



# CBSG News

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## New Dimensions in CBSG Workshop Processes

Two themes of need for improvement of CBSG tools and processes have repeatedly emerged during CBSG risk assessment and management planning workshops over the past five years in over 40 countries. One is the need for more explicit and quantitative incorporation of the human dimension into the simulation and projection of risks for a local protected area and its target species. Another is the need for a broader base of participation in the earliest stages of risk assessment and development of management options. We are enthusiastically engaged in a multidisciplinary program to respond to these needs with improved tools and processes.

Local human population interactions with their environment are acknowledged as a dominant risk factor impacting the viability of protected areas and wild populations. Human demography and environmental science are two of the scientific disciplines which need to collaborate in analysis of these risks as a basis for better informed conservation and management actions. Efforts to develop a trans-disciplinary approach to these conservation problems, however, are still in the early stages of development (see Ness and Golay, 1997, *Population and Strategies for National Sustainable Development*).

Another aspect of the same problem is effective joint participation of the local human population, commercial and development interests, and recreational and conservation groups in the development and implementation of conservation and management plans. The failure to sufficiently include these groups from the beginning of the planning process over the past 50 years has resulted in a series of political and social crises and expensive failures (see Stern and Fineberg, eds. 1996, *Understanding Risk*). Similar problems beset the implementation of conservation programs designed without local participation. A systematic methodology, Participatory Rural Assessment (PRA), has been developed to assist land use planning and management at the local level with full community involvement (see Odour-Noah et al., 1992, *Implementing PRA*).

CBSG has been exploring the incorporation of these approaches into our workshops processes, especially the Population and Habitat Viability Assessment (PHVA) process. We wish to substantially improve our risk assessment tools to assist early effective involvement of the diverse groups with an interest in the conservation problems and management options for a particular area. Organized by Dr. Frances Westley of McGill University, this project was initiated with a meeting in Minnesota at which a group of social scientists, human demographers, population biologists and conservation biologists explored possible ways to integrate these approaches. An initial approach has been developed to explore how specific human demographic information can be incorporated into the stochastic population simulation model, VORTEX. Another step will be to validate the human population data by a current survey. A third step will then be to move into a full PRA process as part of the risk assessment and deliberation process for development of a local conservation management program.

We will keep you informed of developments through this newsletter, CBSG publications, and our website ([www.cbsg.org](http://www.cbsg.org)). We welcome additional participation in these developments. There will also be reports on aspects of this program at the CBSG meeting in Berlin in August. We hope to see you there.

Ulysses S. Seal, CBSG Chairman

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17 June 1997

## CBSG News

The *CBSG News* is published by the Conservation Breeding Specialist Group, Species Survival Commission, World Conservation Union. *CBSG News* is intended to inform CBSG members and other individuals and organizations concerned with the conservation of plants and animals of the activities of the CBSG in particular and the conservation community in general. We are interested in exchanging newsletters and receiving notices of your meetings. Contributions of \$25 (U.S.) to help defray the cost of publication would be most appreciated. Please send contributions or news items to:

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## CBSG Mission Statement

The mission of the Conservation Breeding Specialist Group is the conservation or establishment of viable populations of threatened species.

The goals of the CBSG are to:

1. Organize a global network of people and resources.
2. Collect, analyze and distribute information.
3. Develop global conservation breeding programs.
4. Integrate management programs for captive and wild populations.



## Chimpanzee PHVA in Uganda

The current distribution of the chimpanzee (*Pan troglodytes*) is thought to extend into approximately 21 countries throughout equatorial Africa. This distribution, however, has become considerably fragmented over the past few decades as human populations have rapidly expanded through economic and agricultural development. A primary example of this phenomenon occurs in Uganda, where about 3,000 - 4,000 chimpanzees of the eastern subspecies *Pan troglodytes schweinfurthii* are thought to exist in 12 isolated forest blocks. The capacity for natural exchange of individuals between these isolated subpopulations is very limited, thereby destabilizing the populations and ultimately putting them at considerably greater risk of local extinction. Development of a practical conservation management and research program for *P.t. schweinfurthii* has been hampered by a lack of detailed information regarding current distribution, problems of protecting animals in remote areas, uncertain priorities and a persistent lack of funding to assist proper conservation action. Perhaps most importantly, a management plan must address the rapidly expanding human impacts resulting from five newly created chimpanzee tourist sites in Uganda.

The Conservation Breeding Specialist Group (CBSG) was officially invited by the Uganda Wildlife Authority (UWA) to conduct a Population and Habitat Viability Assessment (PHVA) for the chimpanzee in Uganda, 6-9 January 1997. The objectives of the PHVA course and workshop were to assist local managers and policy makers to: 1) formulate priorities for a practical management program for survival and recovery of the chimpanzee in wild habitat; 2) develop a risk analysis and population simulation model for the chimpanzee to guide and evaluate management and research activities; 3) identify specific habitat areas that should be afforded strict levels of protection and management; 4) identify and initiate useful technology transfer and training; 5) assess the current status of the captive program and formulate future directions of this component of the overall conservation strategy; and 6) identify and recruit potential collaborators from Uganda, Africa and the international community.

A total of 57 participants, including Ugandan biologists, researchers, wildlife managers, and many of the world leaders in the study of chimpanzee population biology and ecology, attended the four-day workshop. Countries represented included Uganda, Kenya, Zaire, Gabon, Denmark, Sweden, Australia, the

United Kingdom, and the United States. The participants were divided into five working groups that reflected their interests, expertise and the key problems for chimpanzee conservation: Distribution and Habitat, Threats, Population Biology and Modeling, Eco-tourism and Education, and Captive Management. Each group presented the results of their work in three plenary sessions to assure that all issues were carefully reviewed and discussed by all workshop participants. In this way, the following recommendations summarized from the preliminary draft report represent a consensus of the workshop participants.

### Summary of Recommendations

#### *Wild Population Distribution and Habitat Priorities*

1. Based on current knowledge, the following areas have a high priority for chimpanzee conservation in Uganda: Budongo Forest Reserve, Kibale National Park, Kasyoha-Kitomi Forest Reserves, and Bugoma Forest Reserve.
2. The extent of forest cover status and numbers of chimpanzees in the following areas should be determined by transect nest counts in the following priority: Priority 1, Kagombe-Kitechura-Matiri Forest Reserves and neighboring forests; Priority 2, Kasato Forest Reserve and neighboring forests. Monitoring of major chimpanzee populations should be continued.
3. UWA should develop a policy for chimpanzees that occur outside of protected areas.
4. A policy for the protection of gallery forests used by chimpanzees in agricultural or other non-forested areas should be developed.
5. Conservation education programs focusing on chimpanzees should be developed in collaboration with Local Government Councils.

#### *Chimpanzee Population Threat Priorities*

##### Habitat Loss/Change

1. Strengthen forestry extension services.
2. When timber is harvested, keep disturbance to a minimum, especially in forest reserves.

##### Poaching

3. Carry out a study at two sites (e.g., Kibale and Budongo) that focuses on snaring as a major threat to chimpanzee populations. Assess the effectiveness and feasibility of approaches to eliminate snares.

##### Diseases

4. Train field staff to report diseases and deaths. UWA veterinarians will organize seminars to train and equip park staff and researchers to monitor disease and health.
5. Develop a post-mortem protocol for detecting certain infectious diseases such as: polio, measles, rubella, Ebola, TB, hepatitis, influenza, SIV, HIV and rabies.

6. Develop research on diseases impacting chimpanzee populations. This includes non-invasive monitoring of the health status using routine fecal examinations, opportunistic collection of biosamples, serum bank, field data on disease frequency, and post-mortem data. Plans could be developed through UWA collaboration with appropriate local and global organizations.

Political Instability

7. Target conservation education programs to politicians and senior security officials as appropriate.  
8. Develop a trust to deal with emergencies so that park management continues in the face of war.

Tourism Activities

9. Control tourist activities and movements.

Human-Chimpanzee Conflicts

10. Identify rogue males in order to capture and destroy them or place them in a captive environment.

Lack of Information

11. Make available literature regarding chimpanzee behavior and ecology for managers (including possible translation of literature into local languages).

Legislation

12. Encourage communication and memoranda of understanding between relevant departments.

Lack of Scientific Research/Information/Management

13. Increase awareness among researchers of the need to submit reports and publications that result from chimpanzee research conducted in Uganda.  
14. Encourage applied research projects that are relevant to management concerns (e.g., effects of snaring, impact of tourism).

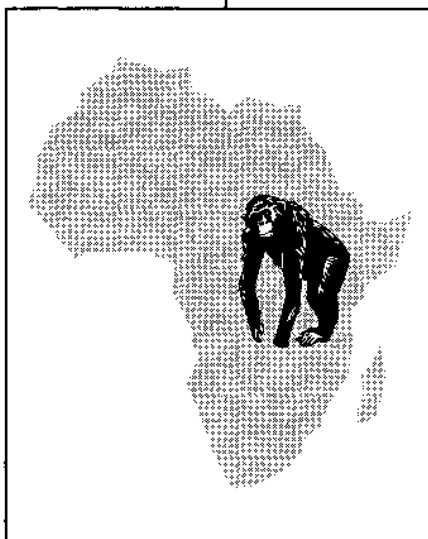
**Population Biology and Modeling Priorities**

1. It is important that small populations of chimpanzees (i.e., 25-100 individuals) are actively protected against those factors—habitat loss, lack of protected status, and the local human population increase—that act to reduce and destabilize wild populations.  
2. Detailed research studies should be conducted to more accurately estimate the age at which female chimpanzees begin to produce offspring.  
3. Because of the great potential danger posed by outbreaks of human-transmitted diseases, minimum distances should be maintained between habituated chimpanzees and either tourists or researchers.  
4. Because poaching impacts adult age classes most severely and the loss of adult females constitutes the

most severe demographic threat to wild populations, poaching and snaring controls should be enhanced.  
5. Wildlife managers should monitor the status of wild populations, through comprehensive nest-counting and other census methodologies, so that if an increase in annual mortality rates is observed, appropriate measures can be taken to reduce the causes of this mortality. Such actions might include a general increase in anti-poaching and/or anti-snaring controls.

**Ecotourism and Education Action Priorities**

1. Chimpanzee tourism is a beneficial and desirable activity in Uganda and should be maintained as a viable conservation alternative.  
2. Tourism should be managed under a standardized set of rules and regulations to be presented in pre-walk briefings and widely distributed in advance to tourists, tour operators and travel agents to facilitate adherence.  
3. Tourism management factors should be standardized across tourism sites, but should also take account of local circumstances.  
4. Protocols that aim to reduce corruption among tourism staff must be developed.  
5. Chimpanzee tourism should be selective. No new sites should be opened or planned pending review and drafting of an Environmental Impact Assessment.  
6. Wild chimpanzee tourism and captive-based tourism should have complementary roles as part of an overall conservation program.  
7. Tourism and chimpanzee population research ideally should be carried out in different chimp groups.  
8. Protected Area authorities should view ALL chimpanzee populations in Uganda as important and in need of protection, not just those providing tourism income.  
9. Local community participation must be stressed as part of any chimpanzee tourism project.  
10. Creative financing for chimp conservation should emerge from tourism-based projects.  
11. Uganda should promote and/or market chimpanzee tourism at its current sites.  
12. Private-sector management of endangered species conservation (i.e., concessions) should be avoided.  
13. Standardization of chimpanzee tourism management between the two primary responsible authorities, Forest Department and UWA, should be encouraged and strongly linked.



14. Chimpanzee tourism development and management should be guided by management and tourism development plans as part of a nation-wide strategy.
15. In addition to implementation of conservation education, there should be a specific emphasis on chimp ecology in the national curriculum at the primary school level to enhance sensitivity regarding endangered species and habitat laws.
16. Workshops should be conducted by UWA and the Forest Department to better inform Local Council members of their rights and responsibilities regarding Protected Areas and endangered species.
17. UWA and the Forest Department should establish a national standardized training program for Protected Area staff to ensure consistency in information presented to the public. Workshops addressing key issues affecting chimpanzees such as snares and crop raiding will then be targeted to local communities.
18. Education centers targeting Ugandans, particularly school children, should be developed.

#### ***Captive Population Management Action Priorities***

1. A memorandum of understanding should be signed between UWA, WD and UWEC (Uganda Wildlife Education Center) with the understanding that UWEC has (currently) the only holding facilities for confiscated chimps in Uganda. UWEC should be issued an official holding permit.



2. UWEC recognizes the State as ultimate guardian. However, as a stakeholder UWEC will have a voice in the final disposal of the animals. A policy should be established that captive chimps should not be used for medical research (except non-invasive research), entertainment industry, pet trade, private holding, or display at schools and fairs.
3. Maintenance of captive chimps should follow international zoo regulations.
4. Captive chimps should be managed under the guidance of a recognized management committee.
5. Education of concerned governmental bodies (e.g., police, customs) should start as soon as possible and be ongoing.
6. Only non-invasive studies should be allowed on captive chimps, with emphasis on research that will benefit their management.
7. Reintroduction or welfare releases of chimps in Uganda should not take place. Instead, efforts should be made to manage existing wild populations.
8. Sanctuaries should be established outside of protected areas, away from wild populations and human settlements. Tourist accessibility must be considered.
9. No sanctuary should be built without adequate holding facilities. A uniform set of guidelines must be followed for facility design according to standards set by the international zoo community for captive chimps.
10. Establishment of a new sanctuary in Lake Victoria is proposed. This sanctuary should have adequate holding facilities for a carrying capacity of 30 chimps.
11. Due to the fundamental problems at Isinga, this sanctuary should be considered as a short-term solution; it should be closed down within approximately one year and the chimpanzees relocated.
12. The formation of a management committee of persons specializing in captive chimpanzees is necessary. At a minimum, this committee should include a veterinarian with chimpanzee experience, an expert in captive chimpanzee management and representatives of UWA and the Forest Department.
13. Before any new chimp is introduced to the captive community of Uganda, their subspecies designation should be identified. If they are not *P. t. schweinfurthii*, they should be relocated. Individuals unsuitable for sanctuary situations will be maintained at UWEC.
14. Any introductions of confiscated infants to existing groups should be conducted according to international captive management guidelines and should be monitored closely.
15. Some controlled breeding should be allowed. UWEC plans to provide available space for 15 arrivals in 20 years.

