neighboring country (Victor 1997). High prob. that the disease will reach our country.

mammals, some insects, marine organisms with pelagic stages, and certain lower plants with highly mobile spores. Despite this, one would still expect a higher *percentage* of the taxa occurring in smaller countries to be red-listed. This is because smaller countries have on average smaller populations (fewer locations) and the probability of extinction is generally higher in smaller populations.

The second argument, that there is not enough data at the regional level, is generally self-contradictory. It is true, many countries do lack data on distribution, population numbers and trends for their taxa. However, the IUCN Red List Criteria have been successfully applied at the global level (the most data poor of all scales) to over 15,000 taxa (Baillie and Groombridge 1996, Oldfield *et al.* 1998). Most assessors also find that after gaining some experience in applying the criteria, that they can readily be used with a very limited amount of hard data.

Objectivity and conceptual difficulties on regional levels

The IUCN Categories and Criteria (IUCN 1994) were developed to enhance the objectivity and comparability of Red Lists (Mace and Lande 1991, Mace and Collar 1994, Baillie and Groombridge 1996). Will these Regional Application Guidelines and their recommended two-step procedure (with a possibility to adjust the category first met) result in a less objective categorization? We think the contrary is true. The assessment in both steps (using the IUCN Red List Criteria and the adjustment procedure) includes subjective evaluations of available data, but both steps have well-defined frames, against which the assessment process is conducted.

At a regional level, the time frame considered in the risk assessment is more important than at the global level (Gärdenfors 1995, 1996). For instance, a regional extinction may be followed by a later recolonization. Also, at a regional level, a taxon may for example be *EN* according to Criterion E on a 20 yr. time scale (IUCN 1994), while the long-term extinction risk may in fact be less than 50% due to the rescue effects of neighboring populations (Hanski 1991, Hanski and Gyllenberg 1993). Although the time scale is conceptually impor-

tant for particular definitions (e.g., Criterion E and the category *RE*), we have largely ignored this issue in the proposed Guidelines. Instead, we have tried to adopt a pragmatic approach, and address, for example, the rescue effect, by suggesting a downgrading of the category. We believe that the resultant problems are more of a conceptual nature than real. In most cases, regional populations disappear because of habitat destruction and no immigrating propagules will rescue the population, or lead to any recolonization.

There is one inconsistency to the downgrading approach suggested in the Guidelines: A downgrading from *RE* to *CR* (or upgrading from *CR* to *RE*) is not recommended. It would be difficult to communicate to the general public that a taxon that no longer occurs in the country is categorized as *CR* or that a still extant species is *RE*.

We have proposed the term *Regionally Extinct*, rather than Extirpated or Vanished, as currently used in some countries. Extirpate literally means a successful eradication conducted on purpose, and that is very rarely the case when a species goes extinct. Also, an abbreviation of Extirpated could easily be confused with *EX*.

Scale of international comparison

In widely distributed species, there may be marked genetic variation over the range, making an account for the global share within a region less meaningful. Consequently, it could be argued that the continental or a comparable biogeographical scale, would be the most appropriate for comparison, both regarding population proportion and risk of extinction (Gärdenfors 1996). But we have chosen to recommend the global level as the first option, because that geographical scale is always unambiguous and there are few Red Lists available which encompass whole continents (apart from those for Australia and North America). Besides, in the majority of taxa, the total distribution is restricted to one continent, making little difference to which scale is chosen. However, nothing precludes a region from giving the population share and Red List Category at both the global and continental levels in their Red List.

Acknowledgements

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- Ulf Gärdenfors (Sweden), Jon Paul Rodríguez (Venezuela), Craig Hilton-Taylor (South Africa), Colleen Hyslop (Canada), Georgina Mace (U.K.), Sanjay Molur (India) and Stuart Poss (U.S.A.)

Books

China Red Data Book of Endangered Animals

Chief editor: Wang Sung, Science Press, Beijing, 1998. Volume I—Mammalia, chief compiler: Wang Sung. Volume II—Aves, chief compilers: Zheng Guangmei and Wang Qishan. Volume III—Amphibia and Reptilia, chief compiler: Zhao Ermi. Volume IV—Pisces, chief compilers: Yue Peiqi and Chen Yiyu. Available from the Science Press Book Store or Xinhua Book Store in Beijing. For further information contact Mr. Li Feng of Science Press, phone: (86 10) 6401 9815; fax: (86 10) 6402 0094.

China is one of the world's megadiversity countries. Her borders encompass a vast territory of complex climates and diverse geography that sustains a rich biodiversity heritage. More than 12% of the world's mammal, bird, and fish species are found in China. However, because of sheer numbers of species, many of which are found only in very remote areas, information about most of China's species is scanty.

This four-volume set, a joint publication of the China National Environmental Protection Agency (NEPA) and the Endangered Species Scientific Commission, PRC (ESSC), provides current information on many of China's endangered vertebrates. A total of 533 species are described, including 133 mammal species, 183 bird species, 96 reptile species, 29 amphibian species, and 92 fish species. For each species listed, there is text in both Chinese and English that includes information on distribution, habitat, population figures, threats to survival, captive breeding, conservation measures taken, and measures proposed. In addition, distribution maps and photographs for many of the species are included.

While this compilation has taken many years to complete, it is only the beginning of an important ongoing effort to identify and assess all of China's species. These volumes represent a significant landmark in China's strategy to identify and classify her biodiversity. This assessment is one of the main objectives of China's National Biodiversity Conservation



Action Plan. The compilers hope that readers of these volumes will contribute to future editions through identification of gaps and errors and contributions of new information about species for which very little is known.

*Reviewed by Susan Mainka
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The Green Web

By Martin Holdgate, (ISBN 85383 595 1, order number B487), published by Earthscan, £17.50, U.S. \$26.75. IUCN and SSC members receive a discount of one third. Available from IUCN Publications Services Unit, 219c Huntingdon Road, Cambridge, CB3 0DL, United Kingdom, Fax: 44 1223 277175; e-mail: info@books.iucn.org; <http://www.iucn.org/bookstore/>

This book really is a must for anyone connected with IUCN, and in particular the SSC. It certainly is not bedtime reading—it is one of the most densely written tomes I have ever read. But it is an essential work of reference trying, with a remarkable degree of success, to compress into a single volume 50 years of history, with all the politics that went with it. If I have a criticism, it is that history of organizations is really about the people who pioneered them, and in this account the people tend to be fairly ill-defined shadows that flit across the pages. Few are described, and we rarely learn what motivated them, what their background was, or what they were like as human beings. One of the few people described in any detail is the late Sir Peter Scott—probably one of the few who should not need describing, at least to anyone involved with SSC, but of course a hugely influential figure in the conservation movement.

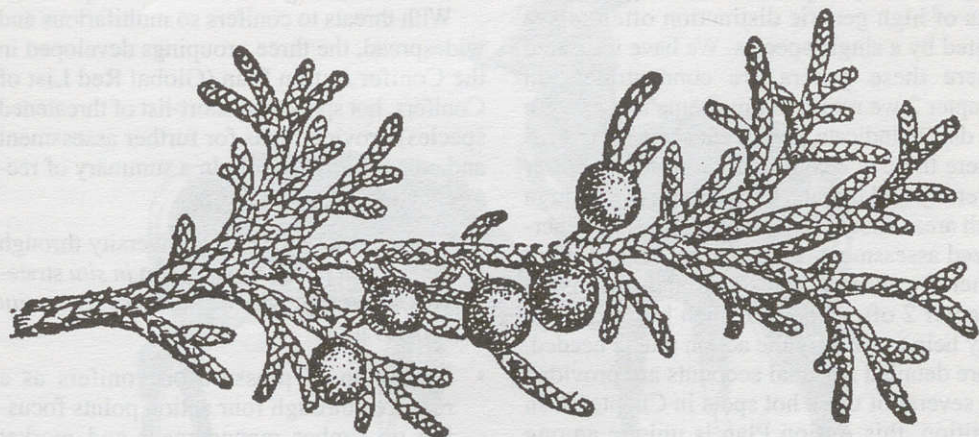
Members of the SSC may find the story a little depressing, as I certainly did. The Union, when founded, was very much concerned with nature, and many of the founders were active naturalists. Many of the early achievements concerned individual endangered species. Even the jacket “blurb” trumpets that IUCN “...is the source of Red Data Books...that are the most important statements about the threats to wild species.” Most members of the SSC would agree with this definition of RDBs, but it is a pity that they no longer appear to be in production. Holdgate records that in the 1950s Sir Frank Fraser Darling, one of Britain’s greatest naturalists, turned down the Chairmanship of the Ecology Commission, saying, “we know enough about ecology, and don’t want any

more Beaurocratic Commissions: let’s get on with it.” Nearly half a century later, after reading this remarkable history, one cannot feel that little progress has been made.

The number of conferences and workshops spirals ever upwards, endangered species lists grow in size, and more and more habitat is lost. I am not sure if it was the author’s intention, but he paints a devastating picture of an organization hampered by bickering and political intrigue and waste of talent over the years. One of the lighter highlights of the book is to be found in a footnote on page 279, which quotes a long poem by a former SSC Executive Officer, Tony Mence, illustrating the deep divisions that have occurred between IUCN and WWF. It is all the more remarkable that dedicated staff managed to get things done. But lest we should become too depressed, we should remember this is going to be better. And *The Green Web* does mention successes—it’s just that they seem constantly overshadowed. The SSC has been responsible for many of the major achievements of IUCN, and all members should read this book. And be aware that one of the problems of becoming a major force on the world stage is that an organization becomes prey to the intrigues, problems, and personality clashes that occur in any big organization. Let us hope that the Union will learn by the mistakes of the past, and to this end Martin Holdgate’s book will have made a very valuable contribution.

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Status Survey and Conservation Action Plan: Conifers



Executive Summary

Conifers are one of the world's most important resources of timber. Especially in the Northern Hemisphere, these resources are vast and will, if managed wisely and used sustainably, provide wood for a multitude of purposes virtually indefinitely. Other functions provided by these vast conifer forests, not the least of which are ecological ones, are equally important. Unsustainable exploitation of these forests, while not yet banned, is gradually giving way to better forestry in many countries with substantial populations of this invaluable resource. Why then this Action Plan? Why an IUCN/SSC Conifer Specialist Group?

Globally, there are some 630 species of conifers, plus approximately 170 taxa at infra-specific ranks (subspecies and varieties), totaling 800 taxa. Of these, 355 are listed as of conservation concern. The total number of taxa threatened with extinction (CR, EN, VU) is 200 (approximately 25%). Seventy of these are likely to become extinct in the foreseeable future if current trends continue.

Conifers occur on all continents except Antarctica, but their abundance is unevenly distributed both in terms of individuals and taxa. Where the vast boreal conifer forests stretch across continents and contain billions of trees, they sustain no more than a handful of species. In contrast, more southerly latitudes in the Northern Hemisphere and all of the Southern Hemisphere have either scattered conifer forests, or mixed conifer/hardwood forests in which conifers occur in low densities, dispersed among other trees or shrubs. Many species occupy very small areas, often as relict populations of once greater abundance. Some areas have a high diversity of species, but hardly any of these species are abundant enough to form forests of any appreciable size. A good example is New Caledonia in the Southwest Pacific, an island with 43 species of conifers, all endemic, in an area about the size of Wales. Mexico has 42 species and 18 varieties of pines (*Pinus*), compared with eight species and one variety in all of Canada and Alaska. Unknown to many, approximately 200

species of conifers are restricted to the Southern Hemisphere, where vast conifer forests are unknown. It is this scattered diversity that is most threatened with extinction.

This Action Plan assesses conifer diversity and its threats in Chapter 1. Endemic genera are particularly important since they represent taxa of high genetic distinction often represented by a single species. We have indicated where these genera are concentrated. In Chapter 2 we return to this theme and analyze the data to indicate "conifer hot spots," or areas where there is a combination of high conifer diversity and threats. Conifer conservation in such areas should be a priority. While a generalized assessment of threats in Chapter 1 and general conservation recommendations in Chapter 2 often apply to such hot spots and may help to identify the action that is needed, more detailed regional accounts are provided for several of these hot spots in Chapter 3. In addition, this Action Plan is unique among IUCN's Plant Action Plans so far published in that it gives the complete Global Red List of Conifers using the 1994 IUCN Red List Categories and criteria. Since this list includes distribution of the taxa, any country can tally from this list its conifers that are threatened globally. We have also developed a formula for prioritizing at the taxonomic level, resulting in a short-list of threatened species. We think that we have chosen objective criteria to do this, but since conservation action often will be taken at regional or local levels, taxa that are not short-listed remain important targets. We encourage priority Action Plans to be undertaken for the short-listed species. This Action

Plan presents 10 species accounts. These accounts should be used both as models for more such reports that need to follow and as first steps towards species Action Plans. In these species accounts, we have included examples of "success stories" to encourage conservationists to begin work on other species.

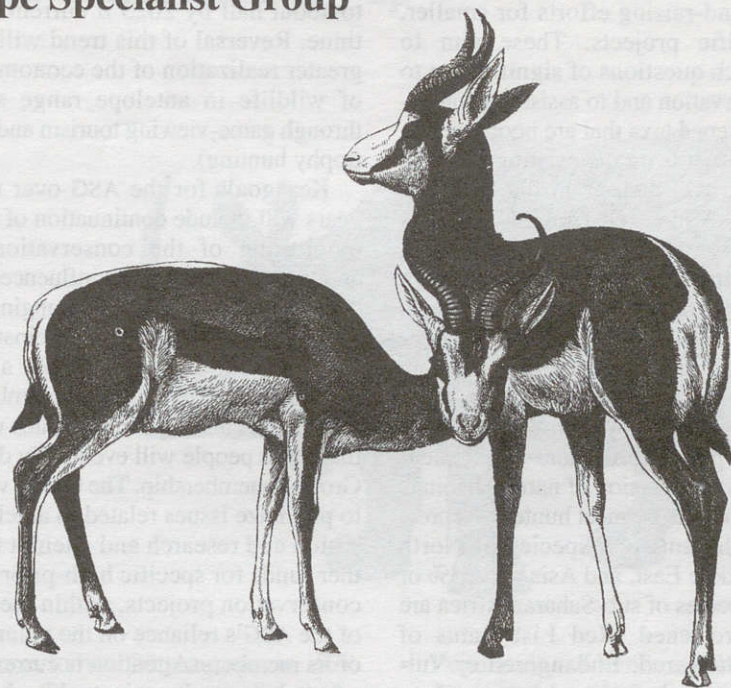
With threats to conifers so multifarious and widespread, the three groupings developed in the Conifer Action Plan (Global Red List of Conifers, hot spots, and short-list of threatened species) provide focus for further assessment and conservation action. In a summary of recommendations, we call for:

- Conservation of existing diversity through nine action points focusing on *in situ* strategies supported where necessary by *ex situ* conservation
- Reduction of pressure on conifers as a resource through four action points focusing on timber management and market strategies

Reprinted from Status Survey and Action Plan: Conifers. Compiled by Aljos Farjon and Christopher N. Page, ix + 121 pp., £15.00, U.S. \$22.50 plus postage and packing (20% overseas surface, 30% Europe air, 40% overseas air). Available from IUCN Publications Services Unit, 219c Huntingdon Road, Cambridge CB2 0DL, United Kingdom.

Specialist Group Reports

Antelope Specialist Group



The Antelope Specialist Group was created in 1978 and currently has more than 100 members based in over 40 countries. It is essentially a scientific advisory group and operates mainly by correspondence. The term "antelope" has no precise taxonomic status, but the ASG covers 102 species, mainly bovids, of which three-quarters occur in sub-Saharan Africa. This includes all of the antelopes of Africa, the Middle East and Asia, plus various "miscellaneous" species such as giraffes, okapi, water chevrotain, African buffalo, and saola.

A key objective of the Group is to monitor the conservation status of all of these species and the success of attempts to conserve and sustainably utilize antelopes. The results of extensive surveys of the distribution, abundance, and conservation status of antelopes in all countries of sub-Saharan Africa were published in parts 1 to 3 of *Antelopes: Global Survey and Regional Action Plans* in 1988-1990. Part 4, covering North Africa, the Middle East, and Asia, is scheduled for publication in 1999. These publications provide a baseline for future comparisons and identify priorities for

antelope conservation. New information is published regularly in the Group's *Gnusletter* (two issues per year) and occasionally in the *Antelope Survey Update* series. The ASG's information on the conservation status of all antelope species in sub-Saharan Africa was reported in December 1998 in the *African Antelope Database 1998*.

