

CBSG News

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Volume 3
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Newsletter of the
Captive Breeding
Specialist Group,
Species Survival Commission,
World Conservation Union

CBSG: A Look Back and Ahead

The annual meeting of the CBSG in Vancouver, 4-6 September, was attended by 150 people from 26 countries. Most of the business of the meeting was conducted by 24 working groups who submitted written reports which form the bulk of this Newsletter.

CBSG has completed a very active three years since the establishment of a funded office after the CBSG and IUDZG meetings in San Antonio. This funding was based upon a three-year commitment by many of the supporting institutions. More than 70 institutions now contribute to the support of CBSG. Virtually all of these institutions and organizations have recommitted support for another three years. In addition to this support, more than 120 individuals also contribute to CBSG as donors and as newsletter subscribers. The CBSG Steering Committee is undertaking a Strategic Planning Process during the next year reflecting our need to carefully examine our mission, goals, activities, and to develop a long-range financial strategy. The results of this planning process will be made available before the next meeting of CBSG in Antwerp, 2-4 September 1993.

The CBSG office is undergoing organizational changes including the departure of Dr. Tom Foose, the Executive Officer, at the end of September. Tom has played a major role in the development of zoo conservation activities in North America and internationally and he has been in close contact with many of you as part of his CBSG activities. He will be sorely missed. Dr. Susie Ellis-Joseph now moves from part-time to full-time as a Program Officer with particular responsibility for the Hawaiian Forest Bird PHVAs and our CAMP Workshops. She has been responsible for seven of these workshops during the past year, has provided very rapid production of draft documents from these workshops, and is a welcome addition. I would also like to welcome Meg Ross to the CBSG staff. Meg will be providing much-needed support for all our functions and activities.

We are expanding our facilitation of coordination of the regional programs with support of the Regional Conservation Coordinators Committee of the CBSG through a Newsletter, workshops and programs at the CBSG regional and annual meetings, as well as direct contact with each of the Coordinators. We also have plans for expanding the number of GCAP and GASP programs through workshops at these CBSG meetings and elsewhere as we gain experience with these activities.

A Reptile Conservation Assessment and Management Planning Workshop (CAMP) covering two groups of lizards and snakes was conducted in Vancouver before the CBSG meeting on 1-3 September. This is the 12th such workshop conducted by CBSG during the past 18 months and 12 more are scheduled for the next year. These workshops are part of a process to review present information applicable to assessing the conservation status of all vertebrates. Other activities of CBSG during the past year included: PHVAs for 16 species held in seven countries; Global Captive Action Plan (GCAPs) meetings in three countries for rhinos, primates, and cranes with review documents produced and in circulation; Global Animal Survival Plan (GASP) meetings in two countries for tigers and for two crane species; and Regional CBSG meetings in Japan, Australasia, Brazil, Africa, and Europe. There are plans, during the next year, for 20 PHVAs covering 40+ species in at least 14 countries, for 12 CAMPs in seven countries, six GCAPs, six GASPs, and nine regional CBSG meetings accompanying regional and national zoo association meetings.

The expenses of many of our Workshops and meetings are paid by the regional or local hosts, by agencies, by individuals, and by our some of our supporting institutions. The core support and activities of CBSG have been greatly amplified (more than ten-fold) by these project funds and by the contribution of time by CBSG member professionals from zoos, aquariums, universities, and agencies.

An exciting development in our PHVA Workshops has been the development of Geographical Information System (GIS) tools for the assembly, analysis, and interpretation of animal distribution data, land use information, protected area use information, and local human population trend

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CBSG News

The CBSG news is published by the Captive 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 Captive Breeding Specialist Group is the conservation or establishment of viable populations of threatened species.