16. Male chimps should be vasectomized not castrated to avoid behavioral changes. Females should be tubal ligated, not given a full hysterectomy. Temporary sterilization in the form of contraception is recommended. The use of implants is recommended over oral contraceptives, as administration is more reliable.
17. All chimpanzees from Isinga Island will be translocated to a proposed Lake Victoria island, together with five pairs of chimpanzees from UWEC.
18. Extremely limited breeding will be allowed at the Lake Victoria sanctuary with a maximum of five offspring in 20 years, allowing for flexibility due to excess confiscations and mortality.
19. UWEC will serve as a receiving facility for new arrivals, limiting breeding to two young in 20 years.
20. At present there is no estimated need for an international captive breeding program for conservation purposes for *P.t. schweinfurthii*. Ongoing assessments for the need of such a breeding program are necessary.
21. The international zoo community should be contacted if individuals confiscated in Uganda are not *P. t. schweinfurthii*, for possible relocation to a captive breeding program if return to the country of export is not deemed appropriate.
22. The captive breeding community will continue to liaise with the international zoo community on chimpanzee management techniques.
23. UWEC should continue to maintain responsibility for fundraising and develop the conservation education program in consultation with UWA. ■

Submitted by Philip Miller, Program Officer, CBSG.

## Edward's Aquifer Ecosystem Management Plan



CBSG was invited by the US Fish and Wildlife Service (USFWS) office in Austin, Texas to assist in developing a management plan for the Edwards Aquifer ecosystem that provides guidance concerning the impact of diverse activities on the survival and viability of the endemic species residing in this system. A group of five species has been declared endangered and is particularly vulnerable to the drying of the San Marcos and Comal Springs outflows from the aquifer.

These species include: Texas blind salamander (*Typhlomolge rathnbuni*), San Marcos salamander (*Eurycea nana*), Fountain darter (*Etheostoma fonticola*), San Marcos gambusia (*Gambusia georgei*), and Texas wild-rice (*Zizania texana*).

Additional species are being considered for USFWS listing. This system has the highest level of endemic species for any similar aquifer system in the world, and a number of human considerations directly impact the survival of these species in their habitat.

CBSG has assisted the USFWS and its collaborating stakeholders to undertake an interactive science and stakeholder ecosystem assessment and evaluation of management scenarios, in an attempt to reach agreement on feasible management processes. This is being accomplished in a series of workshops concerning the management of the species listed above. The first workshop was held in October 1996, with the aim of broadening stakeholder participation, intensifying the available scientific information and identifying its limitations, and beginning to evaluate feasible courses of action and management options to achieve the objective of the program. The broad goal of the process was to "balance the socioeconomic needs of the Edwards Aquifer region while ensuring the survival of species in their habitat." A wide range of management options was ranked by working groups using multiple criteria with the overall objective of species protection and recovery. This provided a preliminary indication of possible management options to address the threats to spring flow and the species.

As another stage in the problem-solving process, a series of four one-day workshops was held in Austin in November 1996. At these meetings, each of three groups of biologists working on salamanders, the Fountain darter, Texas wild rice, as well as a hydrology working group, conducted a more detailed analysis and characterization of the direct and indirect effects of differing flow rates on these species.

In March 1997, a joint meeting of the hydrologists and biologists was held to identify and make more explicit the possible management options and their effect on spring flow and the survival of the various species in their habitat. After lengthy discussions, a list of possible management options, derived from those originally developed by the Hydrology working group at the first workshop, was developed. New criteria were generated against which each option was ranked, again with the overall objective of species protection and recovery. These rankings provide a more thorough indication of the possible aquifer management options that might be used to address the threats to spring flow. ■

Submitted by Susie Ellis, Senior Program Officer, CBSG

## Imperiled Penguins: Penguin CAMP Report



In 1992, a draft Penguin Conservation Assessment and Management Plan (CAMP) was generated at a workshop in New Zealand and its results presented to the Second International Penguin Conference at Phillip Island, Australia. In order to provide a substantive review and update of the document, with wide participation from the penguin research community, a Penguin CAMP workshop was held on 8-9 September 1996 just following the Third International Penguin Conference in Cape Town, South Africa. Thirty-seven people from 10 countries participated in the two-day event, which was generously sponsored by Sea World, Inc. and the New England Aquarium.

At the workshop, workbooks containing the taxon data sheets from the previous meeting, as well as data sheets that had since been revised for the Antarctic species, were distributed to the participants. Using that material as background, the workshop focused on updating and compiling all available information concerning the status of the 20 penguin taxa being reviewed. The development of the draft report is in progress and will be available from the CBSG office within the next few months.

The results of the workshop were startling and alarming. Data indicated that of all the penguin species, only those in the Antarctic do not seem to be facing grave, documented declines or other problems that put them at serious risk. Even Antarctic species

are not secure in perpetuity -- the threats that have put the other penguin species at risk appear to have spread to the boundaries of the Antarctic. Of greatest concern is that whereas five years ago, only five penguin species were considered threatened, penguin biologists now consider 11 taxa (9 species) to fall under one of the IUCN Categories of Threat and two as Near Threatened (see Table 1).

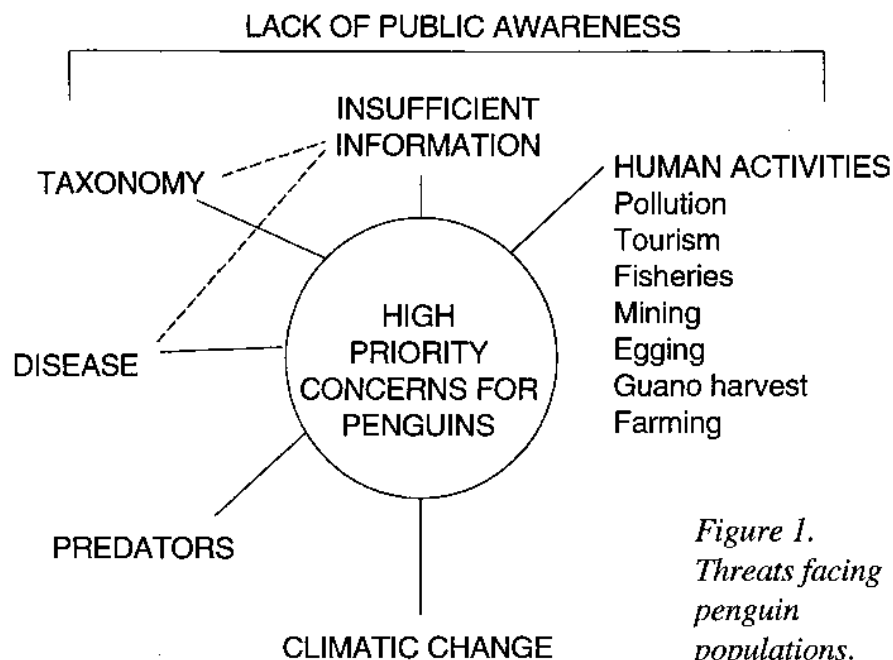
Of particular concern is the erect-crested penguin, which inhabits a single site in New Zealand. It is known to have a relatively small population size, but there are no ongoing field studies at present. Even without intense, species-focused studies, the erect-crested penguin has been documented to have undergone a decline of approximately 50% over the past 20 years at Antipodes Island, 100% decline over 20 years at Campbell Island (now extinct on that island), with status unknown at Bounty and Auckland Islands. Since most of the other populations of Eudyptid penguins have declined dramatically, extrapolations might indicate that this species may be in even a more dire situation than biologists are currently able to document.

The fact that two of the more globally abundant and widespread species, macaroni and African penguins, qualify for Near Threatened status also is alarming. Additionally, the three subspecies of rockhopper penguins had been thought to be secure prior to a serious review of the data, with many numbers and widespread breeding sites. However, over the last three generations the species has undergone a serious decline. Combined, this information suggests that there

Table 1. Status of penguin species classified by IUCN Categories of Threat.

<i>Eudyptula minor albosignata</i>	White-flipped penguin	Endangered
<i>Eudyptes sclateri</i>	Erect-crested penguin	Endangered
<i>Eudyptes robustus</i>	Snares Island crested penguin	Vulnerable
<i>Eudyptes pachyrhynchus</i>	Fiordland crested penguin	Vulnerable
<i>Eudyptes schlegeli</i>	Royal penguin	Vulnerable
<i>Eudyptes chrysochome chrysochome</i>	Southern rockhopper penguin	Vulnerable
<i>Eudyptes c. filholi</i>	Eastern rockhopper penguin	Vulnerable
<i>Eudyptes c. moseleyi</i>	Northern rockhopper penguin	Vulnerable
<i>Megadyptes antipodes</i>	Yellow-eyed penguin	Vulnerable
<i>Spheniscus mendiculus</i>	Peruvian penguin	Vulnerable
<i>Spheniscus humboldti</i>	Humboldt penguin	Vulnerable
<i>Spheniscus demersus</i>	African penguin	Near Threatened
<i>Eudyptes chrysolophus</i>	Macaroni penguin	Near Threatened
<i>Spheniscus magellanicus</i>	Magellanic penguin	Near Threatened (some populations)





*Figure 1.  
Threats facing  
penguin  
populations.*

may be very general environmental factors contributing to the decline of penguin species, and that the state of the global ocean environment is of serious concern. These environmental factors may not be direct human-related factors which could be managed, but more likely include indirect problems such as changes in the ocean and climate, which are more difficult to control. Present, documented threats to penguin species identified by the workshop participants are summarized in Figure 1.

Human-caused factors also are a problem for penguins, in particular, oiling and fisheries interaction. Biologists did not realize how serious and long-term the oiling situation is for penguins until recently, with chronic bilge dumping an issue of particular concern. African, Humboldt, and Magellanic populations have all been hit with serious oiling incidences over the past decade, some with profound consequences. Five years ago, Humboldt penguins were the only Spheniscid species considered threatened; all three of these species were assessed as Vulnerable in the present review because of tremendous population declines, some directly attributable to oiling and related problems.

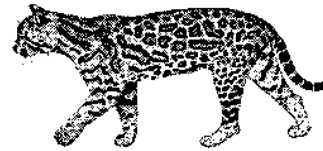
Fisheries interactions, with overfishing on a worldwide scale of krill, pilchard and other penguin prey species, also have been an important contributing factor to penguin population declines. Workshop participants suggested that the non-selective fish meal industry may have a much larger influence than

previously realized, because it fishes those species to which the penguins turn when their preferred prey sources have been depleted.

Adding to these problems is a lack of knowledge concerning status and, in some cases, taxonomy. This leads to difficulty in accurately determining the extent of the effects of threats as well as how to manage them. It appears that penguin species are facing a critical potential for extinction, perhaps unparalleled in their history. The participants of the Penguin CAMP workshop emphasized that penguins should not be viewed in isolation from their environment, and urged action now to try to stop their declines, enlisting the media in documenting their plight for the general public. It is clear that the situation facing penguins now is an unpleasant foretaste of the situation that all marine organisms will be facing in the future, unless we can catalyze immediate and effective change. ■

*Submitted by Susie Ellis, Senior Program Officer,  
CBSG.*

## A Regional Plan for Managing and Conserving Mesoamerican Felids



Wild populations of felids in Mesoamerica are in peril. Mesoamerica provides native habitat to seven wild cat species, including the puma (*Felis concolor*), jaguar (*Panthera onca*), jaguarundi (*Herpailurus yaguarondi*), ocelot (*Leopardus pardalis*), oncilla (*Leopardus tigrinus*), margay (*Leopardus wiedi*) and bobcat (*Lynx rufus*). Of these, only the bobcat is considered secure from the risk of extinction. The primary problem in conserving Mesoamerican felids is a lack of knowledge about the status and ecology of wild cats and how they should be managed in the wild and in zoos. The constant constriction of wild habitat has led to two problems. The first is fewer natural food sources and an increase in wild cats preying on domestic livestock, resulting in human-animal conflict. The second is the capture of wild felids that subsequently are "dumped" in zoos or rescue centers, or increasingly are maintained on local farms. Captured cats then become refugees of deforestation and usually end up in zoos where there are no clear management programs.

To begin to address these challenges, a five-day workshop was held at the Simon Bolivar Zoo in San Jose, Costa Rica 7-12 April 1997. The participants included 80 felid specialists representing nine countries in the region, including Panama, Mexico, El Salvador, Belize, Guatemala, Cuba, Mexico, Costa Rica, and the Dominican Republic.

The genesis of this meeting was the 1991 Felid Conservation Assessment and Management Planning (CAMP) workshop jointly held by the CBSG and the North American Felid Taxon Advisory Group (Felid TAG) of the American Zoo and Aquarium Association (AZA). This workshop was the first attempt to compile information on the conservation status of the world's cats and to identify high priority management needs. Although a great deal of information was generated, the CAMP report lacked important information from specialists in the range regions. One outcome of that effort was a Regional Felid CAMP workshop held in Brazil in 1994 that amplified the information base for felids endemic to South America.