Areas identified as key priorities for the conservation of representative antelope communities show a high degree of overlap with the conservation requirements of other wildlife. Many of these priorities are being addressed by major biodiversity conservation projects funded through bilateral development assistance and agencies such as the GEF. These projects are not usually aimed specifically at antelopes, but they often recognize antelopes as a key component of biodiversity and are usually of general benefit to wildlife conservation. This type of international assistance is at an historical high (e.g., currently more than U.S. \$100 million per annum in sub-Saharan Africa) but the long-term success of wildlife conservation in many antelope range states will

also depend on greater political commitment to conservation at the national and local levels.

Since 1995, the ASG has been directly involved in fund-raising efforts for smaller, antelope-specific projects. These aim to answer research questions of significance to antelope conservation and to assist the conservation of threatened taxa that are poorly represented in or absent from the existing network of protected areas, such as hirola (Kenya), Soemmerring's and red-fronted gazelles (Sudan), and western giant elands (Mali). Other projects have included an anti-poaching feasibility study in the eastern Central African Republic and research on the seasonal movements of the giant eland in northern Cameroon.

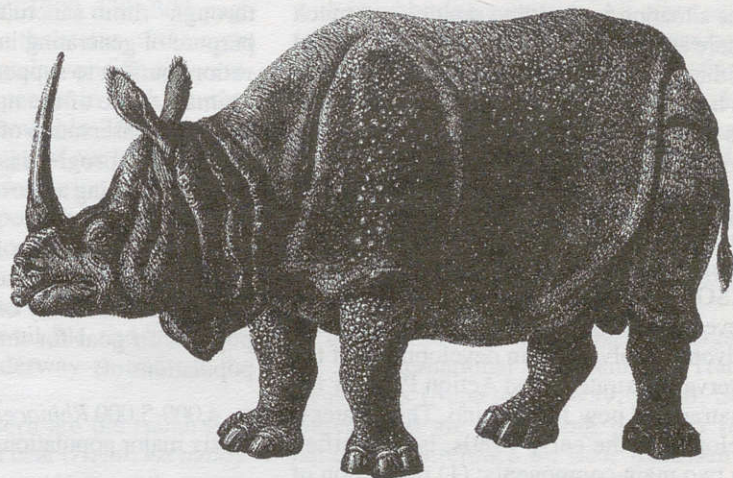
Threats to the survival of antelopes arise fundamentally from the rapid growth of human and livestock populations, and consequent degradation and destruction of natural habitats and excessive offtake by meat hunters. At present, 71% of the antelope species of North Africa, the Middle East, and Asia and 23% of the antelope species of sub-Saharan Africa are classed as threatened (Red List status of Critically Endangered, Endangered or Vulnerable) or are already extinct. Many antelope species still exist in large numbers (e.g., half of the species of sub-Saharan Africa currently number at least in the hundreds of thousands and 85% in the tens of thousands or more) but most species are in decline. The *African Antelope Database 1998* projected that the

proportion of antelope species in sub-Saharan Africa that are threatened (or extinct) will double from its present level of about one-quarter to about half by 2025 if current trends continue. Reversal of this trend will depend on greater realization of the economic potential of wildlife in antelope range states (e.g., through game-viewing tourism and sustainable trophy hunting).

Key goals for the ASG over the next 20 years will include continuation of the Group's monitoring of the conservation status of antelopes and how this is influenced by various approaches to conservation, ranging from strict protection to community participation and private-sector involvement. We also aim to increase the number of ASG members who are nationals of antelope range states with the aim that these people will eventually dominate the Group's membership. The Group will continue to publicize issues related to antelope conservation and research and attempt to raise further funds for specific high-priority antelope conservation projects, within the constraints of the ASG's reliance on the voluntary efforts of its members. Attention is currently focused on antelopes such as giant sables, bongos, giant elands, Swayne's hartebeests, dibatag, beira, and Aders' duikers.

Rod East, Co-chair
Antelope Specialist Group

Asian Rhino Specialist Group



The AsRSG was formed 20 years ago, in 1979. At that time the Group was very small and, like other Specialist Groups, its primary purpose was to compile information and provide advice. These informational and advisory functions are still important for the AsRSG. However, over the last two decades, the AsRSG has grown in size and expanded its scope to assume a more active role in advocacy, coordination, and funding rhino conservation activities.

To facilitate this role, the structure of the AsRSG has evolved. There is now a Chair; two Deputy Chairs (Southeast Asia and Indian Subcontinent); an Executive Committee comprising principal representatives from the significant range states for Asian rhinos (India, Nepal, Indonesia, Peninsula Malaysia, Sabah, and Vietnam); and two Program Officers. The AsRSG has also decided to concentrate on regional (India/Nepal and Southeast Asia) rather than global meetings.

Over the 20 years the AsRSG has been in existence, the situation for the three species of Asian rhinos has changed.

- Populations of Sumatran rhinos (*Dicerorhinus sumatrensis*) have declined drastically from well over 1,000 distributed in at least five range states (Indonesia, Peninsula Malaysia, Sabah, Thailand, Myanmar) to only about 300 primarily in three of the range states. The primary cause has been overexploitation by poachers for the horns. The Sumatran rhino is a spectacular example of a species that is vanishing much more rapidly than its habitat and a validation for efforts at species as well as landscape/ecosystem conservation. Poacher pressure on this species remains intense, and the survival of the species is in great doubt.
- Numbers of Javan rhinos (*Rhinoceros sondaicus*) have not changed much in Indonesia, where most of this species survives (≈ 50 rhino). While it is fortunate that there has not been a decline, it is worrisome that this population has not increased despite what has appeared to be relatively good protection. Serendipitously, another population of this species has been rediscovered in Vietnam, although numbers there are precariously low.

- The real success story in Asian rhino conservation has been the programs for the Indian/Nepali rhino (*Rhinoceros unicornis*) in both India and Nepal, where populations have increased at least two-fold. To date, these countries have achieved this success with very little external support. However, the situation is changing rapidly, and much more assistance from outside will be needed if the success is to be sustained. The AsRSG is becoming more involved with this species as indicated by the recent regional meeting conducted at Kaziranga National Park.

Because of the desperate situation for the Sumatran and the Javan rhino, these two species have been the greater focus for the AsRSG until very recently. The AsRSG believes that its greatest achievement has been its pivotal involvement in development of the conservation strategy and Action Plan for the Sumatran and now Javan rhino. This strategy, developed in the early 1980s, is diversified with two main components: (1) protection of rhino in situ via anti-poaching teams known as rhino protection units (RPU) and (2) an attempt at managed breeding using rhinos considered "doomed" in the wild to propagate the species for reinforcement of wild populations.

In terms of the RPU, the AsRSG was instrumental in securing a Global Environment Facility (GEF) grant to initiate this program. To the best of the AsRSG's knowledge, this grant is still the only species conservation project the GEF has ever supported. Beyond the GEF, the AsRSG has been very active and successful in recruiting additional funds to expand and extend the RPU program. Moreover, in addition to securing and sustaining the financial support for this program, the AsRSG has been directly involved in coordination. It has proven more effective for the RPU to be semi-autonomous from, although coordinated closely with, the government conservation departments.

In terms of the managed breeding, the challenge has proven greater and the results are still problematic. Originally, there was an attempt at traditional captive breeding. However, the biology of the species has rendered it one of the most difficult ever to be tried in captivity. Among other discoveries in the 10 years of

effort and frustration is the fact that this rhino seems to be an induced ovulator and a particularly complex one at that. Much knowledge of this species and its biology has been acquired during the last 10 years. The AsRSG has managed this program very adaptively and is now attempting managed breeding in native habitat through "rhino sanctuaries" that have a dual purpose of generating income through conservation tourism to support the RPU. While the ultimate value of the managed breeding program for conservation of the species is yet to be determined, progress is occurring, with matings finally being achieved and hopefully pregnancies soon.

For the future, the key priorities for the AsRSG are to continue contributions to the survival and recovery of all three species. The population goal for the next 50 years is for populations of:

- 4,000-5,000 *Rhinoceros unicornis* in at least six major populations in India and Nepal;
- 500 *Rhinoceros sondaicus* in at least two populations in Indonesia and three populations on the Asian mainland (two in Vietnam and one re-established in Peninsula Malaysia)
- 2,000 *Dicerorhinus sumatrensis* in at least two populations (primarily in Sumatra, Peninsula Malaysia, and on Borneo but also hopefully re-established in Thailand and Myanmar)

This level of recovery should be possible through the continued activity of the RPU, as well as expansion of the managed breeding programs for Sumatran and eventually Javan rhinos to provide animals for the recovery and re-establishment programs. Achievement of the population goals is dependent upon an equally important key priority for the AsRSG of helping to develop financial viability of the Asian rhino conservation programs.

Mohd Khan bin Momin Khan, Chair
Tom Foose, Program Officer
Nico Van Strien, Program Officer
Asian Rhino Specialist Group

Bear Specialist Group

The Bear Specialist Group (BSG) completed the Bear Status Survey and Conservation Action Plan in January 1999. This 307-page document summarizes the status of the eight bear species. It also contains specific conservation needs for each species in each country where information is available. The document highlights the uneven state of our knowledge of bears with the most information on the brown bear (*Ursus arctos*), polar bear (*Ursus maritimus*), North American black bear (*Ursus americanus*), and giant panda (*Ailuropoda melanoleuca*). The other species have very little basic information available, and little management effort is underway to address the needs of these species.

Of particular concern are the Asian bear species such as the sun bear (*Helarctos malayanus*), Asiatic black bear (*Ursus thibetanus*), and sloth bear (*Melursus ursinus*). These Asian species face multiple threats, including ongoing habitat loss as human development and forest conversion reduce range, and unregulated human-caused mortality. The latter is exacerbated by the use of bear parts in traditional medicine and killing bears as agricultural pests. Spectacled bear (*Tremarctos ornatus*) populations in five Andean nations likewise are severely reduced and face similar threats but are much less impacted by the trade in bear parts than the Asian bear species. Venezuela, Colombia, and Ecuador each have granted protective status to over 15% of their national territory, a measure taken in large part to protect bear populations. However, as in Asia, these parks are increasingly penetrated by roads and occupied and surrounded by agriculture.

Top priorities of the BSG are to make national parks and reserves viable institutions that preserve core bear populations and habitat, and link such areas with protected corridors (for examples see Action Plan country reports on China, India, Bulgaria, Spain, and Venezuela). The BSG is focused on the first step in this process—to improve the capacity of man-

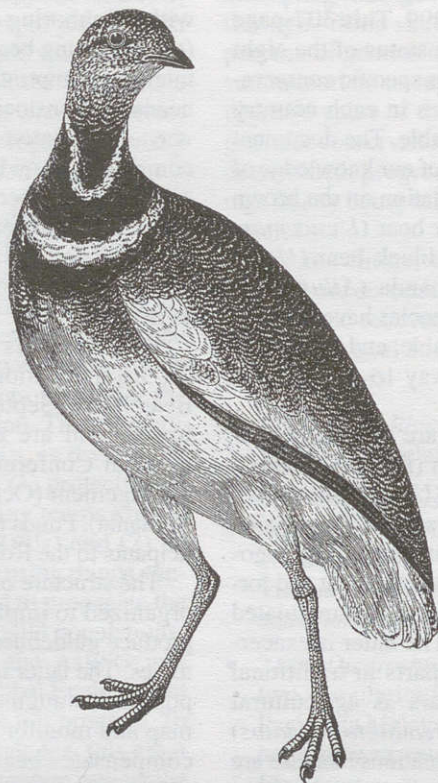
aging authorities to research and monitor populations and threats, and coordinated activities with neighboring countries. All other actions (e.g., reducing bear mortality and bear-human interfaces, improving habitat, or assessing the needs for translocating or reintroducing bears versus alternative actions) are dependent on competent, knowledgeable staff. Toward that end, BSG members continue to supervise field projects on sun bears in Borneo, sloth bears in Nepal, Asiatic black bears in China, brown bears in Russia and Japan, and spectacled bears in Bolivia.

BSG members are planning to co-organize the 3rd International Symposium on Trade in Bear Parts (September 1999; Seoul, South Korea) and are organizing the 12th International Conference on Bear Research and Management (October 1999; Poiana Brasov, Romania). Funds have been raised to send participants to the Romanian conference.

The structure of the BSG is currently being organized to implement the Action Plan and produce guidelines on important management topics. The latter include recommendations on population augmentation and procedures to map and monitor populations, reduce and/or compensate bear depredation of human resources, and reduce the illegal killing of wild bears for commercial purposes. The very different cultural and physical landscapes of where these techniques have been most developed (North America, Europe, and western Russia) and where they are most needed (Asia, South America, and parts of eastern Europe) will challenge the BSG to devise new techniques and test them.

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Bustard Specialist Group (BirdLife/SSC)



Houbara Bustard Conservation Makes Progress

The houbara (*Chlamydotis undulata*) is a medium-sized bustard that inhabits the arid zone belt from northwest Africa through the Middle East to northern China. Its prominence for conservation derives from its value and indeed notoriety as the traditional quarry of Arab falconers. Since the early 1960s, traditional camel-back falconry has been transformed by the development of modern transport and communications and the increased availability of falcons (both wild-caught and captive-bred hybrids). The efficiency and intensity of hunting has increased considerably to the detriment of local populations of houbaras, especially in Arabia and the Middle East. As a result, falconers have latterly begun

hunting in other countries in Asia and North Africa, much to the alarm of conservationists in the region. While the overall population is today estimated to be at least 49,000 birds, numbers have declined greatly during this century for a variety of reasons, which include hunting and trapping, agricultural intensification, and other land use changes. The houbara's future is probably best served by acknowledging the conservation benefits that would accrue from its wise use as a quarry species and establishing a sustainable management system through an Agreement under the Bonn Convention for the Conservation of Migratory Species of Wild Animals.

In January 1996, the SSC organized a meeting in Muscat, Oman, to discuss the conservation management of the houbara bustard in Asia and the Middle East. There were over 90 participants from 13 Range States: Afghanistan, Bahrain, India, Iran, Jordan, Kazakhstan, Kuwait, Oman, Pakistan, Saudi Arabia, United Arab Emirates, Uzbekistan, and Yemen. A number of recommendations were developed at the meeting, including the need to improve protection measures, carry out further research on migration, and assist Saudi Arabia to conclude an international management agreement under the Bonn Convention.

Since that meeting there has been significant progress. On the research front, the National Avian Research Centre in Abu Dhabi in November 1997 reported the first successful tracking by satellite of a houbara that moved from Abu Dhabi to northern China and back again. The bird was released in February 1997, and it covered 6,600 km in just 54 days. It crossed Iran, Turkmenistan, Uzbekistan, and Kazakhstan to summer in the Chinese province of Xinjiang. Eight months later, the bird returned to Abu Dhabi following almost exactly the same route. NARC is now concentrating further research efforts in this region of China. In addition, there is active cooperation between Pakistan, Uzbekistan, and the U.K. to undertake intensive research on the ecology of Central Asian populations.

The confirmation of the integrity of the houbara population from the Gulf to China has given added impetus to international efforts by the Range States, led by Saudi Arabia, to complete a legally binding agreement on joint management of the houbara to ensure that its habitats are properly conserved and that hunting is conducted on a sustainable basis. A draft agreement is now ready for distribution, but the

Action Plan that is intended to be an integral part of the agreement is still required. The National Commission for Wildlife Conservation and Development of Saudi Arabia hosted an expert meeting in October 1998, in Riyadh. The outline of the Action Plan was agreed upon, together with a timetable for its completion. The Bonn Convention Secretariat expected the agreement and Action Plan to be formally distributed by the end of April 1999.

With the situation in Asia and the Middle East improving steadily, the spotlight now increasingly falls on the North African populations. Here, the political situation in Algeria and the far south of Morocco (former Western Sahara) means that pressure from hunting is presently very slight. In Morocco, there have been significant investments in captive breeding centers seeking to restore locally reduced populations. These are now operating at Agadir and near Missour. Perhaps more importantly, the late King Hassan deserves congratulations for creating a substantial Royal Game Sanctuary on the Tamlelt Plain aimed at conserving wild houbara populations. More initiatives like this are needed, not only elsewhere in Morocco, where good populations of wild houbara still survive, but also across the whole of North Africa. Perhaps the time has come for the Maghreb Five countries (Mauritania, Morocco, Algeria, Libya, and Tunisia) to follow the example of the Asian range states and consider how the conservation tools of the Bonn Convention can be applied as successfully in their region.