The goals of the CBSG are:

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



**The work of the Captive Breeding Specialist Group
is made possible by generous contributions from the following
members of the CBSG Institutional Conservation Council:**

Conservators (\$10,000 and above)

Chicago Zoological Society
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Oklahoma City Zoo
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Paignton Zoological and Botanical Gardens
Penscynor Wildlife Park
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Odense Zoo
Orana Park Wildlife Trust
Paradise Park
Rostock Zoo
Royal Zoological Society of Scotland
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Rotterdam Zoo
Species Survival Committee of Japan
Twycross Zoo
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Kew Royal Botanic Gardens
King Khalid Wildlife Research Center
Natal Parks Board
Safari Park
Zoo Conservation Outreach Group

Pan African Association of Zoological Gardens, Aquaria and Botanical Gardens



The Third Annual Conference of the Pan African Association of Zoological Gardens, Aquaria and Botanical Gardens (PAAZAB) was held in June 1992 at the National Zoological Gardens' Game Breeding Center in Lichtenburg, South Africa.

The Conference was attended by 43 delegates representing 27 institutions from eight different countries. Attending the Conference for the first time were representatives from Angola, Malawi and Madagascar. The involvement of representatives from those countries made a significant contribution to the discussions. Of further importance was the granting of membership to the National Zoological Gardens of Rabat, Morocco.

Membership were granted to 160 new members bringing the total membership of PAAZAB to 185 individuals from 13 countries. Of significant importance were the 110 individual members from the United States of America and Canada who joined PAAZAB. This is a valuable source of income and I wish to express my sincere appreciation to all these members for their support.

We were especially honored this year by the presence of Dr. Ulie Seal, Chairman of the Captive Breeding Specialist Group (CBSG), and Mr. Nate Flesness, Executive Director of International Species Information System (ISIS).

Valuable discussions were held which undoubtedly will benefit the structuring of our own African Preservation Program (APP) and the animal record keeping system. An important outcome of the discussions was the possibility of a giant sable PHVA which will be arranged in conjunction with BP Angola as well as a similar program for the mountain zebra in June next year. These workshops are to be arranged in conjunction with the National Parks Board of South Africa.

A great number of species have already been identified under the APP and it is envisaged that constructive progress will soon be made with this program.

While PAAZAB recognizes the establishment of a Zairian Faunal Action Group and a Madagascar Faunal Action Group, it wishes to stress the importance of the involvement of the Pan African Association or at least the coordinators of the African Preservation Program in the activities of these action groups. Failure to do so may cause confusion among the many institutions in countries already members of PAAZAB. This, in fact, was an issue which I had already raised during the Singapore Meeting.

Other issues on the 1992 Agenda included PAAZAB's role in Africa, trophy hunting, the pet trade, anti-zoo lobbyists, animals for advertising, and PAAZAB's attitude towards circuses and animals used in performing acts.

The second edition of our Bulletin, as well as the Animal Inventory, in which 19 institutions participated, were published.

In conclusion, I wish to acknowledge South Africa's Department of Foreign Affairs for their valuable financial support without which many delegates outside South Africa would not have been in a position to have attended our meetings.

This report was submitted by Willie Labuschagne, Chairman, PAAZAB and Director, National Zoological Gardens of South Africa.

Australasian Species Management Programs



This last year has been one of real consolidation for the Australasian Species Management Program (ASMP) as we have moved towards assisting the greater conservation of biodiversity in our region. We have made spectacular progress on a number of fronts and many of our achievements in this last year have laid the solid foundations for the future.

The establishment of 17 Taxon Advisory Groups (TAG) during the year has allowed us to continue the momentum and has provided a firm base for the prioritization and categorization of threatened species held in our region. A major Species Management Workshop was held at the Melbourne Zoo in October 1991 and a number of the TAGs met to formulate forward-planning options and the development of Taxon Action Plans.

To date, a total of 23 individual Species Management Coordinators have been approved and many of these have well-advanced Species Management Plans (SMP) in progress. A training manual for SMP Coordinators is in preparation which should provide a valuable resource while at the same time adding to staff professional skill development. We would welcome support from other regions in developing this training manual.

The 1991 ASMP Regional Census and Plan again proved to be a valuable forward-planning and reference document and this year it was extended to include extracts from SMP and TAG recommendations. Currently this system is on the REGASP Data Base but plans are afoot to integrate this within ISIS III.