This 1997 workshop sought to refine existing CAMP data and recommendations and address issues relating to Mesoamerican felids in nature and zoos, including education, training and the development of a regional network. Following brief daily plenary sessions, participants convened species working groups to update the latest information on status, threats and

management recommendations for the puma, jaguar, jaguarundi, ocelot, oncilla and margay.

### Summary of CAMP Recommendations

The six Mesoamerican felid species were assessed against the new IUCN Red List Criteria with the following results:

<i>Puma</i> :	Critically Endangered (El Salvador); Endangered (Panama); Vulnerable (Belize)
<i>Jaguar</i> :	Endangered
<i>Jaguarundi</i> :	Data Deficient
<i>Ocelot</i> :	Data Deficient
<i>Oncilla</i> :	Data Deficient
<i>Margay</i> :	Data Deficient

Of all the threats facing the endemic Mesoamerican felids, the most striking is habitat loss and fragmentation, primarily caused by deforestation and conversion of forest to agriculture, as well as ranching, logging, and other human activities. Direct human activities, such as hunting and introduction of competitive, exotic species, also pose a serious threat.

None of the taxa were thought to currently require Population and Habitat Viability Assessment (PHVA) workshops. Tentative or "pending" PHVA workshops were recommended for all species but ocelots, but further field data are required for all species before plans can be made.

Recommendations for research management for each species were made in the following categories:  
***Puma***: Surveys, monitoring, natural history studies, reproductive studies, habitat management, husbandry research, disease research, translocation, environmental education programs, taxonomic research.

***Jaguar***: Taxonomic studies, translocation, surveys, monitoring, habitat management, limiting factors research, limiting factors management, reintroduction, studies of infectious diseases.

***Jaguarundi***: Surveys, monitoring, life history studies, infectious disease studies.

***Ocelot***: Surveys, monitoring, taxonomic studies, habitat management, life history studies, reproductive studies in captivity, control of hunting and illegal trade, environmental education plans.

***Oncilla***: Taxonomic studies, surveys, monitoring, limiting factors research, life history studies.

**Margay:** Surveys, life history studies, distribution studies, reproductive studies, habitat management, captive husbandry investigations, monitoring for translocation, and animal health studies.

Two taxa were recommended for one of three levels of captive programs (based in part on the new IUCN Red List criteria):

Level 1	Tigrillo (El Salvador only)
Level 2	Tigrillo (Guatemala and Costa Rica only)
Level 3	Jaguar; Jaguarundi; Ocelot (Mexico only)
Pending	Ocelot (all countries but Mexico); Oncilla
No	Puma

Pending status means that recommendations for a captive program would be postponed until further information was available, either from survey, a PHVA or from sources which need to be queried.

**Summary Of Issues Affecting Mesoamerican Felid Conservation**

The CAMP exercise was completed on Day 2, and was followed by a plenary brainstorming session designed to identify general issues and problems affecting felid conservation in Mesoamerica. Twenty-five separate issues were identified and then collapsed into five topics for working group discussions. Each working group identified several priority strategies for action listed below.

**Wild Populations – Proposed Actions**

Knowledge

- Develop interdisciplinary working groups in each country to establish research objectives.
- Develop academic exchange among the different research projects in each country.
- Conduct a series of training workshops and methodology standardization for: 1) physical and chemical management of wild felids; 2) estimating population size; 3) applying Geographic Information Systems (GIS); 4) using radiotelemetry; and 5) genetic research techniques.

Communication

- Develop an electronic network.
- Promote a follow-up regional meeting.
- Strengthen information centers.
- Make a regional directory of researchers and people interested in wild felids.
- Strengthen links with other groups (e.g., AZA Felid TAG and IUCN Cat Specialist Group).
- Propose national representatives to serve as liaisons between investigators.

Funding

- Create a foundation directory.
- Create a regional fund for wild felid research.
- Foster the development of projects that can be funded by alternative sources (e.g., ecotourism, books).

**Captive Management – Proposed Actions**  
Exhibition

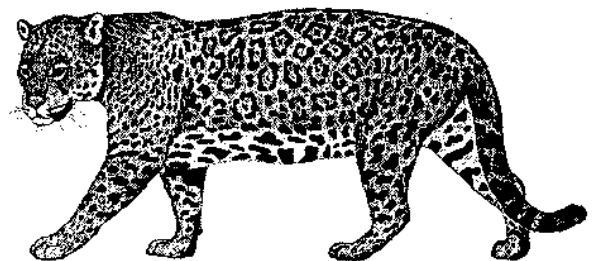
- Improve cage plantings and furnishings and enrich environments.
- Improve husbandry practices.
- Use vitamin supplements on a regular basis.
- Minimize human contact during hand-rearing.
- Develop and standardize registries for each species.
- Hold a three-day registry training session.
- Genetically manage populations once pedigrees have been documented.
- Promote more interactions among researchers.

Rehabilitation

- Identify all individuals.
- Develop a registry for rehabilitated specimens.
- Develop a genetic resource bank using material from rehabilitated animals.

Rescue Centers

- Perform consistent evaluations of all individuals.
- Collect and maintain data on individuals (general information, physical condition, location, etc.).
- Develop consistent disposition evaluations (immediate release, rehabilitation, or euthanasia).
- Establish communication networks.
- Work to ensure that animals stay in rescue centers as short a time as possible.



**Veterinary Management – Proposed Actions**

Interdisciplinary Interaction

- Obtain verbal commitments from veterinarians and field biologists at this meeting to improve interaction.
- Create a directory with all the workshop participants and contact information.
- Veterinarians from each country represented at the meeting will communicate with all institutions conducting research in his/her country about the need for collaboration.

- Ensure that at least one veterinarian from each country attends AMAZOO events.
- Promote investigation of epizootic and zoonotic diseases of captive and wild animals.

Training and Incentives

- Form a Mesoamerican Wildlife Veterinary Specialist Group within AMAZOO to facilitate communication and continuous exchange.
- Produce a newsletter to share experiences, advice, work, etc. to be distributed on a regular basis.
- Recommend to veterinary school faculties that wildlife medicine be included in curriculum.
- Work toward legislation ensuring that wildlife is maintained in adequate facilities and under veterinary supervision in each country.

Infrastructure, Equipment, and Technology

- AMAZOO should provide information to zoos concerning minimal enclosure requirements to promote animal well being and facilitate veterinary care.
- Identify national and international institutions that might donate or sell used equipment at low cost.
- Promote collaboration among veterinarians and physicians.

***Education – Proposed Actions***

Political (short-term)

- Promote a national plan of environmental education for the conservation of felids, in accordance with the social, political, and economic reality for each country.
- Sensitize decision-makers to obtain their support.
- Revise the education laws in each country to incorporate the action plan.
- Obtain media support to advertise the plan.

Political (long-term)

- Put the action plan into place.
- Carry out programs that ameliorate the problems facing Mesoamerican felids, taking into account both urban and rural needs, interests and priorities.

Institutional (short-term)

- Determine available human resources for execution of a regional action plan for environmental education.
- Integrate schools and communities with respect to the implementation of projects that help solve local and regional environmental problems.

Institutional (long-term)

- Involve groups and environmental organizations with the capacity to design and execute programs directed at solving felid conservation problems.
- Establish participation in the design of the plan by all institutions responsible for implementation.

Research (short-term)

- Determine the human resources available for the execution of an environmental education action plan.
- Identify and prioritize the problems that threaten felids by area and focus on the most critical first.
- Foster research and experiments involving the community.

Research (long-term)

- Look for technical and financial resources to implement the action plan.
- Design education programs about Mesoamerican felids at all educational levels.
- Create a Mesoamerican felid database to strengthen a communication network.

Training and Curriculum (short-term)

- Coordinate training activities inter-institutionally, concentrating both on formal and informal activities.

- Develop stimulating educational materials for felids

Training and Curriculum (long-term)

- Train teachers, park guards, and community leaders in environmental education (formally and informally).
- Continue developing exciting, stimulating materials for felid education taking into account the population goals and environmental resources.

The final topic which was identified as a key issue, the development of a network, was discussed in plenary. Follow-up discussions will be held at the upcoming meeting of AMAZOO in June 1997 in Costa Rica and also in Cuba in 1998, with the development of a formal Mesoamerican Felid Network forthcoming within the next two years.

These workshop recommendations are not viewed as "stand-alone" initiatives but rather as components of the overall need for the conservation of Neotropical ecosystems. Many of the species reviewed in this document are excellent candidates (as bio-indicators, key species or flagships) to help facilitate larger-scale conservation programs. The participants therefore urge their inclusion in the planning stages of projects related to research, monitoring and further management of Mesoamerican forests, protected areas and other natural ecosystems, and the consideration of all the general recommendations from this workshop as these plans are developed and reviewed. ■

*Submitted by David Wildt, AZA Felid TAG Chair, and Onnie Byers and Susie Ellis, Program Officers, CBSG. Artwork by Marcelo Aranda.*

## Biodiversity Conservation Prioritization Project for India and the CAMP Process

The Biodiversity Support Program, sponsored by USAID and orchestrated by World Wildlife Fund, The Nature Conservancy and World Resources Institute, invited WWF-India to work with other Indian NGOs and the state and central government to implement a Biodiversity Conservation Prioritization Project (BCPP) for India. The Project is an outcome of the Rio Convention, where signatory nations agreed to prioritize their species and sites and to develop strategies for conservation of biodiversity in their country.

The objective of the BCPP is to use a multi-disciplinary approach to determine conservation priorities for India and to develop a document describing priority sites and strategies for the conservation of Indian biodiversity. A secondary objective is to develop methodology to be used as a model for other countries.

Following a workshop in which the CAMP process, using the IUCN Red List Criteria, was identified as possibly the best means of prioritizing species, CBSG, India proposed workshops for mammals, marine organisms, amphibians, reptiles, freshwater fish, invertebrates and plants as part of the BCPP. (Birds are already being assessed in another project by the Salim Ali Center for Ornithology and Natural History, which is coordinating this endangered species component of the BCPP, and monitoring the CAMPs.)

After contacting different institutes and assessing their willingness to host a workshop, reasonable subject divisions were made out of the larger groups. CBSG, India with another NGO has already conducted three CAMP workshops on medicinal plants of southern India, so assessing medicinal plants from other areas of India was a natural progression. With the Forest Department as host and more than 40 specialists from 20 different botanical institutions in attendance, the CAMP workshop was conducted under the BCPP during 21-25 January 1997 at Kukrail Park in Lucknow. In this CAMP workshop for northeast, northwest, and central Indian plants, 77 species were assessed. Preliminary results indicate that 34 plants are Critical, 19 Endangered, 16 Vulnerable, 11 Lower Risk, and 2 Data Deficient.

The next CAMP workshop was conducted for soil invertebrates of southern India. Southern India was selected as the venue because of the presence of a very active Zoological Survey of India and a very large percentage of long-term field entomologists.

The selection of this group of invertebrates was achieved in a small meeting of eminent entomologists of southern India based on the results of known field surveys, the importance of soil invertebrates, reports of decline of important species, and the challenge of attempting to use the CAMP process and IUCN Red List criteria on such an unwieldy group. This workshop also included brainstorming and strategy sessions on how to address the subject of further species assessment in the veritable ocean of invertebrates which makes up India. Attending the CAMP were 32 specialists from 15 institutions. Eighty species were assessed, indicating that 10 were Critical, 21 Endangered, 16 Vulnerable, 28 Lower Risk, 4 Data Deficient, and 1 Not Evaluated.

The largest group of animals to be considered will be marine organisms. Collaborating institutions held two days of discussions on the CAMP process, determining these CAMPs will focus on coral and mangrove species.

CAMPs for Indian reptiles will be carried out in Coimbatore hosted by the Forest Department of Tamil Nadu with ISRSG as collaborator. The CAMP for amphibians will be held at Utkal University in Bhubaneswar with the Orissa Forest Department and DAPTF-SA as collaborators. A CAMP for freshwater fish will be conducted at Lucknow, hosted by the National Bureau of Fish Genetics Resources, and a mammal CAMP will be hosted by the Center for Ecological Studies, Indian Institute for Science, Bangalore.

At the end of the CAMP workshops, many promising conservationists will have been identified who would make excellent facilitators and organizers of future exercises. CBSG, India then hopes to be in a position to organize a full CBSG Facilitators Training Course for these individuals.

CBSG has worked hard to empower people in range countries to conduct their own workshops. The BCPP protocol emphasizes that the activities carried out under its aegis be largely conducted within India, and CBSG, India's experience to date has been very successful.

The objectives of the BCPP can best be summarized as an attempt to work with the Government and citizens of India to meet our various obligations under the Convention of Biological Diversity. It is a privilege to drive such an important project and a joy to have the tools, both in the CAMP process and in facilitation, to make it work. ■



*Submitted by Sally Walker,  
Convener, CBSG, India*

## Cuban CAMP Report



A Conservation Assessment and Management Plan (CAMP) workshop was held on 7–10 March 1997 to evaluate the threatened status of 15 Cuban taxa. Organized by the Jardín Zoológico de Havana and facilitated by CBSG, this workshop enabled participants from eight Cuban institutions to evaluate the status and threats of each taxon and to outline needed conservation action. Taxa analyzed during the workshop included 2 land snails, 11 reptiles, 2 birds and 1 mammal. Cuban researchers with experience in each species, biologists experienced in captive management, and specialists from protected areas participated in the workshop and evaluated the condition of each species and their habitat.