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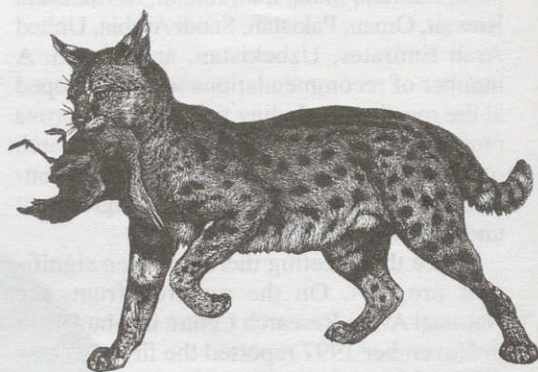
Cat Specialist Group

Tigers dominate the news about wild cats and vie for top place in publicity about wildlife conservation. It is not surprising, considering their charismatic size, beauty, and critical situation. Estimates from the 14 range countries put the probable world population at 5,000-7,000, mostly in sub-populations fragmented by destruction and degradation of habitat as human populations continue to rise and demand space for living and economic development. Deer and wild boars, their main prey, are also food for humans, leading to competition in many areas in which the tiger is losing.

Members of the Cat Specialist Group have been leaders in tiger research and conservation. Their work is summed up in the new publication, "Riding the Tiger: Tiger conservation in human-dominated landscapes", based on the proceedings of a symposium held at London Zoo in February 1997. It is truly a landmark in knowledge of tiger natural history and conservation, with wide application to wildlife conservation in a general sense.

Research on lions has also been carried out but has been fragmented rather than coordinated. Even today, there is no reasonable estimate of the African population of this cat. It is still numerous, but there is good reason to fear for its future because it is increasingly confined to reserves (not necessarily safe) as a result of persecution from livestock owners.

Long-term cheetah research in the Serengeti, Tanzania, has produced valuable data, while in Namibia, where 95% of the roughly 2,500 cheetahs are on farmland, the Cheetah Conservation Fund has been working with farmers to improve ways of protecting livestock. Recently, the opportunity occurred for the Cat Specialist Group to assist the government of the Islamic Republic of Iran in research and conservation of the last Asiatic cheetahs. Preliminary research indicated a possible population of 50-100. In neighboring Balochistan Province of Pakistan, investigation of reports of a surviving cheetah population is under way.



Among the other large cats, the snow leopard has benefited from the work of Cat Specialist Group members affiliated with the Seattle-based International Snow Leopard Trust. Their research suggests a minimum population of 4,500-7,500 in high Asia, compared with "guesstimates" of fewer than 1,000 in the 1960s—but this does not mean that it is not threatened by poaching, illegal killing, loss of habitat, and prey decline. Working closely with the range countries, the ISLT has set up a computerized Snow Leopard Information and Monitoring System (SLIMS). Reducing predation on livestock has been a major focus of ISLT work with local communities.

Livestock predation is the biggest problem confronting cat conservationists. The Cat Specialist Group produced guidelines on management of big cats in the vicinity of human settlements at the request of WWF International and dealt with the problem later in the Cat Action Plan. Members working on tigers, lions, leopards, jaguars, snow leopards, pumas, and lynx contributed to, and are closely involved in, the continuing efforts to bring the level of predation down to acceptable levels and to promote coexistence of people and large cats. The situation differs according to the areas involved. In the Americas and parts of Africa, ranches with many heads of livestock are principally affected. In fact, the level of

predation there has been shown to be very low. It is too, overall, in Europe and Asia, but a dedicated predator and infrequent mass killings can wreak havoc on the wealth and lives of individual livestock owners. Better husbandry would improve the situation but often faces resistance from owners because it demands more work, while protection of natural prey species and their pastures is essential if the cats are not to be forced to turn to livestock.

In Europe, the research for the Cat Action Plan showed how little is known about the lesser cats, even the extent of the range of some of them. Their secretive habits and small size make study very difficult. However, publication of the Action Plan, with its list of priority projects, has promoted research on a growing number of these species. In South America, several teams have been working on the kod-kod (*Oncifelis guigna*) in southern Chile and Argentina and produced valuable reports. The mysterious Andean mountain cat (*Oreailurus jacobita*) had only been photographed twice (during the 1980s) until an expedition to Sala de Surire National Park in northern Chile by a Cat Specialist Group member resulted in 70 photos and video of a cat hunting viscachas (*Lagidium viscacia*) among the rocks behind the houses of a former mining colony.

In Sumatra, infrared-ray-triggered cameras sited along tiger trails have confirmed the presence of the clouded leopard, marbled cat, fishing cat, flat-headed cat, golden cat, and leopard cat in Way Kambas National Park. These camera traps have enabled Indonesian, British, and American researchers working with the Sumatran Tiger Project to identify nearly 40 individual tigers from their stripe patterns in an area where tigers have very seldom been and the population was thought to be much smaller. A similar apparatus has been used successfully in Kerinci Seblat, Sumatra, various reserves in Thailand, and in India.

While members usually find their own funding, some have received support through the Cat Action Treasury, a private initiative in the U.S.A. by the Vice-Chair (Projects), Kristin Nowell. Among those who have contributed funds via CAT are the Barbara Delano Foundation, Bosack and Kruger Foundation, Council

of Agriculture of Taiwan, Exxon Save the Tiger Fund, Chicago Zoological Society, International Snow Leopard Trust, Beyond Extinction-Endangered Cat Foundation, and Siegfried and Roy.

Wild Cats: Status Survey and Conservation Action Plan, edited by Kristin Nowell and Peter Jackson, with contributions from around 200 international specialists, has been a considerable success and has become a standard work of reference. Over 3,000 copies have been distributed, and sales have generated useful income for the operations of the Group. A private donation provided for the heavy mailing costs of this weighty publication to institutions and individual specialists in the Third World.

Most of the text of *Wild Cats* is now available on our Web site (<http://lynx.uio.no/cat-folk>), which is hosted by the University of Oslo and managed by volunteer Nancy Sipos in Toronto. Many researchers are using the site, which has received high praise.

The Cat Specialist Group biannual newsletter, *Cat News*, is now reaching its 15th year of publication and 30th issue. Circulated to all members of the Group, it is also available to anyone interested in wild cats for a small annual donation.

Cat Specialist Group members are affiliated with leading conservation and research organizations, including the Cheetah Conservation Fund, Brazilian Centre for Predator Research, Hornocker Wildlife Institute, International Snow Leopard Trust, KORA Swiss Carnivore Project, Norwegian Institute for Nature Research, Project Tiger (India), Russian Academy of Sciences, Wildlife Conservation Society, and Wildlife Institute of India.

The Chair is deeply grateful to WWF for supporting his work for the past 16 years, as well as funding the publication of *Wild Cats*.

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Coral Reef Fish Specialist Group

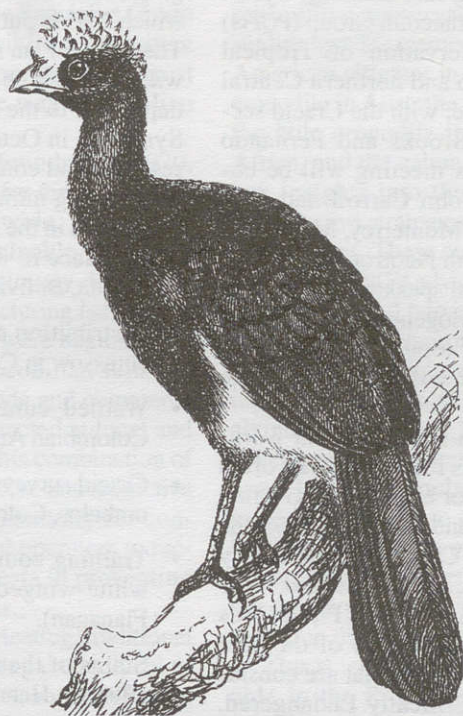
The Coral Reef Fish Specialist Group has the following progress to report:

- A 27-page chapter with numerous maps for the "Global Overview of the Status of Coral Reef Fishes, Global distribution and conservation of coral reef fishes" has been prepared by Callum Roberts, Julie Hawkins, and Don McAllister.
- A presentation entitled, "The distribution of coral reef fish biodiversity: The climate-biodiversity connection," written by Callum Roberts, Julie Hawkins, Alan Strong, Frederick Schueler, and Don McAllister, was given by Don McAllister at the Fourth Session of the Conference of the Parties of the United Nations Framework Convention on Climate Change, Buenos Aires, Argentina, November 1999, and published in *Sea Wind* 12(4): 14-28 (copies of this issue, which also contains other articles, are available for U.S. \$5 each). This presentation was preceded by one given by Thomas Goreau, Global Coral Reef Alliance, on the effects of elevated sea surface temperatures (demonstrated by satellite data) on corals: widespread bleaching and death of coral colonies around the world. The IUCN-US generously paid travel costs. The Roberts *et al.* paper showed that a number of the widespread coral reef areas being bleached or killed by elevated sea surface temperatures from global warming contained high levels of coral reef fish biodiversity, high numbers of endemic coral reef fish species, or important fisheries. This evidence helped convince delegates to the Convention that global warming was already occurring and that the impacts on coral reefs and coral fishes were serious. The combination of satellite sea surface temperature data plus our maps showing high areas of high coral reef fish diversity were most helpful in that they provided a convincing documentation based on science.
- Rainer Froese of ICLARM has agreed to prepare a list of coral reef fishes of the world. Depending on the time frame, this may appear in the Overview or in a later Group publication.
- Patricia Almada-Villela plans to visit Ottawa in 1999 to work on finalizing her chapter surveying the status of coral reef fishes and habitat, country-by-country, around the world.
- A short chapter on the effects of the live reef food fish industry has been prepared for the Overview by Robert E. Johannes.
- The executive committee of the Species Survival Commission approved a new Grouper and Wrasse Specialist Group, chaired by Yvonne Sadovy (University of Hong Kong). The precise area of responsibility for this Group is being defined. But it will include a focus on large groupers and wrasses in the live reef fish food trade. Those species are being threatened by lucrative prices in a very organized market and by the marginalization of fishers in southeast Asia. Increasing their risk to heavy fishing are their high age at maturity, spawning aggregations, and sequential hermaphroditism. The Grouper and Wrasse Specialist Group will liaise and cooperate closely with the Coral Reef Fish Specialist Group and assist the latter Group in reducing the burden of the high number of species for which they are responsible. Dr. Sadovy's experience and location will ensure the success of this new Group.

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Cracid Specialist Group (WPA/BirdLife/SSC)



In an effort to help promote Cracid conservation and research efforts throughout the Neotropics, a number of Regional Coordinators (RCs) have been appointed to help spread the mission of the CSG. They are: Sandra Caziani (Argentina), Edilberto Guzman A. (Bolivia), Fabio Olmos and Mauro Galetti (Brazil), Fernando Gonzalez-Garcia (Central America), Ivan Jimenez (Columbia), Rob Clay (Paraguay), Alfredo Begazo (Peru/Ecuador), Olivier Tostain (Venezuela/Guyana Shield/Caribbean).

Additionally, Gina Sedaghatkish and Alfredo Begazo have officially taken on the role of the Cracid Specialist Group (CSG) Webmaster and Database Coordinator, respectively. The ultimate goal of the CSG Web site is to have a user-friendly information on

Cracids, CSG activities, and publications for scientists and the general public. The objective of the data base project is to accumulate all data on Cracid distribution, available for use by scientists. Alfredo has been accumulating data for this project for some time now, and the database will continue to grow with contributions of additional data.

The CSG has held a number of different Symposia over the last two decades. The primary purpose of these important meeting is to examine detailed reports and updates on Cracid status, distribution, and conservation. Just as important, workshops provide a forum to communicate openly and effectively about several topics relating to Cracid research and conservation. In October 1999, CSG will hold a Regional Workshop focusing on Paraguay/

South Atlantic Forest, coordinated by Dan Brooks and Rob Clay. The Workshop will be held in Asunción, Paraguay, in conjunction with the IV International Congress on Wildlife Management and Conservation in the Amazon. Immediately following this meeting, a joint CSG-Partridge/Quail/Francolin Group (PQFG) Symposium on Conservation of Tropical Galliformes in Mexico and northern Central America will take place, with the Cracid section coordinated by Brooks and Fernando Gonzalez-Garcia. This meeting will be co-hosted with PQFG's John Carroll and Jack Clinton-E. and held in Monterrey, Mexico, in conjunction with the 6th Neotropical Ornithology Congress. Several speakers are lined up to talk about status, phylogenetics, and harvest patterns, among other topics, and the Symposium will conclude with a Round-Table Working Session.

The results of both symposia and workshops are invaluable as references that often result in publication. For example, CSG's first monograph, "Biology and Conservation of the Piping Guans (Aves: Cracidae)," edited by D.M. Brooks, F. Olmos, and A.J. Begazo, is the first definitive work on the genus *Pipile*. This book is very important, as two of the four forms of *Pipile* are endemics that are considered Endangered or Critically Endangered, with the other two species At-Risk where sustainable harvest programs have not been implemented. Most of the contributions are from the Workshop that took place at the 1998 AOU Meetings in St. Louis. The book is 64 pages; half of 12 contributions are extended English abstracts, and half are full text manuscripts, but all contributions have Spanish and Portuguese translated abstracts. For more information on the monograph, please contact Dan Brooks directly (Ecotropix@aol.com).

CSG continues its strong commitment to publication of Cracid research through the trilingual Bol. CSG (Bulletin of the Cracid Specialist Group). This Bulletin has been published and circulated biannually, approxi-

mately every March and September, with generous help from WPA. The Bulletin reaches more than 300 individuals around the globe, predominantly in Latin America. Other recent publications include the Piping Guan Monograph mentioned above, and the Action Plan, which CSG is putting the finishing touches on. The Action Plan should be trilingual also, and will hopefully be out some time this year, perhaps prior to the aforementioned Workshops/Symposia in October. Many excellent Cracid research and conservation projects have been or are being initiated above and beyond those mentioned in the last report. Many of these are taking place in western South America (i.e., Colombia, Bolivia), and include:

- Distribution and status of the blue-billed curassow in Colombia (Andres Cuervo).
- Wattled curassow field research in the Colombian Amazon (Sara Defler).
- Cracid surveys in the Serrania de los Churumbelos, Colombia (Thomas Donegan).
- Training courses for conservation of the white-winged guan in Peru (Jeremy Flanagan).
- Status of the wattled curassow in Bolivia (Bennett Hennessey).
- Interspecific foraging patterns of curassows in the Colombian Amazon (Ivan Jimenez).
- Breeding survey of the southern helmeted curassow in Bolivia (Ross MacLeod).
- Socioecology of Salvin's curassow in Tinigua National Park, Colombia (Juan Parra).

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Crocodile Specialist Group

Since its inaugural meeting of 17 participants in March 1971, the Crocodile Specialist Group has been directly responsible for positive changes in the conservation status of most crocodilian species and the way crocodilian conservation is conducted.

When the Group was founded in 1970, exploitation of crocodilians for their skins was largely uncontrolled worldwide. Volumes of trade were well above sustainable levels and many populations were seriously declining. Hide processing and manufacturing facilities in North America and Europe were beginning to experience shortages of crocodilian skins. In response, laws restricting trade and commerce in crocodilian skins were enacted at local and national levels and CITES. This combination of a declining commercial resource and restrictive legislation provided an opportunity for conservationists and commercial operators to recognize their common interests in preventing the extinction of crocodilians.

At CSG's first Working Meeting, traditional conservation interests including crocodile biologists, conservationists, IUCN, and WWF were represented, but there was also representation from the Reptile Products Association and crocodile farming interests. The proceedings of that first meeting are a mixture of species and national status reports, scientific overviews, trade data, and practical crocodile husbandry information. To a quite surprising degree, themes that have become major emphases of the CSG were visible at that first meeting. In addition to the Group's SSC mandate to "review existing information...; determine national and international research, conservation and management priorities and to devise a mechanism for cooperation and coordination..." the chairman, Hugh Cott, commented on "...the possibility of a regulatory agreement between conservationists and tanners" and "rational exploitation of crocodile populations." The blueprint for action laid down in 1971 served in large part to direct CSG activities over the next three decades.