Individual performance-related contracts have been developed with each of the contributing institutions (zoos) within the Australasian region. The contracts allow the Species Management Coordinating Council (SMCC) to provide consultation services. The SMCC operates as a non-profit corporation registered as a tax-deductible charity under Australian Law. It has two shareholders each holding one share: the Australasian Regional Association of Zoological Parks and Aquaria (ARAZPA) and the Council of Governing Bodies of Australasian Zoos (COGBAZ). This structure is proving to be very workable.

Two Conservation Assessment and Management Plan (CAMP) Workshops were held during the year. The first of these involving marsupials and monotremes was held in Currumbin 5-7 April 1992 and the second involving Penguins was held in Christchurch 18-19 August 1992. Both were conducted under the auspices of the CBSG and we are grateful for the support and encouragement from CBSG Chairman Ulie Seal. A CBSG Regional meeting was conducted during our Currumbin Regional Zoo Conference and we are hoping to continue this trend in Adelaide next year.

This report was submitted by Paul Garland, Australasian Species Management Programs.

Gulf States, Arabian Peninsula



Introduction

The very zoogeographic location of the Arabian Peninsula allows it to be a meeting place for many animals of both the Eurasia and Africa. Although most fauna resembles African origin, there is a great variety from Asia and some from the Europe. There are some 150 species of mammals, more than 450 species of birds, 130 or so species of reptiles, and nine species of amphibians. In addition, there exists nearly a dozen freshwater fishes, not including the marine fauna.

It has been clearly stated by Gallagher (1980), Gross (1987), Harrison and Bates (1991), Nader (1990), Richardson (1990), and Silsby (1980) that nearly 10 percent of the mammalian and avian species and subspecies are endemic in the Arabian Peninsula. Of the nine species of amphibians, six are endemic (Balletto et al, 1985). Over 50 species and subspecies of reptiles are endemic to Arabia (Arnold, 1986; Brown, pers. comm.; Gallagher, 1990).

Zoos

Although there is a very high rate of endemism among the vertebrates and possibly the invertebrates, very few of these received attention in the captive breeding centers and zoo circles of the Arabia. There are zoos and/or captive breeding centers in Bahrain (Wildlife Park), Kuwait (zoo), Qatar (a zoo and a private breeding center), Saudi Arabia (zoo and breeding centers), Sultanate of Oman (one private breeding center), and United Arab Emirates (two zoos and nearly a dozen private breeding centers). There is no zoo in Yemen.

The history of zoos in the Arabian Peninsula is not very old. Most zoos started during the 1960's. Of course, there were many privately-owned captive breeding centers for falcons and some hoofed mammals. Still today, the ruling families of the six Gulf Cooperation Council (GCC) states (Bahrain, Kuwait, Oman,

Qatar, Saudi Arabia and the U.A.E.) have a good collection of both local and exotic species of snakes, birds, and mammals.

Breeding Success

The zoos and the captive breeding organizations of the GCC countries have succeeded in breeding some species of reptiles like the African spur-thighed tortoise (Al Ain Zoo, UAE, has over 1,000 specimens), Indian python, saw-scaled and Russell's viper, Nile, saltwater and siamese crocodile; birds like the houbara, white-bellied, buff-crested, and kori bustard, dikkop and stone curlew, sandgrouse, partridges, francolins, eagles, vultures, flamingoes, ducks and geese, ostriches, rhea and emu, cockatoos, parrots, myna, etc.

Among the mammals, Al Ain Zoo alone bred Arabian oryx (total 150) Fringe-eared oryx (80), scimitar-horned oryx (20), addax (40), dama gazelle (20), mhorr gazelle (10), Arabian gazelle (150), Thomson gazelle (70), nubian ibex (100), white-bearded gnu (40), barbary sheep (40), Bengal tiger (10), and sand cat (12). Dubai Zoo, Qatar Zoo, Riyadh Zoo, Al Areen Wildlife Park King Khalid Wildlife Research Center, and Taif Center of Saudi Arabia have also succeeded in breeding many of these species.