A general recommendation of workshop participants was that the development and application of the CAMP process be continued in Cuba. Tentative arrangements have been made with CBSG to lead other CAMPs in March 1998, continuing this assessment of Cuban endemic species and subspecies. In addition, it was proposed that a PHVA be conducted for the Almiquí (*Solenodon*) for the same date. The status, threats and associated recommendations specific to each taxon follow.

***Polymita* spp. (land snail):** This genus is endemic to eastern Cuba with six taxa considered to be endangered or critical, based fundamentally on habitat fragmentation and indiscriminate collecting. The majority of the populations of the different species have declined except *P. venusta* and *P. muscarum*, which are more or less stable. Aspects of the genetics, ecology and population dynamics have been studied with recorded densities between 0.04–3.6 individuals/m<sup>2</sup>. The risk of extinction is considerable because of indiscriminate collecting, habitat destruction, decreasing distribution, and cattle production. *Recommendation: Habitat management and environmental education.*

***Liguus fasciatus* (land snail):** This species is listed as Endangered on the IUCN Red List. Population densities studied between 1989 and 1996 fluctuated between 0.05–0.6 individuals/m<sup>2</sup>. The risk of extinction is exacerbated by habitat fragmentation and destruction. *Recommendation: Habitat management.*

***Crocodylus acutus* (American crocodile):** This species is classified as Endangered; however the category of Vulnerable was proposed for the Cuban population. This species has a wide distribution in coastal swamps of the Cuban Archipelago, though the

habitat is fragmented. Population studies in two localities indicate stable or increasing trends. The captive population of approximately 6,000 animals is maintained in six facilities. Principal threats include illegal hunting for food, accidental death in fishing nets, habitat loss and fragmentation, pollution from pesticides and industrial tailing, and hurricanes.

*Recommendations: Population census, monitoring, habitat management, and life history studies.*

***Crocodylus rhombifer* (Cuban crocodile):** This species is endemic to Cuba. Its status is Endangered because of its restricted distribution to a single locality in the wild (about 80% of the wild population occupies an area of approximately 300 km<sup>2</sup>). There is another area of approximate 100 km<sup>2</sup> where it has been reintroduced (600 individuals). The wild population is estimated to be around 6,000–18,000 individuals. Two breeding farms maintain a breeding population of approximately 800 individuals. The principal threats in the wild are illegal hunting for food, interspecific competition with an exotic species (*Caiman crocodylus*) in areas of reintroduction, habitat loss, and hurricanes. *Recommendations: Genetic studies (hybridization), translocation (establishment of satellite populations), habitat management, investigation of limiting factors and life history, and clarification of interspecific relationships with C. crocodylus.*

***Epicrates angulifer* (Cuban Boa):** This species is endemic and monotypic to Cuba. It is classified as Near Threatened, based on its wide geographic distribution and relative abundance. Populations are found in two protected areas, and there are a few isolated specimens in zoos. The principal threat for the species is persecution from the rural population who believes that they prey upon their poultry. *Recommendations: Development of education program, control of natural population, and captive breeding for education and research.*

***Anolis vermiculatus* (Water Anole):** This lizard is endemic to Cuba and inhabits only the gallery forests of the Cordilera of Guaniguanico. It is proposed to be listed as Lower Risk (Near Threatened) since its populations have remained stable in recent years. Censuses in Soroa suggest a population density of about 132 individuals/hectare. This species is very difficult to raise in captivity due to its habitat specialization and ecological adaptations. *Recommendations: Genetic studies, population census and monitoring, studies of the limiting factors and life history, possible PHVA (dependent upon more data).*

***Anolis pigmae questris* (Dwarf Anole):** This critically endangered species is confined to Key Frances, its type location. About 80 individuals are

estimated to remain in the wild with none in captivity. Its threatened status is attributable to fragmentation of the ecosystem.

**Anolis equestris ssp. (Night Anole):** This is a critically endangered population existing in the Key of the Harridans. According to 1996 studies, the wild population is estimated at 40 individuals with no animals present in captivity. The risk of extinction is high due to advances of a quarry in the remaining forest. *Recommendation: Urgent to initiate a captive program immediately.*

**Trachemys decussata (West Indian Slider):** One of the two subspecies, *T.d. angusta*, is endemic to Cuba. This turtle is considered almost threatened due to threats from abiotic and biotic factors, particularly those associated with humans. A captive population exists with promising results. *Recommendation: Protection throughout its distribution.*

**Cricosaura typica (Cuban Night Lizard):** This species is endemic and monotypic in Cuba. It is classified as Endangered due to fragmentation and loss of its habitat. The population density is estimated at 0.3-2.30 individuals/m<sup>2</sup>. Field studies conducted in 1987-1990 focused on abundance and utilization of resources. *Recommendations: Population monitoring, studies focusing on reproduction, limiting factors, and life history parameters.*

**Grus camalensis nesiotas (Sandhill Crane):** This endemic subspecies is considered Vulnerable due to population reductions caused by loss of nesting sites and nest predation. In this century two populations have been extirpated in Guanabo, Pinegrove of the River, Ariguanabo and Havana, with other populations apparently stable. Threats include poaching for food, interference and persecution by humans, habitat loss, invasion of exotic plants, pesticides, fires and hurricanes. *Recommendations: Environmental education, taxonomic and genetic studies, population census, ecological study, and PHVA.*

**Geotrygon caniceps caniceps (Cuban Quail Dove):** This subspecies, endemic to Cuba, is considered at risk due to the destruction of its habitat and reduction of its populations. Its range is approximately 10,500 km<sup>2</sup>. Additional threats are illegal hunting for food, predation, fires and hurricanes. In spite of insufficient data to evaluate the populations, populations are believed to currently be stable. *Recommendations: Autoecology studies in the wild and captive breeding.*

**Capromys melanurus (Andaraz Hutia):** This endemic rodent is located in three zones of eastern Cuba, with densities estimated from 0.28 animals / km<sup>2</sup> to 9 animals / hectare. In the last decade reproduction

has been achieved in captivity. Threats to this species are habitat destruction and trapping for human consumption. *Recommendations: Population and habitat management, control of exotic predators, and environmental education.*

The following suggestions were given by the participants at the conclusion of the workshop:

- Establish periodic meetings in order to follow-up on the implementation of the recommended projects.
- Plan which species are studied in the future, to determine the objectives of those studies, to incorporate more scientists into the process, and to continue with the work.
- Influence the administration and policy of each institution to advance studies on the assessed species.
- Conduct a CAMP for other species of Cuban vertebrates that have some degree of threat and to plan similar studies for plants and invertebrates.
- Extrapolate the CAMP process to natural communities and ecosystems.
- Conduct a PHVA for some of these species.
- Develop a national biodiversity program to present to the authorities.
- Promote the development of a series of programs on the Cuban species to be presented to the media.
- Give a greater emphasis to the exhibition of Cuban species in the zoological parks.
- Establish a greater coordination between the personnel who work in the zoological gardens and those who work in the field.
- Include in the zoological parks those species recommended in the CAMP for educational programs. ■

*Submitted by Yolanda Matamoros, Simon Bolivar Zoo, Elssie Perez Dulon, Havana Zoological Garden, and Ulysses Seal, Chairman, CBSG*



## Giant Panda Master Planning Workshop Report



The endangered giant panda (*Ailuropoda melanoleuca*) is endemic to the mountains of Sichuan, Gansu and Shanxi Provinces in China. Historically the species was more widely distributed and may have numbered 100,000 animals, but it has declined to about 900 to 1,200 animals as the result of habitat loss, hunting, bamboo die-offs, and disease. Giant pandas are fragmented into perhaps 32 subpopulations with no opportunity for natural genetic exchange. Efforts to establish an effective captive conservation management and research program for this species have been hampered by a lack of resources, deficiencies in knowledge about species biology, and intense international interest in exhibition of the species, which sometimes has presented political impediments and complications. The captive population has an integral role to play in the survival of this species, both as a hedge against extinction and as a source of animals for intensive biological studies. Giant pandas in zoos and breeding centers also are of great importance for attracting substantial public support for conservation of the species in the wild.

It is well-recognized in China that a new captive management plan needs to be developed and initiated for the giant panda, largely without pressures from forces outside of the country. CBSG is a natural resource for helping re-initiate neutral discussions and action, having conducted similar efforts in China, including a PHVA workshop for the baiji dolphin in 1994 and a Captive Management Master Planning workshop for the South China tiger in 1995. After a formal invitation from the Chinese Association of Zoological Gardens (CAZG) and the Ministry of Construction, CBSG agreed to facilitate discussions to develop explicit recommendations for the captive giant panda population within China.

The result was a Captive Breeding Master Planning Workshop for the giant panda held 10-13 December 1996 for all facilities under the authority of the Ministry of Construction. Dr. Ulysses Seal led plenary discussion, and a team of CBSG specialists including Drs. David Wildt (reproduction), Jill Mellen (behavior), Lyndsay Phillips (veterinary medicine/disease) and Phil Miller (population biology) facilitated working groups and provided advice. Dr. Don Lindburg of the Zoological Society of San Diego (which has ongoing projects with the Chinese involv-

ing giant pandas) also was an active participant. In addition, approximately 50 other individuals representing various Chinese institutions and government organizations participated in the workshop.

The objectives of the workshop were to assist local captive population managers and policy makers: 1) to formulate priorities for a practical and scientific management program that fully utilized all available founders in captivity for the purpose of developing a healthy, growing population of giant pandas in China; 2) to formulate a program that is linked to the wild population, including the possible reintroduction of individuals, if needed; 3) to eliminate the need to take more giant pandas from the wild; 4) to develop a risk analysis and simulation population model for the captive population to guide and evaluate management and research activities; 5) to identify useful technology transfer and training, including evaluation of all adult, reproductive-age giant pandas in Chinese institutions; and 6) to identify and recruit potential international collaborators to enhance action.

A draft report was developed based upon working group and plenary discussions and consensus, with all recommendations reviewed and agreed upon by the participants. These draft recommendations are presented here.

### Recommendations

#### Long-Term Goal

*"Develop a self-sustaining, captive population of giant pandas in China that will assist supporting of a long-term, viable population in the wild".*

#### General Objectives

- The captive population should be increased to produce a surplus sufficient for reintroduction if needed.
- The wild and captive populations should be evaluated together by a Population and Habitat Viability Assessment (PHVA) to develop a management plan that links captive and wild populations, including strategies for exchange of genetic material as needed to ensure viability.
- The captive population should retain its genetic diversity.
- The captive population should be used to educate the public both in China and worldwide to improve the conservation of all wildlife species, not only giant pandas.

#### General Recommendations

- Increase founder representation through recruitment of currently captive wild-caught animals into the breeding population.



- Do not collect additional wild animals for the captive population, because there are sufficient living, wild-caught animals and descendants in captivity to meet genetic and demographic goals.
- All wild-caught pandas need to be used in China to achieve the genetic, demographic, and research objectives of the self-sustaining population.
- Conduct the necessary research to recruit available captive-bred and wild-caught pandas into the breeding program or to use their genetic material and achieve consistent natural breeding.
- All institutions in China need to collaborate in the joint management of the captive population to meet the goal of a self-sustaining population in China in support of a viable wild population.

***Specific Recommendations***

Studbook and Records Working Group

- Permanent transponders must be implanted in all captive giant pandas to ensure unambiguous identification of all individuals. Chinese zoological institutions should receive technological and financial support from the international conservation community to achieve this goal.
- A genome resource bank should be developed to optimize the genetic management of giant pandas in captivity. Sperm should be collected and cryopreserved from all breeding-age males, particularly those wild-caught animals already in captivity. Blood and tissue samples should also be cryopreserved for assessing genetic variation and paternity and as reference materials for disease diagnosis.
- It is important to model simulated matings to prioritize actual mating schemes for optimal genetic and demographic management.
- It is vital that specialists in Chinese institutions become trained in current protocols for studbook file management, possibly with international assistance.

Reproduction, Behavior and Management Working Group

- There is a need to understand more clearly the factors regulating reproductive success in the female giant panda. A major urinary hormone and behavioral monitoring study should be conducted, with technical assistance and training from the San Diego Zoo.
- A matrix was generated for 30 giant panda males from 15 institutions to determine potential factors influencing male reproductive success. Dr. Lindburg and other participants will analyze this valuable data.
- Based on the negative experiences of using exogenous gonadotropins in China for stimulating ovary activity in the giant panda, it is recommended

that no gonadotropins be used during the 1997 breeding season, and that PMSG never be used in the giant panda for any purpose.

- CBSG will assist the CAZG with the development of a Genome Resource Bank action plan.
- Ms. Xie Zhong of the Chinese Association of Zoological Gardens has been named as the Giant Panda Genome Resource Bank Coordinator for China.
- To enhance AI success in the giant panda, the following needs must be satisfied through external funding:
  - a. Purchase of equipment, supplies and lab space;
  - b. Monies to hire a full-time reproductive scientist to coordinate giant panda breeding and sperm banking activities;
  - c. Monies to fund the following high priority research projects:
    - i) Finding new methods to enhance sperm motility after cryopreservation;
    - ii) Identifying the optimal time to AI a female, especially developing a rapid, one-day diagnostic test for ovulation.
- To improve the survivability of young cubs:
  - a. Funding is needed for research on artificial milk, milk production, nursing environment, aggression of mothers to humans, causes of abortion and stillbirths, and increasing immunity of newborn cubs.
  - b. Every cub that dies must undergo a thorough necropsy by a qualified veterinarian, and the findings compiled into a database for further analysis.