The primary basis for CSG activities and crocodilian conservation is science. Detailed studies by CSG members on the ecology of the American alligator in the U.S.A., the saltwater crocodile in Australia and Papua New Guinea, the Nile crocodile in Zimbabwe and South Africa, and the caiman in Venezuela provided key insights into the population dynamics, reproductive strategies, and growth potential of crocodilians. These continue to be the foundation for the CSG's advice to countries managing, conserving, and harvesting their crocodilians. These studies also provided a quantitative basis for rapid population estimation using standardized survey techniques to generate population abundance indices. These techniques were developed and calibrated by multiple sampling in well-studied populations over many years of study and continue to serve as an invaluable aid to the determination of species and population status. The expert network of the CSG developed the tools for successful crocodilian conservation that are still used today.

This scientific information is widely available in the Proceedings of CSG's Working Meetings and a number of other significant reports of special symposia, such as that held in Darwin, Australia, in 1985. The CSG, in conjunction with IUCN and the parent agencies of CSG members, has served as the source and disseminator of vital information.

The scientific information has provided the sound basis for proposing regulated harvest of crocodilians within sustainable limits. The CSG's pioneering and consistent support of sustainable use as a conservation tool has been controversial both within the Group and outside it. In every case in which properly designed and implemented programs of sustainable use have been applied to crocodilian populations, those populations are stable or increasing and their habitats remain secure. The greatest difficulties have been experienced in applying conservation action to those species not used in commercial trade where funds and conservation incentives are lacking.

The activities of the Group have involved both intervention in crises and the steady development of a philosophy, and then policy, which in turn have produced regulations, site-specific projects, and recommendations to promote crocodilian conservation. Effectively linking with and using the strengths of cooperating institutions (such as CITES and IUCN regional offices) has amplified our effect. Another effective strategy has been the inclusion as CSG members of individuals in key national decision-making roles. It is not at all unusual for our recommendations to governments to be directed at CSG members who are in position and already primed to implement them. The development of a funding base with the crocodile skin industry has been a decisive advantage but has presented a constant tension that is only resolved by complete transparency and a firm adhesion to conservation benefit as the basic criterion for decisions.

This activity has required the expansion of our member network. The Group adopted a decentralized regional structure that has proven effective. We have empowered regional representatives and individual members to quickly respond to local and regional issues. This quickly alerts the Group to current needs, speeds our response time, and where necessary facilitates intervention from the Chair's office to provide the substance and credibility of an official response that members can then apply and use. Our quarterly Newsletter has been a basic tool for communication and coordination among members.

This activity is reflected in our recently revised Action Plan 2nd edition 1998 and the Proceedings of our recent 14th Working Meeting. Current crocodilian status differs substantially from 1971, with a small majority of species considered not in immediate danger of extinction. Our perception of those species that are now endangered is more firmly grounded on information and more focused toward remedial action. We are more often recommending removing species from the Red List or downgrading them based on the new IUCN criteria. The criteria themselves received intense critical examination, resulting in suggestions for modification in their application to very long-lived organisms.

For the future, there are numerous elements of crocodilian conservation that require attention. Applying conservation to several Critically Endangered non-commercial species is our current priority, and we are considering how economic benefits from commercial species might be applied to non-commercial ones. The increasing sophistication of sustainable use theory, involving economic and social elements in addition to biological factors, will require us to continue to evaluate programs and develop creative new ways to apply our scientific information. Recent economic assessments of crocodile use programs are giving ambiguous indications of their incentives for habitat conservation. More detailed analysis is needed. A shift in commercial use of crocodilians from traditional centers in North America and Europe to the developing world (particularly China) requires us to expand our network and effectiveness in those regions. New challenges to crocodilian survival involving subtle effects of contaminants on developmental biology need research. New techniques such as DNA analysis provide new scientific tools and insights. The effectiveness of public relations in crocodile conservation and the CSG's role in that field is currently under review. The very success of our activities creates new concerns as more croc populations recover in numbers and increasingly attack people and livestock, requiring management and control measures, as well as public education.

The continual rejuvenation of the Group, recruiting active young crocodilian specialists, is vital to ensure future vigor. We continue to strive for better gender balance in a field traditionally seen as male-dominated by increasingly attracting competent and enthusiastic women. In a smaller, faster electronic world we have enthusiastically adopted the modern tools of e-mail and Web pages to promote our work, but also face crises at a dizzyingly rapid rate. We believe that the application of our flexible conservation philosophy, based on a firm foundation of current science and implemented by our decentralized network, will enable us to continue progress in crocodilian conservation.

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Deer Specialist Group

The Deer Specialist Group convened a field method training workshop in November-December 1998. The participants were from universities and conservation NGOs in five countries—Peru, Chile, Argentina, Uruguay, and Brazil. The instruction team consisted of Chair Chris Wemmer, Smithsonian ecologist Bill McShea, DSG Regional Coordinator Susana Gonzalez, Mauricio Barbante (UNESP), Walfrido Tomás (EMBRAPA, Brazilia), and Mariano Merino (University of Buenos Aires). The workshop was hosted by the University of São Paulo, Jaboticabal, and was generously funded by FUNSP and the Friends of the National Zoo (Washington, D.C.).

This was the initial step in implementing Phase One of the Action Plan: to build local capacity in range countries through training and to secure scientifically reliable statistics on wild populations of threatened deer. The workshop took place at the University of São Paulo, where Dr. Barbante is heading a major research effort funded by CESP on the marsh deer (*Blastoceros dichotomus*) population that will be inundated by the damming of the Rio Paraná at Porto Primavera. This issue provided fodder for workshop discussion. Lectures focused on deer biology and conservation, and three teams were formed to propose prioritized conservation actions for pampas deer (*Ozotoceros bezoarticus*), huemul (*Hippocamelus bisulcus*), and brockets of the genus *Mazama*.

Following the lectures, the class drove to EMBRAPA's Agricultural Field Station in Mato Grosso do Sul. The reward for the 22-hour trip was the splendid fauna and flora of the pantanal. Morning field exercises alternated with afternoon discussions and the presentation of project reports. Facilitated sessions were used to resolve conflicting opinions regarding priorities. Instructors and participants returned to Jaboticabal after five days for wrap-up. Seven small grants were then awarded for specific projects and ongoing work of the DSG's Latin

American office in Montevideo. Two DSG members will undertake conservation reconnaissance missions in 1999 to Bolivia and Paraguay, where little information has been forthcoming.

The DSG Web page was posted in June; a Spanish version is now being prepared by Susana Gonzalez. A new module on population estimation methodology will be drafted by Walfrido Tomas and posted in English, Spanish, and Portuguese versions in 1999. In addition to fund-raising for DSG projects, the Chair also drafted letters to São Paulo's Governor Mario Covas supporting UNESP's proposal for funding from CESP and various other organizations that responded to the consequences of damming the Paraná river at Porto Primavera.

Four years of data have now accumulated on the Burmese brow-antlered deer in Chatthin Wildlife Sanctuary, Myanmar. With funds from a private donor, the entire range of the species in Myanmar was surveyed in 1997. Staff of the Wildlife Division traversed 875 km of transects in 63 forest fragments. Deer were found in 23 townships along the western edge of the dry zone of the Irrawaddy drainage. The species was found exclusively in dry deciduous forest, particularly dipterocarp forests. The mahamyaing region along the Chindwin River was identified as excellent habitat that may form the basis for a new sanctuary. A population viability analysis of the species will be undertaken in early 2000 as a joint effort with the CBSG.

The DSG Action Plan was published in December 1998. Bill McShea will host an August meeting of the DSG at a conference on Ecology and Management of Ungulates in Nelson, B.C., in August 1999. The DSG will also be represented at the 4th Amazon Wildlife Conference in San Lorenzo, Paraguay, in October.

*Chris Wemmer, Chair
Deer Specialist Group*

Diver/Loon Specialist Group (WI/SSC)

The Diver/Loon Specialist Group of SSC/Wetlands International is less than five years old. Its stated primary objective is to facilitate communication among loon researchers worldwide. Thus a special effort was made to develop an efficient communication network among loon researchers living in both the old and new worlds. To achieve this objective, two approaches were used.

A directory with the indication of research or management interests of participating loon/diver researchers and managers was developed and distributed along with the first newsletter produced in 1977. The next issue of the Diver/Loon Specialist Group Newsletter will be available on the Internet (www.briloon.org/diver) in June 1999. An updated directory containing well over 100 names in 14 countries will also be distributed in 1999.

Scientific workshops are the major medium of communication among members of the D/L Specialist Group. The proceedings or extended abstracts of these workshops are published speedily after the meetings. The themes and topics of these workshops are selected from the members' suggestions.

These workshops/symposia are usually held in association with the meetings of other scientific or bird organizations. In North America this has been done in close cooperation with the Research Committee of the North American Loon Fund, a volunteer nonprofit organization.

The first such symposium took place in association with the 15th Annual Symposium of the North American Lake Management Society, "Aquatic Ecosystem Stewardship," Toronto, Ontario, Canada, in 1995 with participation from Europe. The abstracts of this symposium were published in the *Journal of Lake & Reservoir Management*. Similar gatherings took place with abstracts or proceedings published in Fredericton, New Brunswick, Canada, in August 1996 (with the Canadian Ornithologists Society Annual Meeting) and in Minneapolis, MN U.S.A., in August 1997 (with the American Ornithologists' Union Annual Meeting). The Proceedings of the Minneapolis Loon Symposium will be published by the North American Loon Fund. An International Loon Seminar at Viskadalen, Sweden, is planned in August 1999.

The Diver/Loon Specialist Group will continue to provide input to world loon population estimates. The improvement in the accuracy of the world loon population estimates and the monitoring of population trends remains a major objective of our Group.

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Grouse Specialist Group

Grouse Action Plan

The major activity of the Grouse Specialist Group during the past 12 months has been preparation of the first Grouse Action Plan, to be printed in late 1999. The Action Plan will be a tool for promoting grouse conservation, besides providing a reference and guide to the distribution, status, and threats to all grouse species. The Action Plan's major objective is to identify grouse conservation priorities from a global perspective. The GSG hopes that this Action Plan will strengthen the chances of implementing the most immediate conservation needs to improve the viability of the most threatened species and subspecies. They are the Grouse Specialist Group's primary concern. The Action Plan, however, shall also underline the importance of grouse conservation in a broader sense; as typical representatives of a whole spectrum of natural tundra, grassland, and forest habitats of the northern hemisphere, grouse are indicators of ecosystem health. Their indicator function and attractiveness to people make them suitable flagship species to promote biodiversity conservation.

From a global perspective, and compared to other galliform taxa, the situation of the grouse at the turn of the century is not critical. So far, their extended distribution ranges and inaccessible habitats have effectively protected most grouse species. None of the 17 species is considered to be Critically Endangered. However, they are far from being safe, either. Three species with limited geographic distribution (the Caucasian black grouse, the Chinese grouse, and the Siberian grouse) are red-listed as Near Threatened and may be Vulnerable. Some subspecies are considered to be Threatened, but the intraspecific taxonomy of the widely distributed species is still uncertain. Locally and regionally many grouse populations are declining and threatened with extinction. This is particularly true in landscapes densely populated and intensively used by humans. Even in remote northern areas, grouse numbers have declined due to increasing development and habitat exploitation.

Chinese Grouse Project

The GSG supports an ongoing research and conservation program on the Chinese grouse, *Bonasa sewerzowi*, by the GSG's committee member Sun Yue-Hua of the Chinese Academy of Sciences and his co-worker Fang Yun. The Chinese grouse is a close relative of the hazel grouse and occurs in a limited range in central China. The species is threatened by habitat loss and fragmentation, and little is known about its ecology and behavior. The GSG has helped to find funding for the project. From 1995 to 1998, the bird was studied at Lianhuashan Natural Reserve in Gansu Province. More than 50 birds were radiotracked, revealing insight into habitat-relationships, spacing patterns, and behavior. In 1999, research into the effects of habitat fragmentation on population dynamics and persistence of the Chinese grouse has been started as a cooperation between the National Natural Sciences Foundation of China (NSFC) and the Deutsche Forschungsgemeinschaft (DFG) to support the project. Additional small grants have been provided by The Stiftung Avifauna Protecta (SAP) and the BP Conservation Program. Finances for the continuation and completion of the project are still lacking.

8th International Grouse Symposium

The 8th International Symposium on Grouse will be held at the Arctic Center in Rovaniemi, northern Finland, in September 1999. The local host will be GSG committee member Harto Lindén. We invite all colleagues to join us in Finland to recreate the stimulating scientific forum to discuss grouse biology, ecology, management, and conservation.

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Lagomorph Specialist Group



The popular image of lagomorphs is that they are both abundant and highly fecund. Indeed, we often describe organisms with high reproductive rates as “breeding like rabbits.” Rabbits and hares are heavily hunted for food or sport in many ecosystems throughout the world, lending credence to the idea that they can continue to sustain a high level of harvest. One species, the European rabbit, has even proved to be one of the world’s most successful colonizers, wreaking havoc in many of the ecosystems in which it has been introduced (particularly in Australia and on oceanic islands). All of these images support the notion that rabbits and hares (and lagomorphs in general) are unlikely candidates for conservation concern. Rather, we might expect that the management of lagomorphs should focus on sustainable yield or control issues. These are genuine and important management concerns, and the Lagomorph Specialist Group (LSG) includes scientists dedicated to addressing these issues.

The key achievement of the LSG, however, is represented in its work on those lagomorphs that, contrary to common opinion, are among the most endangered vertebrates on earth. The membership of the LSG includes leading scientific specialists on rare and endangered lagomorphs. *Rabbits, Hares and Pikas: Status Survey and Conservation Action Plan* (1990, edited by Joseph Chapman, former LSG Chair, and John Flux) incorporated not only the most comprehensive treatment on the biology of lagomorphs, but constituted the first global synthesis on the status of the lagomorphs. And the results were chilling. We now consider almost one-quarter of all rabbit and hare species, and about one-fifth of pika species, to be globally threatened using IUCN/SSC quantitative criteria. Additionally, many isolated subspecies of otherwise common species are globally threatened. Working through its membership, the LSG has brought attention to these endangered forms, conducted surveys and

analyses on their status, and initiated conservation action to maintain the biodiversity of lagomorphs worldwide.

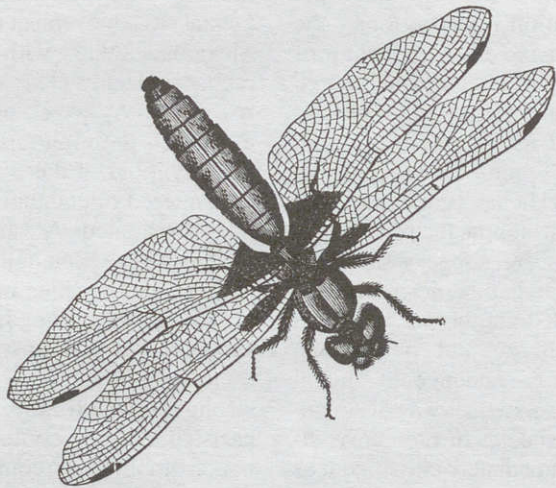
I would like to highlight some recent examples of the accomplishments of the hardworking volunteers in the LSG. A "Riverine Rabbit Project" has just been launched to address causes of endangerment of this form and to put into action conservation interventions—the first such comprehensive effort on behalf of this South African species. The endangered Hispid hare of India and Nepal is the focus of an integrated habitat management protocol sponsored by an LSG member. Several LSG members have visited Hainan Island, PRC, and made recommendations for the management of the vulnerable Hainan hare, a species subject to widespread harvest and habitat destruction. A Japanese team of LSG members is the focal point for biological surveys and conservation recommendations for the endangered Amami rabbit in southern Japan. Recently a LSG member described a new species of rabbit, *Sylvilagus robustus*, and immediately classified it as endangered. Some of the leading genetic laboratories worldwide working on lagomorphs are directed by members of the LSG, and one of these was chosen recently to determine the systematic status of an entirely new form of lagomorph discovered in southeast Asia. LSG members have surveyed the highlands of central Asia and found new species of pikas and gathered data to help determine the status of many other rare pikas in the region. An unknown European population of the steppe

pika was discovered and its conservation needs assessed. The LSG, working in close contact with the Pika Fan Club of Japan, used analyses based on the Hokkaido population of the northern pika to successfully halt a major construction project that would have jeopardized Japan's largest wilderness national park—and in the process greatly empowered the environmental NGO movement in that country. And, in Mexico, a country with the largest number of rabbits and hares (15)—and LSG members—a recent PHVA workshop comprehensively examined the eight species endemic to the country. Four of these are listed as critically endangered or endangered, the other four as near-threatened. A variety of conservation activities have been outlined or put into action to preserve this center of lagomorph diversity.