Reintroduction

From the wildlife and nature conservation point of view, the National Commission for Wildlife Conservation and Development (NCWCD) of Saudi Arabia has not only bred Arabian oryx, several species of Arabian gazelles and birds in their two research centers, but also successfully reintroduced some of them in nature. During the last two years, most introduced species have been established in the semi-arid condition of parts of Saudi Arabia. (Abdul Rahman Khoja, pers. comm.).

Oman's introduction of Arabian oryx in the wilderness of Valooni is a great success story of reintroduction of captive-bred wild animals or an 'ex situ' conservation. The total number of oryx there is said to be over 120. The private captive breeding center at Oman has bred Arabian tahr and Arabian leopard, both almost extinct in nature. At an opportune moment, these and others bred in this center may well be released in nature.

Most of the species bred in Al Areen in Bahrain live in semi-captive condition. Some of these may also be reintroduced when the time is ripe to do so.

Dubai Zoo being the smallest and one of the oldest in the area is regularly breeding the Gordon's wild cat (*Felis silvestris gordonii*) considered a rare cat of the Arabia, as well as the Arabian wolf, Bengal tiger, puma, Laristan sheep, Barbary sheep, scimitar-horned oryx, Indian python, Nile crocodile, and African spur-thighed tortoise. Many species born in Al Ain, Dubai Zoo, and private collections are suitable for reintroduction.

Suggestions

What I feel is that most captive-breeding institutions or, for that matter, the zoos of the region are rather working in isolation. They are paying little or no attention to regional cooperation. I know of very few faunal exchanges that have taken place during

Gulf States Report...

the last decades between the zoos and breeding centers of the region. First of all, we need to make an inventory of the local species which are extinct in nature but present in zoos/breeding centers; those threatened with extinction; those endangered; and those that are vulnerable. Those present in the local zoos and foreign zoos or breeding centers and how to procure them should get the second priority. There should be a meeting organized by the NCWCD or any other party interested in facilitating the discussion and resolution of captive breeding needs of the region. It might be turned into an annual affair. Also priorities should be fixed for the captive breeding of the endangered, threatened, and vulnerable species of local origin and their reintroduction. Such a meeting can also make a decision regarding the breeding of animals of the neighboring region(s).

Acknowledgements

I am thankful to Mr. Abdulrahman Khoja, Director, National Wildlife Research Center, National Commission For Wildlife Conservation and Development Saudi Arabia; Mr. Richard E. Naegeli, Director, Riyadh Zoological Gardens; Mr. Mossa A.J. Al-Khashti, Director, Kuwait Zoological Gardens; Mr. Abdul Rehman Al Doseri, Director, Al Ain Zoo and Aquarium; Mr. Heinz Eller, Curator, Al Ain Zoo and Mr. Bish Brown, former Vice Chairman of Emirates Natural History Group, Abu Dhabi, for providing me with valuable information on the wildlife and captive bred animals of Arabia. Authorities of Dubai Municipality deserve special mention for permitting me to attend the CBSG meeting at Vancouver, Canada.

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This report was submitted by Mohammad Ali Reza Khan, Dubai Zoo, P.O. Box 67, Dubai, United Arab Emirates.

Report from India**Central Zoo Authority**

At the 1991 CBSG Annual Meeting in Singapore last year, we reported that a Zoo Act passed by Parliament in September provided for the constitution of a Central Zoo Authority of India. This was reported last February. The Minister for Environment is chairman; there are eleven other members drawn from the forest, wildlife, veterinary, zoo, and animal welfare establishments both governmental and non-governmental. Specialists in different subject areas are co-opted to meetings as appropriate. The Authority is administered by a Member Secretary who will be an officer of the Forest Department who has served as director of a zoo during his tenure.

The Authority has held four meetings. A subcommittee for drawing up norms and standards was constituted and drew up a document which was reviewed by the Authority and circulated to the Zoo Directors of India for comments. The standards were notified into law in August of this year as the Recognition of Zoo Rules, 1992.

Now the 200+ wild animal facilities in India must submit a formal application to the Central Zoo Authority. They will be assessed and granted recognition if they meet all the requirements. If they do not they will be given time (and in some cases financial assistance by the Authority) depending on need to make required improvements.