*Giant panda at Chongqing Zoological Garden.*

- c. Historically, cub mortality has been skewed by the small cub born as a twin receiving the same 'weight' as a healthy singleton. Therefore, two separate calculations, actual and 'adjusted' mortality, should be examined.
- Detailed recommendations were made for weaning and hand-rearing cubs, which should be adhered to by all holding facilities.
  - Older non-reproductive females (21-29 years old) should be used for two kinds of exhibits including:
    - a. Education within China about the importance of giant panda conservation; and
    - b. Education outside of China about the giant panda and its conservation.
  - Older, non-reproductive females should be used in longevity studies to determine how long, healthy giant pandas can be maintained in captivity.
  - Older, non-reproductive females should be used as recipients for embryos in future embryo transfer trials and should be used as egg donors in studies designed to develop *in vitro* fertilization.

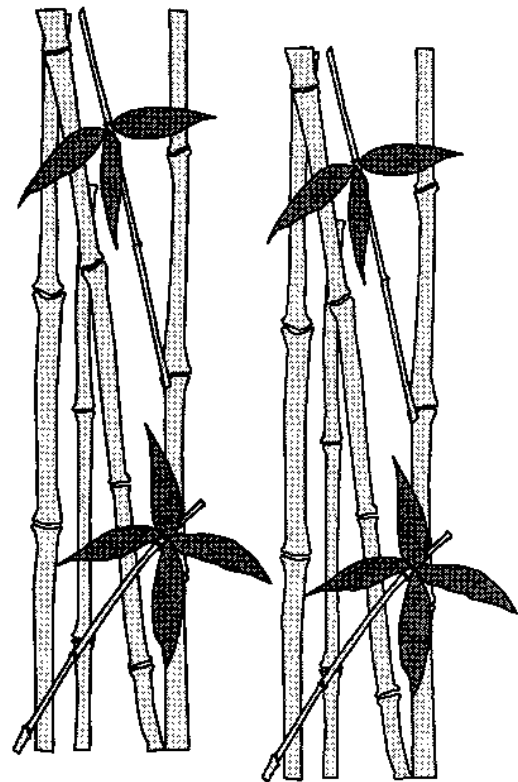
#### Veterinary Working Group

- Specific dietary requirements for the three age classes of giant pandas (infant, sub-adult, and adult) should be investigated. Dr. Zhang En-quan (Beijing Zoo) and Lin Xang Zhen (Chengdu Research Base) will serve as coordinators for creating a Nutritional Research Plan.
- There is a need to develop and adhere to a standardized diet that will be fed in all captive giant panda holding facilities.
- A multi-day veterinary workshop is needed to focus on prevalent diseases with emphasis on those afflicting the sub-adult age class.
- Improvement of veterinary capabilities and medical technology is needed, including:
  - a. Securing needed veterinary equipment.
  - b. Establishing standardization in data reports and tissue collection after postmortem examination.
  - c. Developing a central repository for pathological data.
  - d. Identifying a pathologist and/or laboratory for histopathological examination of all postmortem tissues from giant pandas.
- To achieve the objectives set forth in the previous recommendation, the following solutions are recommended:
  - a. Identify funding to upgrade existing veterinary diagnostic equipment in zoos and breeding centers.
  - b. Increase collaboration between Chinese zoos and breeding centers for the giant panda with agricultural (veterinary) and medical universities in China

to gain access to modern diagnostic equipment.

- c. Strengthen applied veterinary techniques for wildlife species in the areas of disease diagnostics, prevention, and treatment through exchange of information and veterinarians between China and developed countries.
- Eventually establish a 'Center for Pathology'.
  - To develop assisted reproductive techniques, veterinarians should first learn skills using domestic animals as models, and then transfer and refine these techniques for other wildlife species before use in the giant panda. Dr. Zhang Zhihe (Chengdu Zoo) will serve as Veterinary Coordinator through the CAZG office.
  - The permanent marking of all animals will provide the unique opportunity to collect additional data to assess the health of the entire captive population at one point in time. This should be done along with the simultaneous banking (cryopreservation) of biological samples (blood and semen) that will generate a resource of biomaterials useful for future analyses. ■

*Submitted by Philip Miller, Program Officer and David Wildt, Deputy Chair, CBSG.*



## Rome Zoo Master Plan Workshop Report



The Rome Zoo was founded in January 1911 by a private, non-profit zoological society. Planned by Carl Hagenbeck and directed by Knottnerus-Meyer, the 12-hectare zoo was taken over by the municipality of Rome in 1917. For several decades, the zoo had a long and distinguished history of exhibiting and breeding diverse species. Unfortunately, it has been in a period of decline in maintenance and improvements since 1960. It lost its autonomy within the municipality in 1981 and has had four directors since that time.

The Mayor of the City of Rome formed a Scientific Commission in 1994 to review the status of the Rome Zoo, to make recommendations for its improvement, and to establish criteria for meeting its goals. The zoo is to be closed if the goals of meeting international zoo standards and making improvements are not met by Rome's Year 2000 Jubilee. A primary objective will be the conservation of endangered species. The zoo is also intended to serve as a magnet to draw tourists' money into the Roman economy as well as to draw increased attendance by local citizens.

The Howard Gilman Foundation agreed to fund a feasibility study and first phase concept design as the first step in the master planning process. The project was undertaken by the White Oak Conservation Center and CBSG in collaboration with the Rome Zoo. The goals of the feasibility study were to provide the City Council of Rome with a concept plan and program guidelines to assist raising the facilities and operations of the Rome Zoo to meet international zoo standards and the standards recommended by the Scientific Commission of the Rome City Council.

A team of experts was assembled to undertake this first phase of planning. This team included: Koen Brouwer, European Association of Zoos and Aquariums; David Erlinger, Cincinnati Zoo; Rick Hudson, Fort Worth Zoo; Liz Hudson, Fort Worth Zoo; John Lukas, White Oak Conservation Center; Ulysses Seal, CBSG; Lee Simmons, Omaha's Henry Doorly Zoo; Claudio Manicastro, Rome Zoo; and Luigi Boitani, University of Rome. Between 10-14 February 1997 the team met and consulted with the senior staff and keepers at Rome Zoo, Friends of the Zoo Society officers, members of the Scientific Commission of the City of Rome City Council, and other professionals.

This first phase report is intended to provide a feasibility study for the preparation of a complete master plan for the Rome Zoo and to develop a concept design for the initial phase of zoo improvements to be

completed by the year 2000. The goals set for the zoo by the Scientific Commission are to develop a zoo that meets international standards for exhibits, husbandry and management and supports the priorities of conservation, education and research. The first phase of improvements needs to be completed by the Year 2000 in time for Rome's Jubilee Celebration.

The team began the first phase process with a structured analysis to identify and list problems and needs of the zoo. Preliminary possible solutions were formulated. A walking tour of the zoo with staff provided an overview of the buildings and facilities, exhibits, animal collection, support facilities, and landscaping. This review provided a basis for further concept design work on the area targeted for renovation. The choice of exhibit themes is based upon species currently held in the collection and includes an African veldt using the African hoof stock and ostriches, with the wild dogs and pygmy hippos in special exhibits. Modification of the reptile house and the large aviary is necessary to meet international standards and to increase public appeal. Designs, modifications and appropriate species are described below for each of the remaining sections in this area. All of these concepts potentially can be implemented by the year 2000.

The remainder of the zoo was analyzed for changes and modifications in structures and areas that could be made to enhance the condition of the animals, to help the areas approach international zoo standards, and to increase their exhibit appeal. Historically important structures were identified. It is also important to utilize the areas that will become available as animals are transferred to the new exhibits in the first phase construction. These modifications are a temporary solution for problems requiring more extensive changes that will be developed in the next phase of the master planning.

One of the accomplishments of the renovation proposals and this concept plan is to reduce the numbers of species and specimens in the Rome Zoo. This will be a natural consequence of the enlargement of exhibit spaces to accommodate groups of individuals and the emphasis on species conservation and education in the choice of species. The plan proposes to eliminate 22 mammal species (48 specimens) and 44 bird species (192 specimens). This will assist the transition to a modern conservation-oriented collection.

The review team was impressed by the need for the zoo administration to have responsibility and authority for all essential administrative and management functions. This includes personnel selection, staff qualifications and training, concessions, food

services, maintenance, landscaping, animal husbandry and care, and animal collection management. There is a need for all of the staff to receive professional training both within the zoo and by spending time in other institutions. The zoo needs either to be put in a private company or preferably established as a foundation, and needs to establish partnerships with corporations, universities and professional organizations in Rome, in Italy, and internationally.

## Recommendations

### General Recommendations

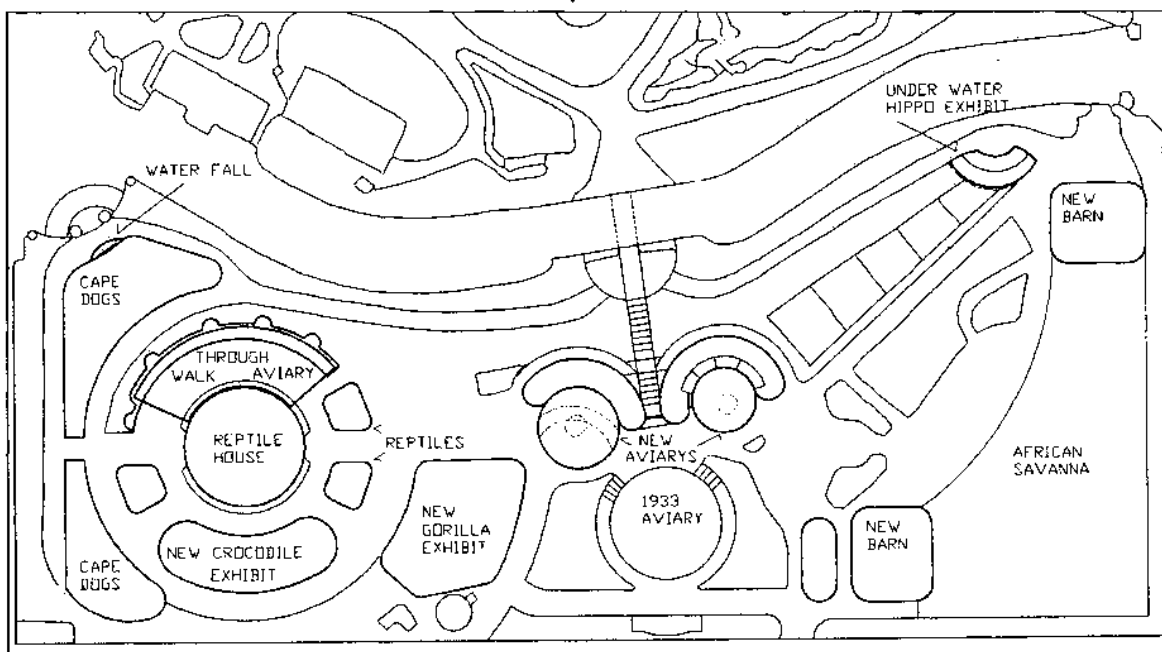
1. Obtain official approval for the concept design and commitment to implementation of the Master Plan.
2. Place administrative authority of all zoo operations including zoo maintenance, animal management and movements, personnel selection and other operations under control of a private company or foundation.
3. Develop the 'new area' as the flagship exhibit area for the Year 2000 Jubilee and as the basis for gaining public support for the renovation of the entire zoo.
4. Remove empty enclosures, modify obtrusive barriers, and improve entrance exhibits.
5. Establish professional standards and job descriptions and initiate professional development for all zoo staff.
6. Implement a broad-based contraception program to manage reproduction in the zoo collection.

7. Participate in international zoo and conservation programs to link *ex situ* and *in situ* conservation.
8. Expand staff expertise by adding more professional positions such as a veterinarian, education coordinator, and a public relations and marketing person.
9. Develop a professional climate and a pride of ownership among the zoo staff. Establish high standards of cleanliness on all of the zoo grounds and in all visitor areas, which would do much to improve public perception of the zoo.
10. Promote a positive zoo culture in Rome by implementing changes and improvements to meet modern conservation and exhibit standards and developing a public relations program.

### Specific Recommendations (partial list)

#### Exhibit Modifications

1. Remove years of accumulated rubble, trash and broken equipment from animal quarters, keeper quarters and back areas.
2. Furnish uniforms for all keepers. Wearing a uniform needs to be made a mandatory condition of employment.
3. Remove cross fences and walls that have been added since original exhibits were built.
4. Remove two structurally unsafe aviaries.
5. The old elephant house should be converted for use as a conference center and special events center. This also would be a good area for a nature bookstore.



*First phase concept design for the Rome Zoo.*

6. The large building behind the lynx exhibit has the space and potential, with remodeling, for use as a rescue center for confiscated animals.

#### First Phase Concept Design

1. Remove the ostrich, emu and cassowary and modify the exhibit to hold pygmy hippos. Lower front fence and replace with half moat/half fence combination and hedge.
2. Tear down five bird and small mammal exhibits near the reptile house. Flowerbeds should be planted temporarily until the area can be used to construct a world class state-of-the-art gorilla exhibit.
3. Retain and modify two large fenced enclosures currently housing maned wolves and cheetah to hold African wild dogs.
4. Remove translucent plastic inner dome in Reptile House, and maximize light transmission and ventilation through existing roof skylights and side windows. An improved heating and forced ventilation system needs to be provided for the central areas.
5. Reopen old unused entrance gate across Viale de Giardino Zoologico to the public in year 2000 as an entrance to the newly renovated portion of zoo.

#### Landscaping

1. Cover obtrusive elements with vegetation or other natural-looking facades.
2. Reestablish the exotic character of the original historical Rome Zoo landscape. Take advantage of the climate by planting lush tropical-looking landscapes, filled with palms, yuccas and tropical plants.
3. An experienced horticulturist should be hired to manage a staff of 4-6 gardeners.
4. Significant botanical conservation collections could be established. A small nursery area should be set up to cultivate small specimens of rare species.
5. Label outstanding botanical specimens.
6. Wherever possible, vegetation should be planted in animal enclosures or exhibits. Enclose exhibits and block objectionable features with screen or buffer with plantings.