These stories are largely of projects in progress—as our conservation work is never done. The LSG feels that it has become stronger through time. Many members have assisted in group communication, and members from different countries are now sharing their expertise with others. The future for the LSG will hopefully see a strengthening of these ties, and of the focus for conservation that we can bring to a generally misunderstood group of mammals—the lagomorphs.

Andrew T. Smith, Chair
Lagomorph Specialist Group
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Odonata Specialist Group



The Odonata Specialist Group was formed in 1980 and held its inaugural meeting that year at Kyoto in Japan. This was a particularly appropriate venue as dragonflies have such an important role in Japanese art and culture. The Odonata Specialist Group was one of the first invertebrate taxon Specialist Groups to be established. The Odonata Specialist Group has to deal with a large number of species about which little is known. Over 6,000 species of dragonflies have been described, and many await description. Most species depend upon habitats in rain forests. Outside the temperate regions little is known about the distribution and ecological requirements of most species.

The Odonata Specialist Group was the first organization to be established specifically to further the conservation of dragonflies. Throughout its 19 years of existence its main role has been to provide an international forum and focus point for those concerned with dragonfly conservation. The Odonata Specialist Group holds a meeting every two years at the beginning of International Symposia on Odon-

atology. These meetings are open to all attending the Symposia and facilitate a vigorous exchange of views between a wide range of people concerned with dragonfly conservation. Reports of the meetings are summarized in a small journal entitled, "Reports of the Odonata Specialist Group, Species Survival Commission, International Union for Conservation of Nature and Natural Resources (IUCN)." The journal also publishes reports on studies relevant to the conservation of dragonflies.

The Odonata Specialist Group provides logistical support to individuals seeking financial dragonfly conservation studies throughout the world. Two examples are given below where valuable work has been done by odonatologists of several nations, including two members of the Odonata Specialist Group.

There are a few dragonflies with notably isolated taxonomic positions, making them extremely interesting and worthy of special conservation efforts. They are the odonatological equivalents of the tuatara (*Sphenodon*) and the coelacanth (*Latimeria*). One of them is

Epiophlebia laidlawi, the Himalayan relict dragonfly. It is one of the two surviving members of the suborder Anisozygoptera that is well-represented in the fossil record. The members of the Anisozygoptera are intermediate in structure between those of the Zygoptera (damselflies) and those of the Anisoptera (true dragonflies). For years *Epiophlebia laidlawi* was only known from its larva; almost nothing was known of its biology. It was thought to be very rare. The adult has now been observed in a number of places in the Himalayas, and information has been obtained about its oviposition and other habits. *Epiophlebia laidlawi* occurs in one area that is protected, and we now have information on which to begin plans for its conservation. It should be noted that the other surviving Anisozygopteran, *Epiophlebia supersies*, is a famous and much-appreciated member of the Japanese odonate fauna and is well-protected.

Another outstanding dragonfly is the Australian species, *Hemiphlebia mirabilis*, the sole member of the super family Hemiphlebioidea. It is a highly specialized species with very ancient affinities. It was discovered in 1912 but for many years was thought to be extinct. Its rediscovery was confirmed in 1985 when its presence was confirmed in a National Park in Victoria. Since then it has been found in three other localities in Victoria, two in Tasmania, and one in Flinders Island in the Bass Strait. Much has been learned about its requirements in the reed beds in which it lives. Its future survival is assured. The work done on this fascinating little damselfly has enabled us to transfer it from the Red List category Endangered to the category Vulnerable.

Work such as that described above takes a long time to conduct; since dragonflies have virtually no known economic importance, financial support for research is negligible. Therefore the Odonata Specialist Group has spent much time recently determining a prac-

tical strategy for the conservation of dragonflies, which takes into account the huge gaps in our knowledge and the slowness in acquiring it, while all the time the continual destruction of rain forest and other habitats threatens more and more species. In these circumstances only a broad-brush approach can hope to conserve the hundreds of species under threat. The Odonata Specialist Group concludes that the only practicable way to conserve large numbers of odonate species is the establishment of large protected areas covering the main biotope types throughout the world. The strategy and action proposals in its support are outlined in the recently published *Status Survey and Conservation Action Plan Dragonflies* (IUCN 1997).

As regards the future, the Odonata Specialist Group will endeavor to implement its strategy. Apart from supporting efforts to establish a worldwide network of representative biotope Protected Areas, it will concentrate on activities that are dependent on odonatological expertise. It will identify those "hot spot" areas that contain exceptional numbers of threatened endemic species so that these can be included in the worldwide network of representative biotopes, if that is not possible, can be protected by other means. In addition it will identify species of special interest that are known not to occur in representative protected areas or in areas likely to be chosen as such in the future. The habitats of these species will also have to be protected by other available means. To achieve these objectives and to facilitate all our work, our key priority for the next few years is to establish a conservation database. This will give us crucial support in identifying priorities for research and conservation measures.

Norman W. Moore, Chair
Odonata Specialist Group

Partridge, Quail, and Francolin Specialist Group (WPA/BirdLife/SSC)

Members of the Specialist Group continue to make progress on a number of fronts. We are seeing increases in activity on key species in both Africa and Latin America. The proceedings of the Malaysia Galliformes Conference held in September 1997 came out as a special edition of Bird Conservation International. Important papers on the Sichuan hill partridge (*Arbophila rufipectus*) and Hainan hill partridge (*A. ardens*) were included. The proceedings also included an opinion piece by Phil McGowan, Pete Garson, and John Carroll on their views of the values and limitations of Action Plans for conservation.

Our five-year Action Plan, completed in 1995, is rapidly coming to a close. We are working on the second plan to cover the years 2000-2004. We plan to have this completed late this year. Rich Fuller has been contracted to assist with this effort under the auspices of the World Pheasant Association (WPA). Plans are also underway for the next International Galliformes Conference, to be held in Katmandu, Nepal, in September-October 2000. This will be held in conjunction with the Pheasant Specialist Group and WPA.

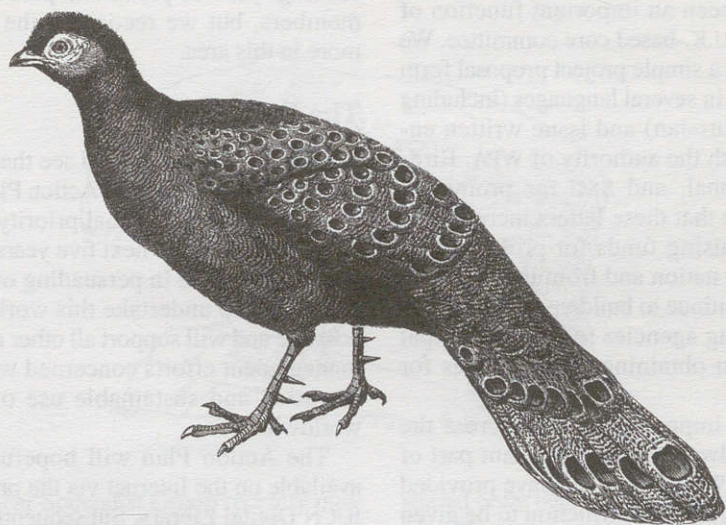
Work is continuing on the orange-necked hill partridge (*A. davidi*) thanks to the Species Survival Commission and Chicago Zoological Society. A grant awarded through the Specialist Group is allowing Nguyen Tran Vy to continue status surveys in the vicinity of Cat Tien National Park in Vietnam. In Africa, Eric Sande has made enormous strides in our understanding of the biology of Nahan's francolin (*Francolinus nahan*). His studies at the Budongo Forest Reserve in Uganda include critically needed population and life history

data on this obscure species. He completes his field work in August 1999 and returns to Makerere University to begin work on his thesis. In Queretaro, Mexico, Jack Eitnien and his team from the Center for the Study of Tropical Birds discovered a new population of the bearded tree-partridge (*Dendrotyx barbatus*). This population is completely outside of the historic range and appears to be more secure than most of the other small and isolated populations previously surveyed. The Specialist Group endorsed a proposal by Gao Yu-Ren of the South China Institute of Endangered Animals for continuation of his work on the Hainan hill partridge.

The Specialist Group is making slow and steady progress despite the fact that most of our members are severely impeded by lack of money. Several of our members participated in a workshop on field techniques for Galliformes in India during March 1999. Christine Dranzoa and John Carroll are planning a similar workshop for Uganda. They hope to have funding to run it after the 2000 Pan-African Ornithological Congress, to be held in Kampala. Our Group activities are kept up to date on our Web site (<http://www.game-conservancy.org.uk/pqf/index.htm>) thanks to support of James Long and The Game Conservancy Trust.

John P. Carroll, Chair
Partridge, Quail, and Francolin
Specialist Group (WPA/BirdLife/SSC)
E-mail: jcarroll@smokey.forestry.uga.edu

Pheasant Specialist Group (WPA/BirdLife/SSC)



Founded in June 1993, this Specialist Group is younger than most. However, its birth was a natural consequence of a long history of interest in pheasants from artists, hunters, collectors, aviculturalists, and most recently conservationists. Pheasant aviculture was fostered by the British in India as far back as 1860 and was later championed by Dr. Jean Delacour, who collected and bred many Asian species in France during the 1920s and '30s. The World Pheasant Association (incorporating all Galliformes) was founded under his presidency in 1975 and immediately set about encouraging and supporting field projects, as well as aviculture and a series of International Pheasant Symposia, the fifth of which took place in Pakistan in 1992.

Action Plans

The idea of preparing Action Plans for Galliformes was put to WPA by Simon Stuart of SSC, and it was agreed that five new Specialist Groups would handle this task. Experts on pheasants, megapodes, partridges, quails, and francolins met with representatives of BirdLife

International and the Conservation Breeding Specialist Group at Antwerp Zoo in 1993 for a Conservation Assessment Workshop.

The Pheasant Action Plan concluded with outline briefs on 25 projects considered to have international priority. These were adopted as the program for the Specialist Group for the period 1995-1999, although much other work has been fostered and undertaken. As we come to the end of the first Action Plan, a formal audit is in progress. Only three of the 25 projects remain uninitiated. We have already given an informal impression of the usefulness of this whole exercise, concluding that it really did focus attention on priorities, thereby stimulating new work on our selected topics and species. As a result we have committed ourselves to the production of a second Action Plan to cover the period 2000-2004. We are currently working with BirdLife International and a common pool of international contacts toward agreed texts, threat categories and criteria, and late 1999 publication dates for our Action Plan, and their Birds to Watch 3 and Asian Red Data Book for Birds.

Other Key Functions

This Specialist Group, like most others, is a voluntary, self-help network without the resources to fundraise or to fund and execute projects itself. Giving advice on project plans has therefore been an important function of the 10-person, U.K.-based core committee. We have developed a simple project proposal form with guidelines in several languages (including Chinese and Russian) and issue written endorsements with the authority of WPA, BirdLife International, and SSC for promising plans. We hope that these letters increase the prospects of raising funds for projects both within the host nation and from international sources. We continue to build up a list of international funding agencies to assist principal investigators in obtaining project funds for themselves.

Training to improve expertise across the network will always be an important part of our work. The WPA Symposia have provided a great opportunity for instruction to be given and information exchanged on field and avicultural techniques, computer software application, and the statistical analysis of data. In a significant extension of this area, a techniques workshop specifically designed for young Asian fieldworkers was held in the Great Himalayan National Park in India during March 1999. This was organized by the Wildlife Institute of India and funded by WPA and the State Government of Himachal Pradesh.

Communication breeds enthusiasm, but symposia and workshops are infrequent and can involve only a fraction of the interested global audience. Thus we try to keep the whole conservation community abreast of all developments relating to pheasants via our newsletter *Tragopan*, produced twice yearly, with Issue 11 due out in August 1999. It can be found at www.game-conservancy.org.uk/.

Of course projects do not finish when research teams emerge from the field or the aviary complex. Good, prompt report writing is essential if important messages arising from new work are to reach their target audiences in government departments, NGOs, research

institutes, and universities. So we also help principal investigators to prepare reports and publications in English. The continuing series of WPA International Symposia on Galliformes (Malaysia, 1997; Nepal, 2000) and their proceedings provide prominent platforms for our members, but we recognize the need to do more in this area.

The Future

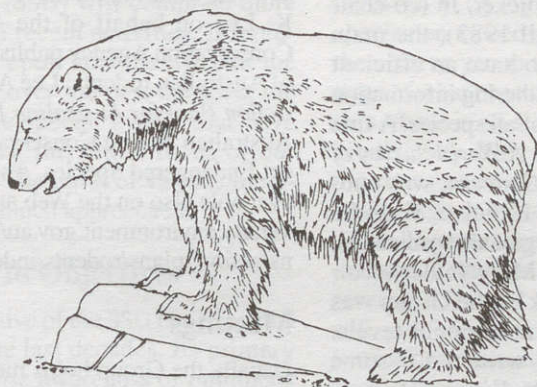
The immediate future will see the publication of a second edition of the Action Plan, detailing a new set of international priority projects as our program for the next five years. As before, we will be active in persuading our members and others to undertake this work as soon as possible and will support all other research and management efforts concerned with the conservation and sustainable use of pheasants worldwide.

The Action Plan will hopefully become available on the Internet via the proposed new IUCN Digital Library. Subsequently, we anticipate making much more information available on our core activities, projects, and members through a regularly updated Pheasant Specialist Group Web site.

We seem to have a good system for screening, improving, and endorsing projects, and for training in techniques. However, our track record on ensuring that good reports appear quickly and that publications are produced in prominent international journals is less impressive. Improving our support to principal investigators in this area seems likely to require one-to-one working assignments for our most able members to work alongside the less experienced. This will require new sources of funds to be explored, but it must be done if the work of this Specialist Group's members is to become more professional and visible, and therefore more influential as a cause for conservation or management action.

*Peter J. Garson, Chair
Pheasant Specialist Group
(WPA, BirdLife, SSC)*

Polar Bear Specialist Group



The Polar Bear Specialist Group recently published the Proceedings of the Twelfth Working Meeting, held in February 1997 in Oslo, Norway. Copies are available from the IUCN Publication Services Unit. Also recently published is *Bears, Status Survey and Action Plan*, by the Bear Specialist Group and the Polar Bear Specialist Group.

The member countries and associated specialists have been focusing efforts on important research and management priorities during the interim period between working group meetings. These include: monitoring PCB levels and potential effects on polar bear immune systems in the Svalbard Island complex; continued efforts to refine population boundaries and better understand sustainable harvest levels or the effects of harvests; evaluating new techniques to conduct aerial population censuses; evaluating the relationship between bears, seals, and sea ice conditions; and evaluating new research techniques to evaluate populations through genetics, as well as detecting polar bear dens beneath snow using infra-red thermal sensing technology. Management arrangements for

shared polar bear populations continue to operate effectively in the Southern Beaufort Sea between the Inupiat of Alaska and the Inuvialuit of Canada. A new bilateral polar bear conservation agreement between the United States and Russia for polar bears in the Chukchi and Bering Seas has made steady progress toward completion. Canada continues discussions with Greenland for developing similar conservation agreements for populations shared between these countries in Davis Strait and Baffin Bay areas.

The strong commitment of coordinated scientific efforts of the Polar Bear Specialist Group have helped to ensure an effective "Agreement for the Conservation of Polar Bears" as envisioned by the Parties when signed in 1973. Yet continued efforts are necessary to ensure the future success of this Agreement.

Stanislav Belikov and Scott Schliebe
Co-chairs, Polar Bear Specialist Group

Rodent Specialist Group

The Rodent Specialist Group was constituted in 1980 by Ken Myers. At the beginning, under the chair of William Z. Lidicker, Jr. (co-chair with James L. Layne until 1983), the main effort of the Group was to have an efficient organization and to start gathering information on the conservation status of all species. A first summary entitled *Rodents: A World Survey of Species of Conservation Concern*, was published in 1989, edited by Lidicker, with the contributions from the 13 regional coordinators.

Subsequently, under J. Mary Taylor (chair 1989-1993), the main task of the Group was to develop Action Plans at regional levels. Action Plan drafts were written for some regions (U.S.A. and Canada, Europe, Western Asia, Indian subcontinent, and Australasia).