At the last meeting of the Zoo Authority, a Committee for Coordination of the Indian Endangered Species Breeding Program (IESBP) was formed and had its first meeting on 17 September. This committee is roughly equivalent to the SSP, the EEP, JSMC. It is headed by the Member Secretary of the Zoo Authority who will function as the Conservation Coordinator for India.

Indian Zoo Directors' Association

The Indian Zoo Directors' Association met for the first time as a registered body in January at Hyderabad Zoo and elected officers. Mr. T. Ramakrishna is President.

The next national conference will be held in January of 1993 in Madras Zoo. A meeting of the Indian Zoo Association along with zoo personnel from other zoos in the world will take place on 11 October on the occasion of the Centenary Celebrations of the Mysore Zoo. The Indian Zoo Directors' Association will be one of the sponsoring organizations of the several upcoming international symposia and PHVA Workshops which are planned in India for the next few years.

Veterinary

In November of 1991, the first International Symposium on Zoo and Wildlife Veterinary Medicine was held in Bangalore. One of the resolutions passed was that all veterinary colleges should include a course in zoo and wildlife medicine in their curriculum.

As a result of this resolution, the Indian Council for Agricultural Research which is the nodal Authority for all veterinary activities in India has given an official instruction that all veterinary colleges must include a minimum of one course in zoo and wildlife medicine in their curriculum.

A Veterinary Special Interest Group (SIG) has formed under the auspices of CBSG, India. This group is part of an initiative to insure that all working zoo and wildlife veterinarians are kept up to date with the latest technological information of importance to zoo and wildlife conservation in India. A mailing list is available.

The World Wildlife Information Network (WWIN), a veterinary information service, which has been initiated by Dr. Suzanne Jackson of London Zoo will be operating in India via Zoo Outreach Organisation/CBSG, India. The first project has been undertaken in collaboration with the Veterinary S.I.G. which will collect veterinary questions of immediate life-saving significance and submit them to WWIN for some initial activities.

Training

The Wildlife Institute of India conducted a five-week training course in zoo management for 20 curatorial and technical level zoo personnel from all over India last November-December. The course covered all basic aspects of zoo management with lectures and demonstrations, including on-site practicals at four different types of facilities, a large, new modern zoo, an old, small inner city zoo, a deer park, and a reptile breeding center. Teaching was done by senior Indian zoo personnel and teachers from the Wildlife Institute. Some zoos in U.K. and U.S.A. contributed printed matter for this course which added to its success.

In November, 1992, a two-week intensive workshop for zoo directors will be conducted by the Wildlife Institute of India at Hyderabad Zoo. Donations of technical printed matter, videos about your zoo, equipment, and educational material will be much appreciated. Marking guns and ear tags would be particularly welcome. There will be about 20 participants.

In June 1992, a three-week summer institute in Wildlife Disease and Management was conducted by the Bihar Veterinary College in collaboration with the Patna Zoo. This institute was particularly significant because 28 of the 31 participants were professors or associate professors of veterinary colleges who had been given responsibility for developing the required curricular course in zoo and wildlife medicine mentioned earlier.

A briefing manual on animal identification and studbooks was made for each participant and a variety of CBSG and ISIS materials were donated for general use. ARKS, SPARKS and VORTEX were demonstrated. The participants all immediately joined CBSG, India and have made a request for assistance in developing their courses.

Education

Three workshops entitled, "Using the Zoo to Teach Biodiversity" have been scheduled in major zoos in three south Indian states. These zoos have invited participation from smaller

zoos and from wildlife field personnel as well. The workshops this year are being conducted by Malcolm Whitehead, Director of Education, Twycross Zoo, who is also a CBSG member. These workshops are sponsored by Zoo Outreach Organisation, CBSG, India, the CBSG Core Education Committee, British Council, British Airways Assisting Nature Conservation and of course the host zoo. We intend this to be a regular feature for the next three years moving from region to region and conducted by a different member of the CBSG Core Committee on Education each year.