#### Reptile Collection and Management

1. Replace the existing clear Plexiglas skylights with an ultraviolet (UV) transmitting acrylic material. Remove the inner-dome, which greatly reduces the amount of available natural light to this exhibit area.
2. Modify the basic design of many enclosures. Remove the glass tops and replace them with a sturdy wire mesh.
3. Install a cooling system and screen the windows so that they can be opened when needed.

4. Establish a designated quarantine area, possibly in the Zoo Hospital.
5. A keeper exchange program needs to be initiated.

#### Bird Collection and Management

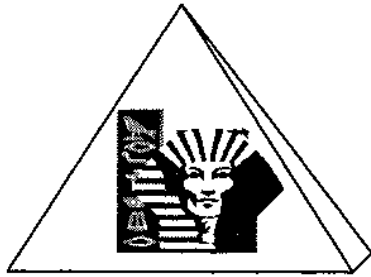
1. A veterinary consultant is needed to sex some of the birds in the collection.
2. An avian nutrition specialist should review all current bird diets.
3. All birds in the collection should be individually marked.
4. The number of birds kept in the large domed flight aviary should be reduced.
5. There are many holes in the aviary meshing, which need to be repaired.
6. The pheasant collection has no conservation value and should be removed.
7. In sunny areas of the large lake area, a wetland effect could be created by planting grasses and cattails. This would encourage wild marsh birds to use the area.

#### Mammal Collection and Management

1. Contraceptive programs need to be initiated immediately for many mammal species.
2. A mammalian nutritionist should review the composition of all current mammal diets.
3. Animal transactions should be conducted directly with other approved and or qualified zoos.
4. All mammals in the collection should be individually marked.
5. It is recommended that Rome Zoo become actively involved in *in situ* conservation activities for the African Wild Dog.
6. The Nile lechwe, or Lady Gray waterbuck, should serve as a flagship species for future conservation activities to be undertaken by the Rome Zoo in Ethiopia. ■

*Submitted by Ulysses Seal, Chair, Chairman, CBSG and John Lukas, White Oak Conservation Center.*

## Status of Egypt's Birds



Egypt possesses a strategic geographical position as a bridge between continents with long coasts on both the Mediterranean and the Red Sea. A wide variety of habitats are found in Egypt, a country whose diversity is great, striking contrast between the Nile Valley and Delta and its surrounding deserts.

Birds are an important component of Egypt's biological resources -- indeed they are the most diverse and prominent of all of the country's non-aquatic vertebrate fauna. There are more than 450 species known in Egypt with about 150 species of resident breeding birds, compared to only about 100 species of reptiles and amphibians, and a similar number of terrestrial mammal species.

Most of the bird species found in Egypt are non-breeding migrants, which pass through the country or spend the winter, and are of palaeartic origin (see Table 1). These wintering and transient bird populations, although not present in Egypt most of the year, are an important component of the country's biological diversity.

### Egypt's Importance for Birds

Egypt has a unique and strategic geographical position along migratory routes of palaeartic birds wintering in Africa. Many of these migrants congregate at "bottleneck" areas at very large concentrations. Soaring birds (such as the majority of birds of prey) are well known for congregating at such localities, but waterbirds also have several bottlenecks in Egypt. Suez province, Hurghada region, Ras Mohammed Marine parks and Gebel El Zeit are internationally important bottleneck areas for soaring birds in Egypt. Zaranik Protected Area (North Sinai) is well known as an important bottleneck area for migratory waterfowl. In addition, vast numbers of palaeartic migrant waterfowl spend the winter in Egypt's extensive wetlands.

Egypt's native avifauna is of moderate significance in terms of global avian diversity. There are no known endemic bird species, though there are several subspecies confined to unique Egyptian habitats, such

as the Nile Delta and Valley. Perhaps the most important component of Egypt's native avifauna, in terms of global biodiversity, is the Sahara-Sindian, composed largely of species adapted to life in arid environments. Moreover, there are about eight species with relatively small world distribution, for which Egypt constitutes an important part of their range.

There are also 16 globally threatened species that occur in Egypt (see Table 2). However, the country is currently of importance to only six of these, namely: Ferruginous Duck (*Aythya nyroca*); Crested Spotted Eagle (*Aquila clanga*); Imperial Eagle (*Aquila heliaca*); Lesser Kestrel (*Falco naumanni*); and Corncrake (*Crex crex*). The White-eyed Gull (*Larus leucophthalmus*) is the most important of these, for which Egypt is extremely important (the Egyptian Red Sea Islands hold the largest known breeding population in the world).

Several native species have become locally extirpated from Egypt: Long-tailed Cormorant (*Phalacrocorax africanus*), although this species has been recorded in small numbers in Lake Nasser recently; Sacred Ibis (*Threskiornis aethiopicus*); White-headed Duck (*Oxyura leucocephala*); Egyptian Plover (*Haliaeetus albicilla aegyptius*); Barbary Partridge (*Alectoris barbara*); and Chestnut-Bellied Sandgrouse (*Pterocles senegallus*). Most of these species have disappeared from Egypt due largely to habitat loss and hunting. All have fairly large world distributions and are not globally threatened (except for the White-headed Duck). The Sardinian Warbler subspecies (*Sylvia melanocephala norrisae*), formerly resident in the Faiyum, is now extinct, but the nominate species is still abundant. No bird species known from contemporary Egypt has become extinct; however, the Slender-billed Curlew (*Numenius tenuirostris*) and Bald Ibis (*Geronticus eremita*) are on the verge of extinction.

Table 1. Classification of avifauna in Egypt.

Status Category	Est. No. of Species
Resident breeder	119
Migrant breeder	29
Migrant	226
Winter visitor	183
Non-breeding summer visitor	10
Vagrant	70
Introduced species	4
<b>Total number of species</b>	<b>450</b>

## Avian Habitats in Egypt

The following division of Egypt's habitats is based primarily on the general habitat preferences of the country's most characteristic breeding bird species.

### Wetland Habitats

Wetlands are Egypt's most productive habitats (second only to the Red Sea coral reefs), supporting the greatest diversity and density of bird species. This is particularly evident when considering the migratory and wintering species utilizing these habitats, as well as the globally threatened species involved.

### Inland Wetlands

There are six major inland wetland areas in Egypt: Bitter Lakes, Wadi El Natrun, Lake Qarun, Waid El Rayan, the Nile Delta and Valley, and oases in the Western Desert. Characteristic birds of inland wetlands include Little Egret (*Egretta garzetta*); Little Bittern (*Ixobrychus minutus*); Purple Gallinule (*Porphyrio porphyrio*); Moorhen (*Gallinula chloropus*); Painted Snipe (*Rostratula benghalensis*); Spur-winged Plover (*Vanellus spinosus*); Pied Kingfisher (*Ceryle rudis*); and Clamorous Warbler (*Acrocephalus stentoreus*).

### Marine and Coastal Wetlands

The most important areas are the six major coastal lakes on the Mediterranean: Bardawil, Malaha,

Manzalla, Burullus, Idku and Maryut. The remainder of the Egyptian Mediterranean coast is of limited importance for birds. Characteristic birds of the Mediterranean coastal wetlands include: Greater Flamingo (*Phoenicopterus ruber*); Kentish Plover (*Charadrius alexandrinus*); Slendered-billed Gull (*Larus genei*); and Little Tern (*Sterna albifrons*); as well as many species characteristic of inland wetlands.

Red Sea wetlands include mudflats, reefs, mangroves and marine islands. Characteristic species of the Red Sea coast and islands include: Reef Heron (*Egretta gularis*); Striated Heron (*Butorides striatus*); Brown Booby (*Sula leucogaster*); White-eyed Gull (*Larus leucophthalmus*); Sooty Gull (*Larus hemprichii*); White-checked Tern (*Sterna repressa*); Bridled Tern (*Sterna anaethetus*); Lesser Crested Tern (*Sterna bengalensis*); Swift Tern (*Sterna bergii*); and Caspian Tern (*Sterna caspia*).

### Desert Habitats

**Coastal Deserts.** The Mediterranean coast receives the highest rainfall in the country (up to 200mm annually), and thus has a fair amount of plant cover and the greatest floral diversity in Egypt. The effect of the coastal rains reaches up to 60km inland. Several bird species are largely restricted in Egypt to this habitat type, such as Dupont's Lark (*Chersophilus duponti*); Short-toed Lark (*Calandrella cinerea*); Lesser Short-toed Lark (*Calandrella rufescens*); Red-rumped Wheatear

Table 2. Globally threatened bird species known to occur in Egypt.

Bird Species	Status
<i>Pelecanus crispus</i> (Dalmatian Pelican)	Vulnerable
<i>Marmaronetta angustirostris</i> (Marbled Teal)	Vulnerable
<i>Aythya nyoca</i> (Ferruginous Duck)	Vulnerable
<i>Aegyptius monachus</i> (Black Duck)	Near Threatened
<i>Milvus milvus</i> (Red Kite)	Vulnerable
<i>Circus macrourus</i> (Pallied Harrier)	Near Threatened
<i>Aquila clanga</i> (Greater Spotted Eagle)	Vulnerable
<i>Aquila heliaca</i> (Imperial Eagle)	Vulnerable
<i>Falco naumanni</i> (Lesser Kestrel)	Vulnerable
<i>Crex crex</i> (Corncrake)	Vulnerable
<i>Glareola nordmanni</i> (Black-winged Pratincole)	Near Threatened
<i>Vanellus gregarius</i> (Sociable Plover)	Vulnerable
<i>Numenius tenuirostris</i> (Slender-billed Curlew)	Endangered
<i>Gallinago media</i> (Great Snipe)	Near Threatened
<i>Larus leucophthalmus</i> (White-eyed Gull)	Vulnerable
<i>Emberiza cineracea</i> (Cinereous Bunting)	Near Threatened

Source: Collor, Crosby and Statterfield, 1994.

(*Oenanthe moesta*); and Barbary Partridge (*Alectoris barbara*), which is now extinct from Egypt.

**Mountain and Wadis.** Wadis and mountains are characteristic of the landscape of much of the Eastern Desert and Sinai. Birds characteristic of this landscape include: Barbary Falcon (*Falco pelegrinoides*); Hume's Tawny Owl (*Strix butleri*); Sand Partridge (*Ammoperdix heyi*); Desert Lark (*Ammomanes deserti*); Trumpeter Finch (*Bucanetes githagineus*); Mourning Wheatear (*Oenanthe lugens*); Hooded Wheatear (*Oenanthe monacha*); Blackstart (*Cercomela melanura*); Tristram's Grackel (*Onychognathus tristramii*); and Sinai Rose Finch (*Carpodacus synoicus*), with the last two species confined to South Sinai.

**Gravel and Sandy Desert Plains** (including inland dunes). Open gravel and sand desert occupy the greater part of Egypt's land area. This, however, is the least productive of the country's habitats. The characteristic species of these habitats include: Spotted Sandgrouse (*Pterocles senegallus*); Cream-colored Courser (*Cursorius cursor*); Bar-tailed Desert Lark (*Ammomanes cincturus*); Hoopoe Lark (*Alaemon alaudipes*); Timminck's Horned Lark (*Eremophila bilopha*); Desert Wheatear (*Oenanthe deserti*); and Brown-necked Raven (*Corvus ruficollis*).

**Oases.** Oases are perhaps the most prominent feature of the Western Desert. They are the only source of water and vegetation over much of the desert, which occupies about two-thirds of the country's area. Most bird life known from this region is confined to or dependent on oases. The principal oases of Western Desert are: Moghra, Siwa, Wadi Rayan, Bahariya, Farafra, Dakhla, Kharga, Kurkur and Dungul. There are also some smaller, largely uninhabited oases dispersed throughout the Western Desert. Birds characteristic of this habitat are: Pharo's Owl (*Bubo ascalaphus*); Palm Dove (*Streptopelia senegalensis*); Hoopoe (*Upupa epops*); Olivaceous Warbler (*Hippolais pallida*); White-crowned Black Wheatear (*Oenanthe leucopyga*); and Trumpeter Finch (*Bucanetes githagineus*).

## **Agriculture Landscape**

Almost all of the cultivated land in Egypt is in the Nile Valley and Delta. Although today agriculture has virtually replaced all of the original habitats and vegetation of this region, a good proportion of Egypt's bird species are confined and well adapted to this man-made landscape. The characteristic birds of the Nile Valley and Delta include: Black-shouldered Kite (*Elanus caeruleus*); Kestrel (*Falco tinnunculus*); Cattle

Egret (*Bubulcus ibis*); Lapwing (*Vanellus spinosus*); Senegal Thick-Knee (*Burhinus senegalensis*); Barn Owl (*Tyto alba*); Graceful Warbler (*Prinia gracilis*); Olivaceous Warbler (*Hippolais pallida*); Goldfinch (*Carduelis carduelis*); and Hooded Crow (*Corvus corone*).

There are also small areas of cultivation in North Sinai and in Western Desert oases, irrigated by underground water. The avifauna of cultivated areas of the Western Desert oases is very similar to that of the Nile Valley, while that of North Sinai is an extension of Levantine avifauna, including species not known to breed elsewhere in Egypt, such as Sardinian Warbler (*Sylvia melanocephala*), Great Tit (*Parus major*), and Syrian Woodpecker (*Dendrocopos syriacus*). ■

*Submitted by Atef Mohamed Kamel, CBSG Egypt*

## **Activities of APEC Nepal**

The Association for the Protection of Environment and Culture (APEC) was established in Nepal in 1988 to focus on the conservation of biological diversity and community-based development. The organization now has expanded to 30 branches and 35 sub-branches involving 555 active volunteers and 1,255 general members. APEC also is a member of CAUZ-USA, IUCN/SSC/CBSG, ZOO, Tainga Rescue Network, and SASEANEE (South and Southeast Asian Network for Environmental Education).