In 1994 I was appointed as chair and I have followed the path laid by the previous chairs.

During the last triennium the Rodent Specialist Group worked at the organization and the preparation of the Action Plans for the different regions. The first to be completed was the Action Plan of North American rodents (U.S.A. and Canada) published in 1998. A draft was prepared for the South American Region; Action Plan drafts for Central America and Russia are in progress. The difficulties in getting in touch with some regional coordinators (Africa, Eastern and Southeastern Asia) made it impossible to implement the activity of the Group in these areas.

Our goal for the future is to ascertain the status of all rodent species through the publication of the Action Plans of the 12 remaining regions. This can be achieved by developing a more efficient way of communication among members, especially for those areas for which the Action Plans are at the moment not implemented. Considering that about 50 rodent species have been described since 1993, the drafts already available should be updated and rewritten following also the scheme of the North American one, and then published as soon as possible.

Regional Activities

The Australasian members coordinated by A. K. Lee on behalf of the Australian Nature Conservation Agency published an Action Plan of Australian rodents: Lee A.K. (ed) 1995. *The Action Plan for Australian Rodents*. Canberra, Australian Nature Conservation Agency, Project Endangered Species, Australia; 130: 62 pp. available also on the Web at http://www.biodiversity.environment.gov.au/plants/threaten/plans/action_plans/rodents/index.htm

Meetings

Usually the Group holds meetings in occasion of the International Theriological Congress (every four years). In 1997 the Group met in occasion of the 7 ITC (Acapulco, Mexico). Another meeting was held in Santiago de Compostela (Spain) during the Euro American Mammal Congress (1998), where the following reports were presented: Generalities of IUCN and SSC (M. Gimenez Dixon); Rodent conservation: coping with diversity and limited resources (G. Amori and S. Gippoliti); Ecological factors controlling the presence of the Cabrera's vole (*M. cabrae*) in Portugal; The common hamster, conservation methods and conservation problems (U. Weinhold); Two "case histories" of jumping mice in Colorado and New Mexico (D. Hafner); Southeast Asian rodents: conservation trends and needs for the 21st century (L. Ruedas).

Publication

Hafner D. J., Yensen E., Kirkland G. L. Jr. (compilers and editors). 1998. *North American Rodents. Status Survey and Conservation Action Plan*. IUCN/SSC Rodent Specialist Group. IUCN, Gland, Switzerland and Cambridge, U.K. x + 171 pp.

Internet service is in progress: <http://fauna.varbio2.unimi.it/iucnrodents>

Giovanni Amori, Chair
Rodent Specialist Group

Seal Specialist Group

It is the 50th anniversary of SSC and in honor of this event, this report from the Seal Specialist Group (SSG) will comprise more than a mere list of recent activities. It represents a reflection upon how the work of the SSG has changed over the past decades, the way we work, the special events that have occurred, and what the future focus of our activities will be. The input of various members of the SSG is much appreciated.

Developments in Objectives

The primary objective of the SSG has remained consistent over the last decades. Its primary goals are to increase awareness of pinnipeds and their conservation needs and to promote activities that prevent the decline of populations and extinction of species. However, the focus of actions and the means to achieve these goals have changed, parallel in a shift in people's attitude toward pinnipeds. Pinnipeds are now appreciated as an essential and valuable component of healthy marine ecosystems. Other changes include: attitudes regarding pinnipeds as a common inheritance to be conserved in their own right; attitudes among groups that consider pinnipeds as a resource to be harvested; and attitudes among groups that consider them undesirable competitors.

Early conservation activities were predominantly aimed at preserving small groups, populations, or species, threatened and severely declining as a result of direct human influence such as overhunting or by indirect effects, often of unknown causes. These activities were often driven by a strong concern about animal welfare considerations and indeed quite often stemmed from such initiatives. But gradually the nature and focus has changed toward larger units of protection, e.g., populations instead of individuals or colonies. It became clear that simply trying to isolate populations/species from direct human impact was only a form of damage limitation and that conservation action had to be considered in the context of the wider ecosystem. Next to biomes in the biosphere, the largest unit within nature's hierarchical

structure seems to be an ecosystem. But there are major practical and theoretical problems involved in trying to manage populations or species on an ecosystem scale. For example, there are as yet no universally accepted definitions of what constitutes an ecosystem. In addition, there is no standard on how to measure biodiversity. This makes it difficult to assess the status of ecosystems in terms of having a low or high, increasing or decreasing diversity. There is general recognition that conserving ecosystem function is to be preferred over conserving individual species. However, there are still questions to be resolved. The principal one is which of the many definitions of biodiversity should be used in an operational sense. Should it be species diversity, ecosystem diversity, or genetic diversity, and should we allow species to be lost as a result of natural fluctuations?

Changes have also occurred in the views of those considering pinnipeds to be harvestable resources. The shift from subsistence hunting to commercial sealing almost always leads to maximizing catch for obtaining products and/or for removing animals as competitors. Experience has shown that this can easily lead to severe depletion of many stocks and species. It is now recognized that this will bring only short-term revenues. As a result of international debate and pressure, the process of setting catch quota is no longer carried out in isolation and in an uncontrolled manner and has become more transparent and subject to scrutiny by international management fora. Nevertheless, it has become clear that we need a more conservation-oriented style of management in which conflicting views have to be accommodated.

Major Achievements

By the nature of the work of the SSG, the Group is more a facilitator than an enterpriser itself. It collects and analyzes information on the conservation of pinnipeds in order to translate this into recommendations for specific management or into a viewpoint on particular issues. Achievement in this context should be

interpreted as progress made in conservation of species/populations or awareness.

One group of species to which many efforts of the SSG have been devoted is the monk seals. Particular in conservation activities regarding the Mediterranean monk seal is our involvement longstanding and was intensified during a period in which the European Commission had a special program on monk seals. This resulted in the drafting of a Monk Seal Status Report and Action Plan, published by IUCN. Several actions regarding the monk seal have been undertaken by different organizations, each acting in accord with its own agenda. The role of the SSG in these actions has always been to act as an objective, scientific advisory body. The SSG was heavily involved in conservation actions regarding the monk seals in the Western Sahara (Morocco and Mauritania). On request of the European Commission, it formed a Steering Committee for the Spanish LIFE/CE Monk Seal Project, aimed at: 1) investigating the demography of the colony in the Western Sahara, 2) the environmental and anthropogenic threats to the colony, 3) the design of a management plan, and 4) investigating the costs and benefits of translocation of animals as a way to reduce the risks for the colony being concentrated in a very few sites. We invited the Reintroduction Specialist Group to join us because of its expertise in this area. This project has generated a wealth of new population data on the colony, which are an excellent basis for the protection of the colony and have increased our knowledge on the biology of the species. At the same time, we have contributed to an extensive study and debate on the advantages and disadvantages of translocation, in order to evaluate the risks to the parent colony and to the animals transported. Unfortunately, the colony was hit by a severe mass mortality in 1997, most likely caused by toxic algae. The SSG played a central role in coordinating rescue actions by organizing an Emergency Meeting, drafting an Emergency Rescue Plan, co-organizing the implementation of the plan, and raising funds for this. The SSG further organized a Workshop on the Causes and the Consequences of the 1997 Mass Mortality, and published a report on its outcome.

The SSG was also involved in larger-scale conservation initiatives for monk seals in Madeira and in Greece. A workshop on Population Viability Analyses for monk seals in Greece was co-organized with the Conservation Breeding Specialist Group. On a more general level, the SSG initiated and participated in the drafting of a Conservation Management Plan for monk seals in the Western Sahara coast. This was carried out at the request of UNDP and involved discussions with both Moroccan and Mauritanian authorities, research institutions and NGOs. The plan has been presented to UNDP.

The SSG was also involved in an expedition to investigate the supposed extinction of the Caribbean monk seal. The expedition did provide some circumstantial evidence of relatively recently observations of some individuals of that species. Another expedition, supported by the SSG, is planned to further investigate.

A more general activity, but certainly requiring much effort, the Pinniped Action Plan was drafted. This was a major exercise and consumed most of the time our members had available for IUCN-related work. The SSG is promoting implementation of pinniped conservation actions by government agencies and conservation organizations to achieve recovery of severely threatened species to viable population levels.

A specific effort has been the SSG participation in the modifications of the IUCN Red List Categories. The 34 species of pinnipeds and their various subspecies, divided into three Families, had to be classified using the newly established criteria. Assigning species to the Vulnerable and Lower Risk groups in particular required substantial drafting, consultation and validation. The Red Data Books and Red Lists are widely recognized internationally as authoritative and non-disputable documents. Even though the status of populations/species might change gradually, the classifications should not be subject to short-term changes, as that would undermine the credibility of the Red List and thus hamper conservation efforts.

Most recently, the SSG was involved in the drafting of IUCN/SSC's Strategic Plan 2000.

*Peter J.H. Reijnders, Chair
Seal Specialist Group*

South American Camelid Specialist Group

In 1969, the call of specialists from Andean countries worried about the precarious situation of vicuña populations motivated an agreement among countries inhabited by this species. IUCN/SSC answered that call, creating the GECS (Grupo Especialista en Camelidos Sudamericanos), a Specialist Group whose purpose is supporting national and international efforts to conserve both wild South American camelids (vicuñas and guanacos). Chairs of the GECS were Christian Schmidt (1971-1975), Carlos Ponce del Prado (1975-1980), Hernán Torres (1980-1995), and Silvia Puig (1995 to present).

The initial actions of the GECS were critical for the conservation of the vicuña: to help Perú in the establishment and initial planning of the Pampa Galeras National Reserve, with the active participation of our members Marc Dourojeanni and Carlos Ponce del Prado of Peru. The Group's activity increased, and conservation efforts for the species were strengthened by the participation of GECS members in the Lauca National Park (Chile) and the Ulla Ulla National Reserve (Bolivia). The GECS actively participated in international negotiations that culminated in 1979 with the signing of a new Convention for the Conservation and Management of the Vicuña, this time with an indefinite duration.

The GECS detected that the available information about wild South American camelids was dispersed and scarcely known, and generated the several technical documents: Compilations on the current conservation status of

vicuñas and guanacos, the manual "Techniques for the Management for the Vicuña" with results of a GECS workshop, the bilingual *South American Camelids: An Action Plan for their Conservation*, and the manual "Techniques for the Management of the Guanaco." The GECS newsletter, *Carta Noticias*, was published starting in 1982 as a tool of information and communication among the Group's members, and with other organizations and individuals interested in the conservation of South American camelids. The lack of funding forced us to discontinue this newsletter. With new style and name (*Camelidae News*), we are now hoping to publish it again.

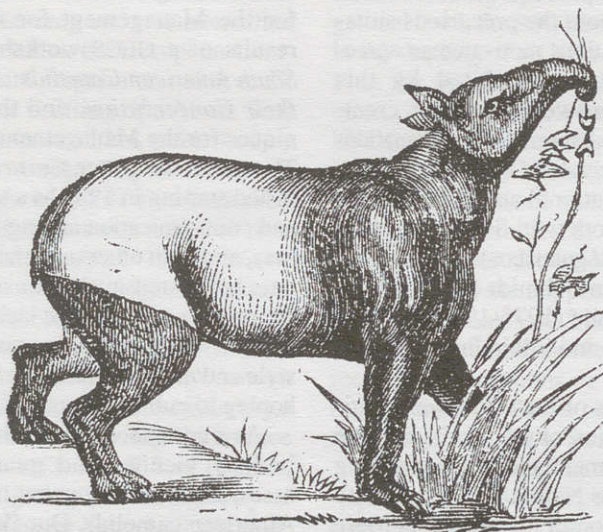
As a continued help to the countries inhabited by vicuñas and guanacos, the GECS assessed the management of both wild South American camelids. Our Group reviewed the proposal to CITES concerning these species, participated in the annual meetings of their Convention for the Conservation and Management of the Vicuña, and assisted as external observer in national censuses of vicuñas. We are close to endorsing an agreement between this Convention and the UICN-Sur, in the name of GECS, focused to facilitate coordinated actions in favor of wild camelids conservation.

Silvia Puig, Chair

Hernán Torres

South American Camelid Specialist Group

Tapir Specialist Group



Over the past eight years, the Tapir Specialist Group (TSG) has grown in size and in its impact with respect to the manner in which support and communications linkages have developed, subsequently assisting people working for the conservation of tapirs. With the competence and assistance of Deputy Chair Sheryl Todd, the TSG has been able to form a strong alliance with the Tapir Preservation Fund (TPF), and this has strengthened the sharing of important information about the species. TPF initiated the e-mail communication line "Tapir Talk," and now there are over 200 members in 30 countries. With this communications medium, field researchers can share experiences and benefit from each others' work. The TSG has members in 12 countries, and many

are undertaking field investigations about the ecology of tapirs. The strengthening of communications has shown a closer network realized between those working in the field and other professionals working on behalf of the conservation of tapirs. As we enter the next millennium, the TSG is targeting the strengthening of communications even more, developing funding assistance for field projects, and increasing its lobbying effectiveness to become a more proactive organization working to sustain all four species of tapir into the future.

*Sharon Matola, Chair
Tapir Specialist Group*

West Indian Iguana Specialist Group

The West Indian Iguana Specialist Group (WIISG) continues to grow, presently consisting of 53 members representing 17 countries who share the common goal of conserving iguanas and the ecosystems to which they belong. Currently, we are actively involved with each of the 10 species of West Indian iguanas and have established programs in 15 different range countries. Of the 20 critical projects listed in our upcoming Conservation Action Plan, half are already underway. That four species and nine subspecies of West Indian iguanas are ranked as Critically Endangered on the IUCN Red List of Threatened Animals underscores the need for immediate and effective action. Iguanas represent a unique and irreplaceable component of Caribbean natural heritage, but one that exists within a multicultural human landscape. To the extent that our work can continue to help foster an increased sense of pride and stewardship for iguanas in the people with whom they share the islands, we will further contribute toward our mission.

Although only two years old, the WIISG has rapidly become a catalyst for conservation of iguanas and their dry tropical forest habitat throughout the Caribbean. Our conservation work on Anegada, British Virgin Islands (BVI), is a particularly notable example of activity on behalf of iguanas that is well-coordinated with larger-scale efforts to preserve biodiversity island-wide. In 1998, the WIISG formed a cooperative partnership with the BVI National Parks Trust, the objective of which is to promote and support the conservation and rehabilitation of iguanas on Anegada through a joint program of research, capacity building, and conservation action, integrated wherever possible with sustainable development strategies. The primary purpose of the partnership is to improve our collective ability to undertake scientific studies through professional training and technical assistance in field research and survey methods, and to assist in the development and implementation of protected areas

management, species recovery, and ecological restoration on Anegada.

Over the past three decades, the endemic Anegada iguana has undergone precipitous declines and is currently listed as Critically Endangered on the IUCN Red List. Recent research indicates significant decreases in the abundance and range of the species on Anegada, with an adult population of no more than 200 adults estimated to remain. The most immediate threat to survival of the population appears to be the presence of feral cats, which take a heavy toll on juveniles, thus inhibiting population recruitment.

An initial grant from WWF-UK allowed construction of a headstarting facility on Anegada with the assistance of WIISG members. The facility, located near the government offices, consists of six 3m x 4m units that currently house 18 juvenile iguanas. The headstarting facility is designed to permit a large number of juvenile iguanas to be reared in a safe environment until they reach a body size at which they are no longer vulnerable to cat predation and can be released into suitably managed areas of the island. Additional grants from the UK Foreign and Commonwealth Office and the Zoological Society of San Diego are facilitating joint work by the the Trust, the WIISG, and Fauna & Flora International (FFI) to expand the headstarting facility, study the wild population, train wardens, control cats, and develop environmental education materials. This June, a WIISG research team will carry out field surveys to further assess the wild population, identify key nesting areas, and transfer additional hatchlings to the safety of the headstarting program.

Ultimately, the work of the Trust and the WIISG will be integrated into a regional biodiversity assessment, undertaken by Kew Gardens and FFI, designed to contribute to development of management plans on Anegada, including long-term recovery of the iguana population. Because of its status as a wetland of international importance, Aneg-

ada's western ponds, which include key iguana habitat, have been designated as a Ramsar site. That such sites must be protected by the strictest national measures will greatly aid the Trust in its advocacy for the creation of a national park on Anegada. The WIISG is proud to be an active partner in this effort and views the multi-institutional cooperation that has emerged on Anegada as a model for success in other iguana range countries.