CBSG India

The Zoo Outreach Organization has convened a regional branch of CBSG in response to the recommendation of the Conservation Coordinators at the Annual CBSG meeting last year for enhanced regional activity. In course of time, we hope this initiative will become CBSG, SAARC (South Asian Association for Regional Cooperation) which covers the surrounding states of Bangladesh, Pakistan, Sri Lanka, Bhutan, and Nepal. We have a few members from those countries already and hope there will be a representation at the upcoming Mysore meeting.

The response to the initiative of CBSG India has been extremely enthusiastic. We had 250 members when I left India four days ago, all of which except for about a dozen are zoo personnel, wildlife field personnel, forest and wildlife officers, university and research institute personnel, and veterinarians. A poster describing the *modus operandi* was presented at the World Endangered Species conference at Jersey and at the Vancouver CBSG meeting. On this poster is a booklet listing all the members and their special interests as well as the "story" of how the initiative evolved. We can make copies of this for people who are considering a similar regional initiative and I will be happy to conduct a working session for this also.

CBSG India is sponsored by Zoo Outreach Organization which acts simply as a secretary or administrative office to organize this human resource data base and disseminate information. We encourage members to initiate Special Interest Groups (SIGs) on their own to focus on species and subjects which need concentrated attention. These are intended to become Regional Animal Specialist Groups in course of time which can be recognized by SSC.

The following SIGs have been established and are beginning to function : lion-tailed macaque, Asiatic lion, Sangai, Veterinary, White-winged wood duck, Desert monitor, Himalayan salamander, Himalayan dragonfly, and Education.

The Indian Reptile and Amphibian Specialist Group was already functioning before the formation of CBSG, India and held a meeting last November. They have affiliated with CBSG, India and their co-chair is on the Coordinating Committee. We are publishing the proceedings of their Regional meeting as the November issue of ZOOS' PRINT.

The Wildfowl and Wetlands Trust is sponsoring the White-winged wood duck SIG. The Knoxville Zoo is sponsoring the Asiatic lion SIG. One of the major functions of the SIGs concerns international meetings. We are focusing all our attention now on

getting international meetings concerning Indian species held in India...

India itself. We help the SIGs as well as zoos and state wildlife establishments liaise with taxon groups in hard currency countries for the purpose of organizing international workshops and symposia concerning Indian species in India itself. Already national or international symposia/PHVA workshops have been scheduled for Manipur Brow-antlered deer (October 1992), Lion-tailed macaque, and Asiatic lion (October 1993). Workshops hoped for are Asian rhino, tiger, and white-winged wood duck in 1994.

Studbooks

The only new Studbook is the Regional Bengal Tiger Studbook. This is a preliminary studbook consisting of all wild-caught tigers. Probably there will be two tiger studbooks, one for conservation breeding program and another for covering all the tigers exhibited in India. An education program is being carried out with brochure, stickers and T-shirts for Wildlife Week this year.

The Zoo Authority will now coordinate and insure maintenance of studbooks for highly-endangered species on priority basis. It will be discussed at the first meeting of the Committee on 17 September.

Mysore Zoo Centenary/ Sangai PHVA

The Mysore Zoo celebrates their centenary this October and everyone is invited. On the occasion of this centenary, there will be also a regional CBSG meeting and PHVA Workshop on the Manipur Brow-antlered deer.

Miscellaneous

There will be an International Elephant Symposium in July 1993 in Mudamalai Wildlife Sanctuary sponsored by the Bombay Natural History Society, Forest Department of Karnataka and the Ministry of Environment, Government of India.

The 20th Anniversary of Project Tiger is being celebrated in 1993 and there will be an international conference associated with it. Details of this are not yet available.

The First Zoo Management Book

This year, 1992, marks the 100th Anniversary of publication of the very first zoo management book in the world. This was written by an Indian named Ram Brahma Sanyal, Superintendent of Calcutta Zoo for 30 years. The book was recognized as the first of its genre by Nature magazine. A Handbook of the Management of Wild Animals in Captivity in Lower Bengal describes the habitat, taxonomy, care, sanitation, feeding, enclosure design, transport, transport cage design, behavior, breeding management, medical treatment both preventative and curative, environmental requirements, and animal welfare aspects of 200 species of mammals and 400 species of birds. R. B. Sanyal, an Indian, was certainly one of the first modern zoo managers. We want the world to know that at the time of Sanyal, Indian zoos

were as good or better than any zoos anywhere. With a little help from some of you who have moved ahead and with a lot of work from us we again will be as good or better than any zoos anywhere.