APEC uses a multi-disciplinary approach to protect biological diversity, including wildlife, wetlands and forests, and social development by organizing individuals and experts toward the conservation of natural resources and their sustainable use.

Several different programs have been conducted since APEC's inception. Many programs on wetland conservation have been initiated in Koshi-Tappu to disseminate knowledge about the importance of wetland areas. Educational programs for local villagers and school children using video, audio, drama, songs and dance have been conducted in 11 districts in eastern Nepal. Cultural studies of the indigenous communities of Magar and Jhangar were begun in 1991 and continue today.

In an effort to create a green-belt to preserve biodiversity in the natural forest, plantation programs



have been initiated in Koshi-Tappu, Biratnagar, Morang, Sunsari and another seven districts. Three major nurseries with the capacity of two million seedlings and 13 other, smaller nurseries (capacity of one million each) have been established.

Detailed studies on the wildlife in Koshi-Tappu and eastern Tarai have been completed. To protect and conserve the Koshi-Tappu wetland, various education and self-sufficiency programs have been conducted jointly with WWF-Nepal, MAB-UNESCO and the Ministry of Forest, Nepal. In addition to this, APEC has also initiated programs to protect birds, dolphins and crocodiles. APEC has plans to establish a bird breeding ground at the Koshi-Tappu site or Biratnagar

site for protection of ibis, stork and other bush birds.

Presently APEC has few resources to conduct these and other programs, and support from concerned agencies and individuals is greatly needed. For further information on APEC and its activities or to make a contribution, please contact:

Medini Bhandari  
APEC Head Office  
Hatkholra Road  
Biratnagar 10  
Morang, Nepal  
Fax: +977-21-24230/24099

## Announcements and Updates

### MSc Course in Wild Animal Health

The Royal Veterinary College (University of London) and the Institute of Zoology (Zoological Society of London) is offering a 12-month MSc course in wild animal health. The course includes practical and theoretical instruction in husbandry, nutrition, taxonomy, conservation genetics, utilization of wildlife, welfare issues, epidemiology, immunology, infectious and non-infectious diseases, preventative medicine, restraint, anesthesia and aspects of surgery in various taxa, together with an individual research project. Applications are continually accepted. For more information and an application form, contact Dr. M.T. Fox, The Royal Veterinary College, Royal College Street, London NW1 0TU (tel: +44 171 468 5000; fax: +44 171 338 2342).

### European Vertebrate Pest Management Conference

The University of York will host the first European Vertebrate Pest Management Conference on 1-3 September 1997. Presentations will focus on problem identification, population management, behavior management, habitat management, socioeconomic factors, environmental implications, and related topics. Registration deadline is 15 August; poster abstracts are due by 31 July. For more information, contact the Conference Secretariat (tel: +44 1904 432940; fax: +44 1904 433029; e-mail: biocomms@york.ac.uk).

### Request for Gorilla Information

John Cooper, Durrell Institute of Conservation and Ecology, University of Kent at Canterbury, is seeking information on skin diseases of gorillas to include in a paper to be presented to the British Veterinary Dermatology Study Group in October 1997. Dr. Cooper is also compiling an inventory of gorilla skeletons and bones and developing a database of skeletal disease in gorillas. Anyone interested in providing information or in possible collaboration, please contact Dr. Cooper (tel: +44 1227 827282; fax: +44 1227 827839).

### CITES Website

For information on CITES resolutions, permits issuance, fact sheets, and updates, search the CITES web page: <http://www.fws.gov/r9dial/>

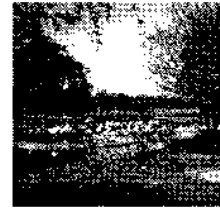
### Condor Release Update

Four California condors were recently released in Coconino County in northern Arizona. These birds are in addition to the five condors released in Arizona last December, which are doing well and have extended their flight range to the south of the Grand Canyon. Five more condors are scheduled for release and are currently being held in a large netted area on cliffs north of the Grand Canyon.

*From the Ornithological Council Newsletter, Vol. 3, No. 1, June 1997*



**1997 CBSG Annual Meeting**  
**14-17 August 1997, Berlin**  
**Tentative Working Groups**



We are in the process of putting together the agenda for the 1997 CBSG Annual Meeting which will be held 14-17 August in Berlin, co-hosted by the Zoologischer Garten Berlin and the Tierpark Berlin-Friedrichsfelde. Please note that early registration fee must be paid by 15 July 1997. For more information regarding registration, please contact:

Mrs. Regine Damm  
Zoologischer Garten und Aquarium Berlin  
Hardenbergplatz 8  
10787 Berlin 30, Germany  
Tel: 49-30-25-40 10; Fax: 49-30-25-40 12 55

Workshop participants are responsible for making their hotel reservations (please contact Hotel Palace, fax: 49-30-25-02 1197)

Please note that invitations to the CBSG Annual Meeting were mailed in January in the last issue of *CBSG News*.

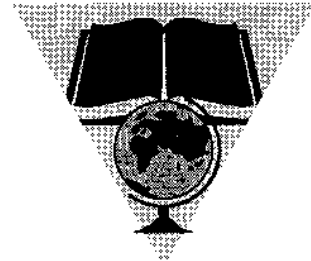
Below is a tentative list of working groups. The format of the meeting will be similar to last year's. Working group chairs will introduce their topics in plenary session to set the stage for the work that needs to be accomplished when the groups meet. We look forward to your participation in the 1997 CBSG Annual Meeting. We welcome your suggestions for additional working group topics and encourage your participation as a working group chair. For more information regarding the meeting agenda, please contact Dr. Onnie Byers at CBSG (tel: 01-612-431-9325; email: [cbsg@epx.cis.umn.edu](mailto:cbsg@epx.cis.umn.edu)). See you in Berlin!

- ⇒ World Zoo Conservation Strategy Review
- ⇒ Giant Pandas in Captivity Outside China
- ⇒ Taskbook and Windows Version of VORTEX
- ⇒ Using Internet as a Conservation Tool
- ⇒ SciNet Interdisciplinary Group
- ⇒ National Sovereignty/Property Rights to Native Wildlife
- ⇒ Sustainable Use
- ⇒ Biodiversity Convention: *Ex Situ* Conservation Elements and the CAMP Process
- ⇒ Conference on Captive Breeding of Endangered Species
- ⇒ Confiscation/Rehabilitation/Reintroduction – The Role of Zoos
- ⇒ Rhino Global Captive Action Plan/Programs
- ⇒ Invertebrates
- ⇒ Plants

## Missing Issues of *CBSG News*?

Since the first issue of *CBSG News* in 1990, we have published a total of 20 issues covering the diverse activities of the CBSG. The number of issues has varied from year to year, making it difficult for some members and supporters to ensure that no issues have been missed. Below is a complete list of past *CBSG News* issues. Back issues are available through the CBSG Office upon request for US \$2.00 each to cover mailing costs.

1990	Vol. 1	No. 1, 2, 3
1991	Vol. 2	No. 1, 2, 3, 4
1992	Vol. 3	No. 1, 2, 3
1993	Vol. 4	No. 2, 3, 4 (no No. 1)
1994	Vol. 5	No. 1, 2, 3
1995	Vol. 6	No. 1
1996	Vol. 7	No. 1, 2



## CBSG Staff Update

The CBSG Office has undergone several staff changes in the last six months. Judi Mikolai, long-time Administrative Officer for CBSG, has left our office to pursue other career interests. Judi is sorely missed, as she has been such an integral part of CBSG throughout its development. Shelly O'Brien has taken over as Administrative Officer, and we welcome Ian Gilby and Jenna Borovansky as our new Administrative Assistants.

Kathy Traylor-Holzer is the new editor for the *CBSG News*, and Jenna is producing the *CBSG Donor News*. These staffing changes contributed to the delay in production time for the most recent issues of these publications.

### *A Good-bye Message from Judi:*

*Alas, the time has come for me to depart CBSG. I want to thank you for your friendship and assistance. It has been eight years of challenges and growth since Ulie hired me to work in the CBSG Office – I am appreciative for all of the wonderful learning opportunities. I am confident that the present CBSG staff will cover my office duties seamlessly. I will remain in contact with the CBSG office, and therefore, hopefully, with you.*

*Judi*

## CBSG Schedule - 1997-1998

This schedule changes constantly; contact the CBSG Office for an update before final scheduling. Meeting dates that are final are followed by an F. CBSG Staff Attending: (S)=Ulysses Seal, (E)=Susie Ellis, (B)=Onnie Byers, (M)=Phil Miller

<u>1997</u>	<u>Travel</u>	<u>Meeting Dates</u>	
June	1,7	1-7	San Salvador, El Salvador: Reintro/Confis Wksp & Birds/Rep/Mamm CAMP (S)
	5,10	6-9	Ojai, California, USA: Cheetah Conservation Fund Strategic Planning (E)
	5,9	6-8 F	Vancouver, British Columbia: Society for Conser.Bio.Annual Mtg.(M)
		12-14	Mpls, MN USA: Participatory Rural Assessment (M,S,B,E, Westley, Vredenburg)
		16	Mpls, MN USA. Mussel PHVA planning meeting (S, B, M)
	22,27	23-27	Costa Rica: Regional Primate Masterplanning Mtg.(S,MAS)
	30	Brackett conference call (9 am CST)	
July		05-26	Ulysses Seal on vacation
		10	Minnesota Zoo: Fred de Jong visit.
		15-17	Boston, Mass,USA: Risk Analysis Mtg. (M)
		20-23	Frances Westley meets with Seal in Virginia.
		23-26	MN Zoo, Apple Valley: Dick Frankham visit
	27,1	28-31	Austin, TX, USA: Edward's Aquifer Scientific Mtg. (S,E)
	28	Brackett conference call (Texas, 9 am CST)	
August	1,8	2-7	Montevideo, Uruguay: Deer Project (S)
	12,18	14 -17F	Berlin, Germany: CBSG Annual Mtg. (S,E,B,M)
	12,18	17- 19F	Berlin, Germany: IUDZG(S)
	20,21	20-21	Austin, TX, USA: E.A. Design Planning Mtg. (S. Westley)
		21	Front Royal, VA, USA: Conservation Genetics Course. (E)
	25	Brackett conference call (9 am CST)	
September	29,8	1-7	Lae, Papua New Guinea: Tree Kangaroo CAMP/PHVA (B,M,S)
	9(pm),11(am)	10	Columbus, Ohio, USA: (S)
	11(am),12	11	Albuquerque, New Mexico: USA, Save the Tiger Fund Council Mtg. (S)
	13,18	14-17	Albuquerque, New Mexico:USA, AZA (E)
	20,29	23-28	Chengdu, China: International Panda Workshop (S, Wildt)
October		6-9	Horseshoe Bay, MN, USA: Goblin Fern PHVA (S,M,B)
	6,12	7-11	Alphen a/d Rhine, Netherlands: EAZA/EEP Conference (E,+/or B)
	11,19	13-17	Pretoria, SA: Wild Dog PHVA (S,B,E,Wildt,MAS)
		24-26	Canada: PRA Meeting (S,B,E,M)
		27-30	Singapore: SEAZA Conference.
		Last Week	Mexico: Marine Mammal CAMP / Sea Lion PHVA (E,M)
	?	Houston, TX,USA: Disease, risk mtg. (S) (OR Jan/Feb of 98 in San Diego)	
November		1-14	China: South China Tiger Project. (B)
	2,8	3-7	Austin, TX, USA: E.A. Stakeholders Mtg. (S,Westley, E, R.Seal)
	2 <sup>nd</sup> week in Nov		Guatemala: Confiscation Wksp. (S,E)
	29,6Dec	30-5	Omaha, NE, USA: Facilitators Training Workshop (S,E,B,M,Ballou,Lacy)
	?	JAZGA Mtg. (S)	
December	5,13	7-12	Kampala, Uganda: Mountain Gorilla PHVA (S,M,E,Rosen,Wildt)

<u>1998</u>	<u>Travel</u>	<u>Meeting Dates</u>	
Jan		5-8	St. Croix Falls, MN: Winged Maple Leaf Mussel PHVA (S,B,M)
Feb		week of the 10th 14-20	Dallas, TX, USA Tiger meeting. Jersey, Channel Island, UK: PHVA Facilitators Course
March		week of the 2 <sup>nd</sup> week of the 8th week of the 15 <sup>th</sup> week of the 22	Botanical Gardens, Havana, Cuba: Endemic Plants CAMP Cuba: Solenodon PHVA (S) Cuba: CAMP and Zoo Master Planning (S) Costa Rica: Orchid CAMP (S)
April		?	Chile: Humboldt Penguin PHVA (E,Lacy?)
May		Mid 22-30	Bratislava: Conference of the Parties of Biodiv. Conservation (S) Belo Horizonte, Brazil: Muriqui PHVA. (S)
June		? 23-25	El Salvador: Atele PHVA; CAMP Ojai, CA, USA: CCF Futures Search Progress Meeting (E)
October		8 9-11 12-15?	Yokohama, Japan: CBSG Steering Committee Mtg.(S,E,B,M) Yokohama, Japan: CBSG Annual Mtg.(S,E,B,M) Nagoya, Japan: IUDZG (S)