As we look ahead to the next 50 years, we see many challenges, perhaps the greatest of which will be to address the significant threat posed by introduced mammals to West Indian iguanas and their island habitats. For almost all iguanas inhabiting larger islands, dogs, cats, and mongooses are having devastating consequences, particularly for juveniles. The recent introduction of black rats to several iguana-inhabited cays is also cause for concern. On some islands, browsing by feral livestock has radically affected vegetation structure and altered the diversity and palatability of food plants available to iguanas. Trampling of nest and burrow sites by hoofstock is also a serious

threat. The WIISG recognizes the gravity and magnitude of the problem and is committed to working with the Invasive Species Specialist Group and others to assist in the design, funding, and implementation of comprehensive control programs in the West Indies.

The recent WIISG-sponsored successful eradication of black rats from White Cay in the Bahamas in partnership with the Bahamas Department of Agriculture, the Bahamas National Trust, FFI, Zeneca Agrochemicals, and Loma Linda University represents a promising first step in this direction. WIISG members are also actively supporting mongoose control in Jamaica's Hellshire Hills region and feasibility studies for cat control on Puerto Rico's Mona Island. Such activities will clearly benefit not only iguanas, but many other species of native reptiles, amphibians, and ground-nesting birds as well.

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Wolf Specialist Group

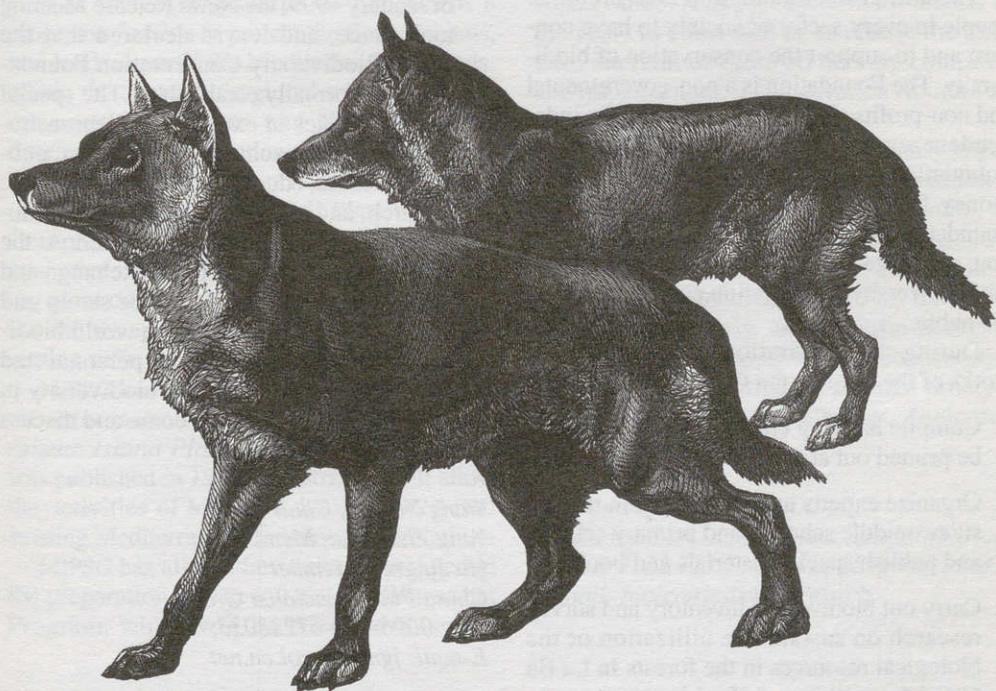
The Wolf Specialist Group, formed in 1973, has met 15 times in 10 countries, allowing members to share important information about wolf recovery, research, and management throughout the world, usually via symposia, most of which have been published. Our key accomplishments include (1) recovery of the wolf over much of its range in Europe and key areas of the U.S., and (2) publication of a "Manifesto on Wolf Conservation" and an "Action Plan for Wolf Conservation."

A key priority of the Wolf Specialist Group for the future is to promote ecologically sound management of the wolf to minimize conflict with humans so as to allow the wolf to recover in as much of its original range as possible.

L. David Mech, Chair

Wolf Specialist Group

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China Plant Specialist Group

China Biodiversity Conservation Foundation Formally Established

The conservation of biodiversity is an undertaking related to everybody. Besides the attention paid by the departments of the Government, it also needs the participation of the people in every field of the society. Approved by the China Association for Science and Technology and other leading authorities, the China Biodiversity Conservation Foundation began preparing for its establishment in April 1997. After more than one year of preparation, the Foundation formally established and began its work.

The aim of the Foundation is to mobilize people in every sector of society to have concern and to support the conservation of biodiversity. The Foundation is a non-governmental and non-profits civil organization. It is an independent corporation. The main tasks of the Foundation are: to collect the funds, pooling money for special activities and the Awaed Foundation, to organize the academic cooperation, exchange and training courses, to enhance the biodiversity conservation consciousness of the public.

During the preparation period, the main works of the Preparation Committee were to:

1. Compile hanging charts on biodiversity, to be printed out at the end of 1999.
2. Organize experts to give lectures in universities, middle schools, and primary schools and publish special materials and booklets.
3. Carry out biodiversity inventory and survey research on sustainable utilization of the biological resources in the forests in La Ba Gou Men village of Huai Rou county in north of Beijing, where the large area of natural forests were conserved in good condition. Suggestions were put forward to the Government about the establishment of the

protected area in the near future. Now, the suggestions were approved by the county government, and it needs to be approved by the city government to establish as a City Protected Area. In the future, we will take the county as the base for establishing experimental and demonstration projects for the reforestation and farming.

4. Organize the experts to research on special topics and consultation on forestry and agriculture.
5. Carry out the assessment and the feasibility study on the establishment of the Company of International Green Development Center. In January 1999, the News Release Meeting took place, and it was declared that the China Biodiversity Conservation Foundation was formally established. The special research topics of experiment, demonstration, scientific exchange, publication, public awareness, education, training, scientific research, and sustainable utilization of biological resources will be established. At the same time, the international exchange and cooperation projects should be set up and we will devote our energy to world biodiversity tasks. We welcome personal and units who are interested in biodiversity in everywhere of the world come and discuss the cooperation with us.

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Mediterranean Islands Plant Specialist Group

With almost 5,000 islands, the Mediterranean Islands archipelago is one of the most important in the world. Its species richness, high endemism, and history imbue this island group with a special place in global biodiversity.

For millennia, humans have maintained a constant pressure on Mediterranean ecosystems, and this human presence has become an integral part of these systems. Over the last few decades, profound socioeconomic changes have produced negative effects on these ecosystems and their species, particularly in coastal areas. The islands are particularly vulnerable as their small size intensifies the consequences of these perturbations.

It is therefore essential to implement a program of action to protect the flora, habitats, and landscapes of the Mediterranean Islands, within the context of a global strategy of environmental protection and the sustainable development and valuation of natural resources by local communities.

The Mediterranean Islands Plant Specialist Group (MIPSG) was created in 1995, with the goal of promoting, coordinating, and developing plant conservation initiatives. It currently constitutes approximately 30 members representing different Mediterranean Islands.

MIPSG has defined a strategy to guide conservation action: *Conservation of Mediterranean Island Plants. 1. Strategy for Action* was published in 1996. The strategy will allow the activities of MIPSG to be integrated into existing Mediterranean conservation initiatives.

MIPSG has also enthusiastically engaged in the preparation of a new IUCN Mediterranean Program, which will be launched this year

once the new IUCN Regional Office for the Mediterranean is established (in Malaga, Spain). MIPSG members are hopeful that this regional program will lead to improved coordination between the different IUCN Commissions in their activities throughout the Mediterranean, pulling together and promoting regional biodiversity conservation, both marine and terrestrial.

Among recent activities of the MIPSG, the compilation of a "Top 50" list of the most threatened Mediterranean Island plant taxa should be mentioned. The Top 50 list is annotated with descriptions of each taxa, their threats, and recommended actions for their conservation. A major objective for MIPSG for the years to come will be to ensure the long-term survival of these 50 taxa by compiling and implementing a conservation Action Plan for each.

MIPSG will also endeavor to identify important centers of plant diversity for the Mediterranean Islands, with the goal of promoting the creation of appropriate protected areas based on the conservation needs of the islands' flora.

Finally, the members of MIPSG have been able to take timely and specific action to respond to a range of urgent conservation issues, with the financial support of a variety of institutions, notably the Chicago Zoological Society.

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Orchid Specialist Group

The Orchidaceae is one of the largest and most diverse families of flowering plants, with estimates of its size ranging up to 35,000 species. However, it has recently been estimated that up to 6% of the world's orchid flora could be threatened, with 1,779 orchid taxa listed in the 1997 IUCN *Red List of Threatened Plants*. For many years orchids have been the focus of great public attention due to their sheer beauty and diversity. Orchids are therefore an important flagship group, and by focusing on the conservation of these remarkable plants, it is possible that other species can be conserved through the protection and management of orchid-rich habitats.

Habitat loss is undoubtedly the current major threat to the survival of orchids. Logging, agricultural, urban, and industrial development are factors that reduce and fragment habitats, isolate populations, and alter the ecological support system required to maintain species in the wild. Orchids are also a major commodity in the horticultural trade and historically have been overcollected to satisfy the demands of the industry. Collection of wild orchids for the trade in Chinese medicinal products has also taken its toll.

Recognizing the need to create a network of international orchid experts to assist in conserving the world's orchid flora, the Orchid Specialist Group (OSG) was established in 1984 under the chairmanship of Eric Hágsater (Director of Herbario AMO, México), who remained as Chair of the Group until 1997. One of the major achievements of the OSG during this time was the publication in 1996 of *Orchids: Status Survey and Conservation Action Plan*, the first IUCN/SSC Plant Action Plan to be produced.

The first half of the plan discusses the unique biology of the orchid family, threats posed by habitat loss and overcollecting, *in situ* strategies of habitat conservation and management, *ex situ* strategies of artificial propagation and seed banking, and the need for more research and education. The second half describes the present status of knowledge,

diversity, and threats to orchids in those countries or regions containing high levels of orchid diversity and/or richness, using case histories for illustration. The plan concludes with a number of recommendations, stressing the need for adequate protection and management of orchid habitats, strategies for conserving orchids *ex situ*, and the need for better education, communication, and regulation.

In 1998, Phillip Cribb, Deputy Keeper of the Herbarium at the Royal Botanic Gardens Kew (RBG Kew), became the new OSG Chair, and an official OSG Secretariat was established with the help of funding from the American Orchid Society, RBG Kew, and IUCN. The OSG has now been reconstituted under the new chairmanship and consists of over 100 members from 40 countries. The first OSG newsletter, *Orchid Conservation News*, was published in March 1999 and is available as hard copy and on the Web.

A plenary meeting of the OSG took place in Vancouver at the World Orchid Conference in April 1999. Items discussed included:

- Development of an OSG strategic plan to be published on the World Wide Web.
- Mechanisms for information dissemination and exchange, including development of the OSG Web site.
- Procedures for updating the IUCN Red List of Threatened Plants.
- Establishment and coordination of OSG regional groups in Africa, Asia, Australasia, South America, Meso-America, North America, and Europe.
- Development of an orchid conservation bibliographic and projects database.
- Establishment of an OSG education committee that will produce and endorse educational materials and promote education programs in orchid conservation.

Shelagh Kell, Executive Officer
Orchid Specialist Group

Invasive Species Specialist Group

The Invasive Species Specialist Group (ISSG) continues to grow and flourish: there are now over 100 members in the Group. Coordination is based in New Zealand, where the Chair (Mick Clout), network coordinator (Maj de Poorter), and database manager (Sarah Lowe) are based at Auckland University's School of Environmental and Marine Sciences. The Deputy Chair (Randy Westbrooks) is based at APHIS in the U.S.A.

A good deal of advice is now being offered by ISSG both nationally and internationally. The ISSG newsletter *Aliens* continues to be well-received and was widely cited as an information source in the recent book *Life out of Bounds*, written by Chris Bright (Worldwatch Environmental Alert Series). Distribution of the Group newsletter is growing, and it is planned to target further increases in distribution in 1999 at Pacific and Indian Ocean endusers. *Aliens* is now viewable on the Web at <http://elib.cs.berkeley.edu/docs/query.shtml>, and Web access will be further improved.

The "Aliens-I" listserver, established and managed by ISSG, now has over 450 subscribers. Lively debates on invasive species issues take place almost daily. This listserver is available free of charge to anyone with Internet access. The additional ISSG "members-only" listserver allows for the tapping of members' ideas to increase ISSG's effectiveness (e.g., for comments on policy documents).

Early in 1998 the IUCN Global Initiative on Invasive Species was announced in a special double issue of "World Conservation," which was devoted to the issue of invasive species and their effects on biodiversity.

International Policy Development

In March 1998 both IUCN and the Global Invasive Species Program (GISP), in which IUCN is a partner, held back-to-back meetings in San Mateo, California, to discuss their complementary global plans for work on invasive species. Several ISSG members participated in both meetings.

ISSG also sent a representative (Rod Hay) to the May 1998 CITES Meeting (Caracas, Venezuela) to follow up on the close liaison between ISSG and CITES that had been proposed at the previous CITES Conference of the Parties.

The "IUCN Guidelines for the Prevention of Biodiversity Loss due to Biological Invasions" is being circulated to all IUCN members (English, French, Spanish versions). These guidelines will be presented to IUCN's full Council for endorsement by the end of 1999.

We are also making the draft guidelines available at the upcoming Global Biodiversity Forum (GBF) and Ramsar Meeting (Costa Rica, May 1999) and the 4th meeting of the Subsidiary Body on Scientific Technical and Technological Advice (Montreal, Canada, June 1999), where the invasives issue is on the agenda.

Pacific Regional Work

From its inception, ISSG has recognized the particular threats that invasive species pose to the native biodiversity of islands. For this reason, the Group has maintained a special (but by no means exclusive) focus on raising awareness of invasive species problems on islands and improving capacity to deal with them. One of the greatest challenges is improving access to crucial information.

ISSG now employs a full-time researcher (Sarah Lowe) who is focusing on the development of invasive species information systems. These will include regional databases, in the first instance for the islands of the Pacific. This Pacific regional database of invasive species is currently under development, with a prototype (with attached automatic Web site-generating software) having been produced in January and February 1999. Progress was greatly facilitated by the recent visits to New Zealand of two ISSG members with Pacific database expertise: Phillip Thoma (Hawaiian Ecosystems at Risk Project) and Jim Space (Institute of Pacific Islands Forestry). The prototype data-

base was presented at a Global Invasive Species Program workshop in Kuala Lumpur in March 1999 (see below). ISSG liaised with Pacific experts on invasive issues to ensure their participation at this workshop and their involvement in the ongoing consultative process that will follow.

ISSG has close links with the South Pacific Regional Environment Program (SPREP). In January 1998 Sarah Lowe visited SPREP headquarters in Samoa and later in the year several Pacific experts (including the SPREP Program Manager for invasive issues, Greg Sherley) were hosted by ISSG at a meeting in Auckland. The interest in Pacific invasives, encouraged by ISSG, has now resulted in SPREP establishing a Regional Invasive Species Program and ordering a review of invasive species problems in the Pacific, to be followed by the development of practical priorities and pilot programs. ISSG will maintain a strong involvement in these developments.

Scientific Conferences and Workshops

ISSG organized a symposium on "Conservation issues of invasive Species in Australia and the Pacific" at the Annual Meeting of the Society for Conservation Biology, held for the first time in the Southern Hemisphere, in Sydney, Australia (July 1998). Ten speakers took part, representing institutions from New Zealand, Australia, and the Pacific. Mick Clout chaired the meeting, giving the introductory remarks, as well as his own presentation.

The Global Invasive Species Program (GISP) held a workshop in Kuala Lumpur, Malaysia, in March 1999. Several ISSG members were present. This meeting, which was funded primarily by the Global Environment Facility, was a collaborative effort by two sections of GISP: the "Management" section (chaired by Jeff Waage of CABI Bioscience)

and the "Early Warning Systems" section (chaired by Mick Clout of ISSG). Our two sections of GISP decided last year that we would cooperate closely in preparing tools to help developing countries (especially "small island developing states") to deal with the threats to their biodiversity that are posed by invasive species. The Kuala Lumpur workshop therefore had as its major aim the drafting of a "toolkit" for early warning and management of invasive species problems in such developing countries.