This report was submitted by Sally Walker, Zoo Outreach Organization.

Brazil Fauna Interest Group



The IUCN-SSC Captive Breeding Specialist Group Global Brazil Fauna Interest Group (FIG) is continuing to develop its strategy for support of conservation efforts in Brazil. The FIG concept incorporates a cross-taxonomic, as well as an interdisciplinary approach to the conservation efforts of the zoological community within a geopolitical area. Such an approach is needed as it has become increasingly apparent that the focus of the CBSG is shifting from the strict management of captive populations to that of small populations involving both captive and field aspects. The Global Brazil FIG will strive to encourage collaborative conservation efforts for species preservation in Brazil.

Dr. Iolita Bampi, Director of the Wildlife Department of the Brazilian Institute for the Environment and Natural Renewable Resources (Instituto Brasileiro do Meio Ambiente e de Recursos Naturais Renovaveis, IBAMA), attended the meeting as a guest of the CBSG and the AAZPA Brazil FIG. The official representation of the Brazilian government at the CBSG meeting enhances the potential for the development of long-term partnerships for conservation initiatives in Brazil. A goal of the Global Brazil FIG will be to promote a closer working relationship between the international zoological community and Brazilian wildlife officials and field research personnel, as well as the Brazilian Zoo Association (SZB).

The following recommendations were made at the Vancouver meetings:

- 1) Dr. U. S. Seal, CBSG Chairman, will write a formal letter to IBAMA to officially inform the Brazilian Government of the formation of the Global Brazil FIG. Full participation of Brazilian wildlife management personnel will be encouraged.

- 2) A working group will be formed to finalize the internal structure of the group. A mission statement that includes input from all of the different regional groups (AAZPA, EEP, etc.) will also be defined.

- 3) To ensure that the efforts of the FIG are in line with local conservation needs, it was recommended that potential projects be submitted to IBAMA for comments and prioritization of in-country needs. Input will also be solicited from the Brazilian zoological community and relevant organizations. However, final decisions regarding support of these projects should be made by the Global Brazil FIG.

4) A database of interested individuals will continue to be compiled. The network of individuals participating in the CBSG Global Brazil FIG will increase the potential of exchanges of technology and information with Brazil.

A mid-year progress report will be published in the CBSG Newsletter. Anyone interested in participating in the CBSG Global Brazil FIG should contact Natasha Schischakin, Conservation and Research Office, Houston Zoological Gardens, 1513 North MacGregor, Houston, Texas, 77030, U.S.A. or Jeremy Mallinson, Jersey Wildlife Preservation Trust, Les Augres Manor, Trinity, Channel Islands, UK.

Madagascar Fauna Group



After much debate, we have decided to conduct a PHVA Workshop in Madagascar in August 1993 for one lemur and one reptile species (to be decided). The primary focus of this Workshop will be on training for Malagasy policy-makers and on-the-ground personnel in current programs of the CBSG and on concepts of population biology, wildlife management, and captive breeding programs. We will work with local authorities in the National Association for the Management of Protected Areas (ANGAP), Department of Waters and Forests (DEF), and Parc Zoologique de Tsimbazaza on local organization with funding to be solicited from MFG, CI, JWPT, and the ANGAP training program.

The group continued discussions with members of the Herpetological Specialist Group about large-scale legal and illegal trade in Malagasy herpetofauna. Alarming numbers of chameleons, geckos, lizards, and amphibians have been entering the USA and Europe with up to 80% mortality upon arrival. The trade has been difficult to mitigate within Madagascar. Local authorities have requested substantiation of the deleterious effects of the trade on wild populations. Efforts will be made with assistance from HSG and SSC to review the need for upgrading CITES listings. The HSG will compile TRAFFIC and field data to support any recommendations.