**In 1997 or 1998**

MN Zoo: GIS Software Training Course

**Tentative workshops (not yet scheduled)**

Sumatra, Indonesia: Sumatran Felid, Civet & Otter CAMP (B, Tilson)  
Cali, Colombia: Endemics CAMP (S,E)  
Columbia: Columbian Primates CAMP;  
Mt Tapir PHVA (E,S or M)



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**Conservation Breeding Specialist Group  
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### CONSERVATION ASSESSMENT & MANAGEMENT PLANS (CAMPs)

- \_\_\_\_\_ CAMP Reference Material Packet (English) \$5.00
- \_\_\_\_\_ CAMP Reference Material Packet (Spanish) \$5.00
- \_\_\_\_\_ CAMP Reference Material Packet (Chinese) \$5.00
- \_\_\_\_\_ CAMP Summary Document 1994

### Reports:

- \_\_\_\_\_ Antelope CAMP Draft IV
- \_\_\_\_\_ Asian Wild Cattle CAMP
- \_\_\_\_\_ Canids, Hyena & Aardwolf CAMP
- \_\_\_\_\_ Caprinae CAMP
- \_\_\_\_\_ Costa Rican Endemics CAMP
- \_\_\_\_\_ Costa Rican Endemics CAMP Summary
- \_\_\_\_\_ Crane CAMP (draft)
- \_\_\_\_\_ Cuban Selected Species CAMP 1996
- \_\_\_\_\_ Cuban Selected Species CAMP II 1997
- \_\_\_\_\_ Felid CAMP
- \_\_\_\_\_ Galliform CAMP
- \_\_\_\_\_ Guan, Curassow, and Chachalaca CAMP
- \_\_\_\_\_ Hawaiian Forest Birds CAMP
- \_\_\_\_\_ Hornbill CAMP
- \_\_\_\_\_ Iguanid/Varanid CAMP
- \_\_\_\_\_ Medicinal Plants of Southern India I CAMP
- \_\_\_\_\_ Medicinal Plants of Southern India II CAMP
- \_\_\_\_\_ Mexican Felid CAMP
- \_\_\_\_\_ Mexican Lagomorph CAMP
- \_\_\_\_\_ Mexican Primate CAMP
- \_\_\_\_\_ Panamanian Endemic Birds and Mammals CAMP
- \_\_\_\_\_ Pigeons & Doves CAMP
- \_\_\_\_\_ Primate CAMP
- \_\_\_\_\_ Saint Helena Island CAMP
- \_\_\_\_\_ Saint Helena Island CAMP Summary
- \_\_\_\_\_ Small Carnivore CAMP
- \_\_\_\_\_ Stork, Ibis, and Spoonbill CAMP
- \_\_\_\_\_ Tapir CAMP
- \_\_\_\_\_ Threatened Plants of Costa Rica
- \_\_\_\_\_ Waterfowl CAMP

### Briefing Books:

- \_\_\_\_\_ African Antelope and Parrot CAMP
- \_\_\_\_\_ Asian Wild Cattle CAMP
- \_\_\_\_\_ Australian Marsupials/Monotreme CAMP
- \_\_\_\_\_ Canids, Hycna & Aardwolf CAMP
- \_\_\_\_\_ Costa Rican Endemics CAMP
- \_\_\_\_\_ Crane Conservation Workshop - Calgary
- \_\_\_\_\_ Cuban Selected Species CAMP 1997
- \_\_\_\_\_ Falconiformes CAMP
- \_\_\_\_\_ Galliform CAMP
- \_\_\_\_\_ Guan, Curassow, and Chachalaca CAMP
- \_\_\_\_\_ Hawaiian Forest Birds CAMP & PHVA
- \_\_\_\_\_ Hornbill CAMP
- \_\_\_\_\_ Iguanas & Varanids/Boas & Pythons CAMP
- \_\_\_\_\_ Indonesian Sea Turtle CAMP
- \_\_\_\_\_ Medicinal Plants of Southen India CAMP
- \_\_\_\_\_ Mesoamerican Primate CAMP
- \_\_\_\_\_ Mexican Cactus CAMP
- \_\_\_\_\_ Mexican Felid & Primate CAMP
- \_\_\_\_\_ Mexican Lagomorph CAMP
- \_\_\_\_\_ Panamanian Endemics CAMP
- \_\_\_\_\_ Penguin PHVA & CAMP
- \_\_\_\_\_ Pigeon & Dove CAMP

- \_\_\_\_\_ Saint Helena Island CAMP
- \_\_\_\_\_ Selected Medicinal Plants of India CAMP
- \_\_\_\_\_ Sheep, Goat & Rupicaprine CAMP
- \_\_\_\_\_ Small Carnivore CAMP
- \_\_\_\_\_ Soil Invertebrates of Southern India CAMP
- \_\_\_\_\_ South American Felid CAMP
- \_\_\_\_\_ Stork, Ibis, and Spoonbill CAMP
- \_\_\_\_\_ Threatened Plants of Costa Rica CAMP

### GLOBAL CONSERVATION ASSESSMENT

#### RECOMMENDATIONS (GCARs) (formerly GCAPs)

- \_\_\_\_\_ GCAR Reference Material Packet (English) \$5.00
- \_\_\_\_\_ GCAR Reference Material Packet (Spanish) \$5.00
- \_\_\_\_\_ Australasian Monotreme/Marsupial GCAR Briefing Book
- \_\_\_\_\_ Cervid GCAP Briefing Book
- \_\_\_\_\_ Cracid GCAR Report
- \_\_\_\_\_ Rhino GCAP Briefing Book
- \_\_\_\_\_ Equid GCAR (draft)
- \_\_\_\_\_ Primate GCAP - 1992 Edition
- \_\_\_\_\_ Rhino Global Captive Action Plan (GCAP) Report
- \_\_\_\_\_ Wild Cattle GCAR (draft)

### GLOBAL ANIMAL SURVIVAL PLAN (GASPs)

- \_\_\_\_\_ Tiger Global Animal Survival Plan Report
- \_\_\_\_\_ Tiger GASP Briefing Book

### POPULATION & HABITAT VIABILITY ASSESSMENTS (PHVAs)

- \_\_\_\_\_ PHVA Reference Material Packet (English) \$5.00
- \_\_\_\_\_ PHVA Reference Material Packet (Spanish) \$5.00
- \_\_\_\_\_ PHVA Reference Material Packet (Chinese) \$5.00
- \_\_\_\_\_ PHVA Process Design Manual

### PHVA Reports:

- \_\_\_\_\_ 'Alala, Akohekohe & Palila (Hawaiian Forest Birds) PHVA
- \_\_\_\_\_ Anoa PHVA
- \_\_\_\_\_ Aruba Island Rattlesnake PHVA
- \_\_\_\_\_ Asian Elephant PHVA
- \_\_\_\_\_ Asiatic Black Bear PHVA
- \_\_\_\_\_ Attwater's Prairie Chicken PHVA
- \_\_\_\_\_ Babirusa PHVA
- \_\_\_\_\_ Baiji Dolphin PHVA
- \_\_\_\_\_ Bali Mynah PVA
- \_\_\_\_\_ Baird's Tapir PHVA
- \_\_\_\_\_ Black Footed Ferret Recovery Plan Review
- \_\_\_\_\_ Chimpanzees of Uganda PHVA
- \_\_\_\_\_ Costa Rican Squirrel Monkey (*Saimiri oerstedi*) PHVA
- \_\_\_\_\_ Clouded Leopard PHVA
- \_\_\_\_\_ European Bison PHVA
- \_\_\_\_\_ Florida Key Deer PVA
- \_\_\_\_\_ Florida Panther Viability Assessment. 1989.
- \_\_\_\_\_ Gharial PHVA
- \_\_\_\_\_ Houston Toad PHVA
- \_\_\_\_\_ Indian/Nepali Rhino PHVA
- \_\_\_\_\_ Javan Gibbon PHVA
- \_\_\_\_\_ Javan Hawk-Eagle PHVA
- \_\_\_\_\_ Javan Rhino PVA
- \_\_\_\_\_ Kea/Kaka PVA
- \_\_\_\_\_ Kenya Black Rhino Metapopulation Workshop
- \_\_\_\_\_ Kirtland's Warbler PHVA
- \_\_\_\_\_ Komodo Monitor PHVA
- \_\_\_\_\_ Leontopithecus Population Viability Workshop (4 species)
- \_\_\_\_\_ Lion Tailed Macaque PHVA
- \_\_\_\_\_ Mantled Howler Monkey PHVA
- \_\_\_\_\_ Marine Turtles of Indonesia PHVA

**PHVA Reports (Continued)**

- \_\_\_\_\_ Marsh Deer PHVA
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- \_\_\_\_\_ Mississippi Sandhill Crane PHVA
- \_\_\_\_\_ Namibian Cheetah & Lion PHVA
- \_\_\_\_\_ Orang utan PHVA
- \_\_\_\_\_ Orinoco Crocodile PHVA
- \_\_\_\_\_ Pampas Deer PHVA
- \_\_\_\_\_ Peninsular Pronghorn PHVA
- \_\_\_\_\_ Pink Pigeon Conservation Viability Assessment
- \_\_\_\_\_ Puerto Rican Parrot PVA
- \_\_\_\_\_ Sangai PHVA
- \_\_\_\_\_ Sumatran Rhino PHVA
- \_\_\_\_\_ Sumatran Tiger PHVA
- \_\_\_\_\_ Tamaraw PHVA
- \_\_\_\_\_ Tana River Primate Reserve Conservation Assessment
- \_\_\_\_\_ Thai Gibbon PHVA
- \_\_\_\_\_ White-Winged Wood Duck PHVA
- \_\_\_\_\_ Whooping Crane Conservation Viability Assessment

**Briefing Books:**

- \_\_\_\_\_ Anoa PHVA
- \_\_\_\_\_ Aruba Island Rattlesnake PHVA
- \_\_\_\_\_ Asian Elephant PHVA
- \_\_\_\_\_ Asiatic Black Bear PHVA
- \_\_\_\_\_ Asiatic Lion PHVA/GASP
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- \_\_\_\_\_ Caribbean Parrots Conservation Viability Assessment
- \_\_\_\_\_ Clouded Leopard PHVA
- \_\_\_\_\_ Costa Rican Squirrel Monkey PHVA
- \_\_\_\_\_ Cotton-top Tamarin Conservation Viability Assessment
- \_\_\_\_\_ Eastern Sarus Crane PHVA
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- \_\_\_\_\_ Lion Tamarins of Brazil PHVA
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- \_\_\_\_\_ White-winged Wood Duck PHVA

- \_\_\_\_\_ Whooping Crane PHVA
- \_\_\_\_\_ Wild Dog (African) PVA

**GENOME RESOURCE BANKING (GRB)**

- \_\_\_\_\_ Genome Resource Banks: Progress on the Systematic Collection, Storage and Use of Rare Animal Biomaterials (1994) \$35.00
- \_\_\_\_\_ GRB for Conservation in Africa (1994) \$10.00
- \_\_\_\_\_ GRB for Wild Species Conservation (1991)\$10.00
- \_\_\_\_\_ Tiger GRB Action Plan (1995) \$10.00
- \_\_\_\_\_ Population Biology Aspects of GRB (1994) \$10.00

**OTHER CBSG PUBLICATIONS**

- \_\_\_\_\_ A Plan for Genetic Restoration & Management of the Florida Panther. 1994.
- \_\_\_\_\_ Asian Rhino Conservation Workshop
- \_\_\_\_\_ Confiscations: Analysis & Planning Workshop (Costa Rica) Report & Briefing Book 1996. Set = \$45.00.
- \_\_\_\_\_ Confiscations: Analysis & Planning Workshop (El Salvador) Briefing Book 1997
- \_\_\_\_\_ Genetic Management Strategies and Population Viability of the Florida Panther Briefing Book. 1992.
- \_\_\_\_\_ Genetic Management Strategies and Population Viability of the Florida Panther Report. 1992.
- \_\_\_\_\_ Genetic Mgmt.Considerations For Threatened Species With A Detailed Analysis of the Florida Panther. 1991.
- \_\_\_\_\_ Giant Panda Captive Management Planning Workshop Report & Briefing Book (English/Chinese) Set = \$75.00
- \_\_\_\_\_ International Conference on Implications of Disease Briefing Book
- \_\_\_\_\_ Int'l Conference on Disease Working Group Reports
- \_\_\_\_\_ Przewalski's Horse Draft Global Conservation Plan
- \_\_\_\_\_ Sumatran Tiger Regional Captive Breeding Workshop
- \_\_\_\_\_ Wild Cattle Symposium Proceedings

**ZOO MASTERPLANS FOR CONSERVATION**

- \_\_\_\_\_ Budepest Zoo Conservation Planning Overview (\$35.00)
- \_\_\_\_\_ Roma Zoo Master Plan Report (Full Color-Cost \$75.00)
- \_\_\_\_\_ Roma Zoo Masterplan Briefing Book (\$35.00)
- \_\_\_\_\_ Thai Zoo Masterplan for Conservation Final Report (cost \$50.00)
- \_\_\_\_\_ Thai Zoo Association Planning Materials (4 document set - \$250.00)

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- \_\_\_\_\_ World Zoo Conservation Strategy (\$10.00 per copy for orders under ten. Maximum of \$100.00 for orders greater than ten). Postage is additional.

**OTHER**

- \_\_\_\_\_ **VORTEX 7.3 (English)Population Modeling Software & Manual**  
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*Newsletter of the Conservation Breeding Specialist Group  
Species Survival Commission  
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CBSG News  
12101 Johnny Cake Ridge Road  
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