The meeting had 29 participants, from 13 countries. Consensus was reached on the format and content of the "toolkit," which will include a manual on prevention and management of invasive species and a supporting international database on their characteristics. Both could be tailored to meet regional needs. By the end of the meeting, the first draft of a generic manual had been completed and there was endorsement of the design for an international invasive species database. The pilot version of this (being prepared by Sarah Lowe and Philip Thomas of ISSG) will be the database of the "World's 100 Worst Invasive Species," funded by the Total Foundation.

Funding Support

The growing activity of the ISSG has been made possible by funding support from a variety of sources, especially the NZ Ministry of Foreign Affairs and Trade, Global Environmental Facility, the Total Foundation, U.S. National Fish and Wildlife Foundation, and Landcare Research. We are grateful to all of these supporters and to the SSC staff who continue to provide us with strong back-up, sound advice, and great encouragement.

*Mick Clout, Chair
Invasive Species Specialist Group
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Reintroduction Specialist Group

The Reintroduction Specialist Group (RSG) was founded in 1988 to stimulate and coordinate interest in reintroductions. As most Specialist Groups are concerned with single taxonomic groups, the RSG has a broad remit, spanning the whole range of vertebrates, invertebrates, and plants. The RSG coordinates its activities by undertaking the following.

Implementing Viable Reintroduction Projects

To provide a guiding framework for reintroduction projects, the IUCN developed a position Statement on Translocation of Living Organisms, which was approved by the 22nd Meeting of IUCN Council in September 1987. This position statement set out to show IUCN's position statement on translocations that covered introduction, reintroduction, and re-stocking.

The need for more detailed guidelines was felt and work started on preparing Guidelines for reintroductions. These were developed through a lengthy process of consultation and review with the wider conservation community and beyond. A draft was submitted to IUCN for adoption. The Guidelines for reintroduction were formally adopted by 41st Meeting of IUCN Council in May 1995. The guidelines were then translated into five languages and booklets in the following combinations: Spanish/English, French/English, Arabic/English, Russian/English and Chinese/English, plus an English-only version. A total of 15,000 booklets were printed and distributed in 1998.

The Guidelines for reintroduction represent a policy document. The next step is to develop Planning Protocols for Viable reintroductions. This will be a document that will use case histories from different taxa, representing both animals and plants, to enable reintroduction practitioners to assess, plan, and implement reintroduction projects. These Planning Protocols for Viable reintroductions will provide a practical approach to the assessment and design of reintroduction projects.

Current Reintroduction Information

To provide reintroduction practitioners with up-to date information, the RSG has been producing and distributing its newsletter, *Reintroduction News*, since November 1990. The RSG has produced, published, and distributed 17 issues of *Reintroduction News* to date.

In 1990, the first newsletter was distributed to less than 100 addresses. Our current issue, No. 17, was distributed to well over 680 addresses representing a wide selection of reintroduction practitioners, organizations, and interested individuals.

A new approach to producing newsletters has now been implemented, and this is the production of thematic-based issues that focus on particular taxa or themes. The last issue was exclusively on reptile/amphibian reintroductions and was done in conjunction with the Toronto Zoo, Canada. Issue No. 18 will focus on carnivore reintroductions, and this will be done in conjunction with the Turner Endangered Species Fund, U.S.A. We hope to dedicate Issue No. 19 to plant reintroductions.

Who's Who in Reintroductions?

The RSG increasingly receives queries from people trying to contact reintroduction projects. The RSG finds it very important for reintroduction practitioners and other interested individuals to network between projects. This can be useful in learning lessons from previous reintroduction attempts and avoiding the duplication of costly mistakes that should be avoided when dealing with endangered species. In a response to this, the RSG, in conjunction with its Bird Section Chair, based at the National Commission for Wildlife Conservation and Development (NCWCD), Saudi Arabia, developed a database of reintroduction practitioners that was used to print the reintroduction Practitioners Directory 1998. This directory can be ordered from the RSG and NCWCD.

The plans are to place this directory onto the WWW and to make it more accessible to people looking for contact information on reintroduction projects.

Information Management

The RSG has always considered it crucial to maintain its reintroduction library and membership information in a well-organized and retrievable manner. The RSG has developed and maintains a reintroduction library database that catalogues information on reintroduction articles in its library.

Since the RSG has a large membership base, it maintains its own membership database, which lists all biographical data and information on areas of reintroduction expertise. This database proves very useful when the need to contact members in specific geographical regions arises and when looking for members with expertise in specific species or taxa.

The RSG also works closely with the SSC Species Data Management System and the Biodiversity Conservation Information System (BCIS) initiative to ensure that databases are constructed and maintained in a format that can be useful to a wider network.

Placement of Live Confiscated Animals

A large number of live animals are confiscated from illegal and irregular trade. The placement of such individuals is an issue of major concern and the RSG is working on developing specific guidelines that can provide options for placement for confiscated live animals.

These guidelines have undergone a comprehensive review process and have been submitted for IUCN for adoption. The RSG and associated SSC staff working on these guidelines receive comments from individuals and organizations, and these are being incorporated to ensure that these guidelines represent a balanced view. Once these guidelines are completed, the RSG will plan to put these on the Web and also make them available in different language versions.

RSG Members

The RSG membership in November 1990 stood at 80 members, in 1994 stood at about 250 members, and currently stands at about 300 members. This growth in membership has been possible through RSG's increased capability of contacting reintroduction practitioners and through the dissemination of reintroduction literature worldwide. The RSG has an extensive membership and there are members from the various regions.

RSG members also represent a wide variety of disciplines and expertise in both animal and plant reintroductions. The RSG organizational structure consists of a Chair, Vice-Chair, Secretariat, and Section Chairs representing aquatic mammals, birds, primates, Australasia/marsupials, habitat restoration, carnivores, plants, invertebrates, and reptiles/amphibians.

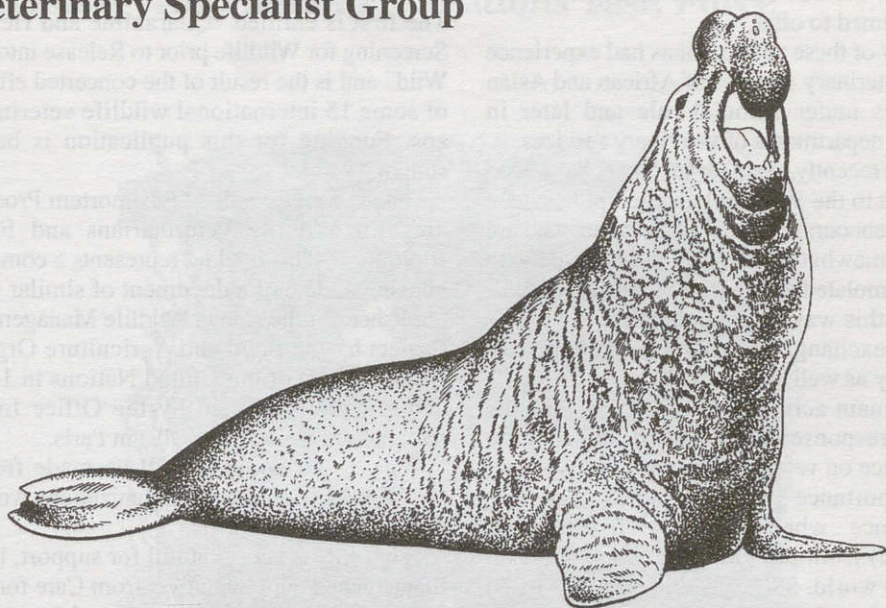
There are now plans to develop a reintroduction e-mail discussion site that will enable members to interact more frequently and engage in discussions involving reintroduction issues.

The Future

The RSG would like to strengthen its vision, which is to promote the restoration of species diversity and ecological processes through sustainable reintroductions, based on best available practices to achieve viable populations in their natural habitats. This vision will be achieved through enhancing sound reintroductions and promoting awareness of their role in biodiversity conservation.

*Mark Stanley Price, Chair
Pritpal Singh Soorae,
Senior Technical Project Officer
Reintroduction Specialist Group*

Veterinary Specialist Group



It was during the early planning stages of "Operation Oryx" in 1961 that a veterinary practitioner in cattle practice in the south of England drew the attention of the organizers (the then Fauna Preservation Society, the East African Wildlife Society, and the Species Survival Commission, to the wisdom of including a veterinarian in the capture team that was to go to the then Eastern Aden Protectorate in an attempt to capture some of the last free-ranging, wild Arabian oryx (*Oryx leucoryx*).

At that time, very few veterinarians showed much interest in the health of wild animals, chemical capture techniques were in their infancy, and almost no veterinary school in the world taught a course on wildlife medicine. In the event, it was decided that the risks to the oryx were too great to use the new and largely untested chemical capture technique and to rely on the more familiar "pursuit and lasso." Following the success of "Operation Oryx," IUCN realized that the SSC might on occasion need veterinary advice, and eventually a veterinary advisor was appointed by Sir Peter Scott. As the Specialist Groups of the SSC multiplied, and particularly when the capture, cap-

tive breeding, translocation, and reintroduction of wild animals became popular conservation techniques, so the demand for veterinary advice increased, and by the end of the 1970s it became clear that no one person could provide all the necessary expertise. A small band of volunteer veterinarians, few of whom would have had the temerity to call themselves "wildlife vets," was assembled, and by 1995, when the fledgling Specialist Group published its first newsletter, the Group membership stood at 10, representing six countries.

Since then, interest in wildlife veterinary matters has greatly increased throughout the world. The VSG now has about 150 members, not all of whom are veterinarians, based in 38 countries. Advice is now freely available on demand from specialists on individual taxa and specific geographic regions. Contact is established and maintained with international and national conservation agencies and with the veterinary faculties of many universities worldwide.

In the early stages of the development of the VSG, the membership tended to consist of older veterinarians, most of whom were per-

sonally known to each other. Their experience in the field of wildlife medicine was needed to maintain the advisory pool of expertise the VSG claimed to offer.

Many of these veterinarians had experience in the veterinary services of African and Asian countries under colonial rule and later in national departments of veterinary services.

More recently, younger members have been recruited to the VSG, and an attempt has been made to encourage the access of these, who are often somewhat isolated on field projects, to the accumulated experience of the older members. In this way our membership is encouraged to exchange information and expertise internally as well as externally.

The main activity of the VSG is thus the prompt response to requests for information and advice on veterinary matters of conservation importance (and sometimes economic importance when domestic livestock is involved) from individuals and agencies all over the world. SSC Specialist Groups often have a reintroduction or welfare component in their Action Plans, and it is here that advice from VSG specialists can minimize the risk of inadvertent disease transmission by translocated wild animals. Methods of communication are those deemed most appropriate for each situation and include e-mail, telephone, fax, and "snail mail."

The VSG Newsletter is published twice a year and is not only an important vehicle for the wide dissemination of ideas, news, and information, but also a means for the expression of opinions on specific issues, some of which are controversial.

For the future, the VSG hopes very soon to publish two important booklets that will prove useful to the SSC Specialist Group community. The first is entitled "Quarantine and Health Screening for Wildlife prior to Release into the Wild" and is the result of the concerted efforts of some 15 international wildlife veterinarians. Funding for this publication is being sought.

The second is called "Postmortem Procedures for Wildlife Veterinarians and Field Biologists." This booklet represents a comprehensive update of a document of similar title published for the Kenya Wildlife Management Project by the Food and Agriculture Organization (FAO) of the United Nations in 1972 and will be published by the Office International des Epizooties (OIE) in Paris.

These two booklets will be made freely available to conservation organizations worldwide.

The VSG is very grateful for support, both financial and administrative, from Care for the Wild, a British wildlife charity, and for generous funding by the Geraldine Dodge Foundation and the Wildlife Conservation Society.

Our ability to maintain the high standards of service to the SSC and to the international conservation community now depends on our success in attracting future financial support.

*Michael Woodford, Chair
Veterinary Specialist Group*

Declining Amphibian Populations Task Force



Past, Present, and Future

At the First World Congress of Herpetology, held in the United Kingdom in 1989, Dr. David B. Wake asked other amphibian biologists whether they had observed unusual declines of amphibian populations, as he had recently observed. The unsettling answers to his queries were that his observations were not unique. Wake took it upon himself to determine whether there was cause for concern and, therefore, action. After a series of meetings, two conclusions were reached: (1) although most of the evidence for amphibian declines was anecdotal, the number and geographically dispersed nature of the informal reports indicated that the situation should be addressed and treated as a possible environmental emergency; and (2) an international working group should be established to determine, on the basis of scientifically defensible information, whether in

fact there was an environmental catastrophe occurring. If such a catastrophe was underway, this international working group needed to determine its extent and causes.

A determined core of concerned amphibian biologists, led by Wake, set out to organize this international working group. After considering various alternatives, the decision was made to establish significant affiliation of this group with the Species Survival Commission. This new group was designated as a Task Force by the SSC in recognition of two differences between it and most of the other SSC Specialist Groups. First, this Task Force was focused on answering a specific set of scientific questions. Second, it should have a finite existence, because once the scientific questions were resolved, the group would have completed its reason for being. Wake agreed to chair the DAPTF initially. Since his tenure, Robert

Johnson and Ronald Heyer have served in that capacity.

The DAPTF headquarters were initially established at the Center for Analysis of Environmental Change at Oregon State University. James L. Vial served as coordinator, assisted by Lorelei Saylor. In June 1994 the DAPTF office was transferred to The Open University, in Milton Keynes, United Kingdom. Timothy Halliday assumed the position of International Director and John M. R. Baker was hired as the first International Coordinator; John W. Wilkinson currently serves as the International Coordinator.

The Task Force headquarters coordinates the worldwide effort involving the declining amphibian population phenomenon. The actual work is done by issue-based and regional and sub-regional Working Groups operating under their own leadership and with their own funding. Task Force headquarters provides a database accessible to all investigators, disseminates progress reports, defines the issues, builds infrastructure, and engages in projects designed to improve research methods and produce reliable results. In other words, the Task Force headquarters empowers local groups so that they can target their work more effectively toward the global effort. One of the primary communication methods used by the Task Force is through its newsletter, *Froglog*, now issued six times per year.

In order to stimulate the kinds of research efforts determined by the DAPTF Board of Directors to have the greatest likelihood of success in solving the declining amphibian mystery, a seed grant program was established. To date, 44 international projects have been awarded \$92,000 in seed grants, the significant results of which have begun to appear in the scientific literature.

In order to raise awareness of the amphibian problem, a media briefing program was established. When significant new developments take place, a briefing document is sent to a select set of scientific writers and editors in the newspaper, magazine, and television industries throughout the world. This has helped to encourage the publication of a number of newspaper articles and other media reports that draw attention to the declining amphibian phe-

nomenon and its wider implications. Another means of raising awareness throughout the rest of the scientific community has been through affiliation with the international DIVERSITAS program, which focuses on the threat to all aspects of biodiversity.

The Task Force recently completed a major part of its mandate, which realistically may be the only conclusion this volunteer organization can be expected to make. It was not until 1997 that we were able to state as a fact that: "amphibian populations, in far flung locations, are indeed disappearing even in seemingly virgin environments" (see Halliday & Heyer, *Technology Review*, 100:61, 1997).

With respect to causes, it is likely that most of the pieces of the puzzle are now identified, but it is not yet clear how they fit together. The pieces involve effects that are local, regional, and potentially global in their scope. Local effect causes include habitat modification, collecting, and introduced species. Regional effect causes include acid rain and agricultural and other industrial chemicals. Potential global causes include increased ultraviolet blue radiation, endocrine disrupters, climate change, and disease. In the past year, considerable attention has focused on a newly discovered chytrid fungus that has been identified as a cause of amphibian mortality in several parts of the world.

The Task Force leadership is currently determining how we can successfully conclude our mandate in 2001. In order to finish our work, we need to resolve two basic questions. First, what products should the Task Force deliver in order to complete our mandate? Second, what mechanisms need to be put in place to make certain that the declining amphibian population phenomenon continues to be addressed by scientists and at what level of activity? Inherent in the answer to this second question is provision for making certain that the successful network of those individuals making up the Task Force is transformed or redirected to continue to address amphibian decline and conservation issues.

Ron Heyer, Chair
Tim Halliday, International Director
Declining Amphibian Populations Task Force

In order to maintain an effective SSC communications network, we need your submissions and updates for *Species*. Submissions for *Species* 33 are due March 1, 2000.

**Note: *Species* has a new editor.
Submissions should be addressed to:**

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