We are working with the North American Prosimian Taxon Advisory Group and with the Primate TAGS in Europe and the U.K. to facilitate and coordinate participation in captive breeding programs for Malagasy fauna. A working session of member institutions was held at the International Primatological Society Congress in Strasbourg in August 1992 to update Primate CAMP Taxon Sheets for lemurs and to review the current status of internationally based programs. Informal studbooks will be initiated for species with small captive populations until an official application for an International Studbook can be made. A report of this working session will be distributed to members.

Dr. Hilary Simons Morland has been hired as full-time Project Coordinator to expand and manage the Madagascar

program and to assist the Chairman with coordinating other MFG activities. Efforts in Madagascar in 1992 have focused on working with the newly appointed Director and with staff at Parc Botanique et Zoologique de Tsimbazaza in Antananarivo to improve administration, staff training, and animal collection management. Accomplishments include instituting systems for generating revenue (e.g., admission fees; gift items), improving visitor services, providing staff uniforms, and continuing English Language courses for management. A request has been made to Chris Wemmer to conduct a Zoo Biology and Animal Management Training Course in Madagascar.

The Director of Parc Tsimbazaza was sponsored by the South African government to participate in PAAZAB's 1992 Annual Meeting, and Parc Tsimbazaza has become a full member (with sponsorship from Joyce Basel of FUN Safaris). We hope to work with PAAZAB to coordinate mutual efforts at Parc Tsimbazaza.

The Japanese government (JICA) has been assisting Parc Tsimbazaza and currently has a full-time technical consultant working on improving the Parc's aye-aye exhibit. We hope to discuss the potential for collaborative efforts with colleagues from zoos in Japan in the next few months.

Development of exhibits, conservation education, and breeding programs continues at the eastern regional conservation center of Parc d'Ivoloina by Andrea Katz and Charlie Welch working with the Direction des Eaux et Forêts.

In the interests of expanding and strengthening links between the captive breeding community and *in-situ* conservation programs, we are providing channels for staff from our member zoos to get directly involved with in-country conservation activities (e.g., through information exchanges, technical consultancies, and/or participating in field surveys). We also will work with members to provide public relations for their support of in-country conservation programs.

The process of renewing the MFG's formal agreement to work in Madagascar (Annex to the Convention of Collaboration of St. Catherine's Island) has been initiated with the Ministry of Foreign Affairs.

The Annex requires the MFG to evaluate its in-country activities in 1992 and to consider developing a new regional conservation center. The Department of Water and Forests has asked the MFG to rehabilitate a former breeding station at Marohogo on the northwest coast (about 20 km from the major city of Mahajunga and 100 km from Ampijoroa Reserve). Under the leadership of George Rabb and the Brookfield Zoo, we will explore the possibility of developing this station, with a strong focus on conservation education activities, following the model of Parc d'Ivoloina.

We are continuing to expand MFG membership. We recently added Denver Zoo, Zoo Atlanta, and Columbus Zoo, and we have been talking with other interested institutions. We will welcome new members.

This report was submitted by Hilary Simons Morland, Madagascar Project Coordinator.

Zaire Working Group Report



We should use the new name of the country, Peoples Republic of Congo, which the National Conference decided to change last month in Kinshasa. This fait-divers illustrates the political turmoil which is going on in this central African country. The information we get is also very unclear and sometimes based on very local situations in one of the major cities like Kinshasa, Kasangani or Lulumbashi.

In general, we can surmise that the situation of wildlife in P. R. of Congo is not bad because the interior of the country became nearly inaccessible for major logging or other use of the natural resources. Thus, wildlife is not disturbed. National Parks like the Salonga are a wealth of biodiversity. Congo is the most important source of biodiversity in Africa, and perhaps ranks third in the world after Brazil and Indonesia.

In May, 1992, two new Natural Reserves were created in (ex)Zaire, namely the Ituri Forest in the north and a mangrove forest at the ocean shore. In Ituri, we find the Epulu-station which deals mainly with the okapi population. The Zairean Faunal Group, chaired by Dr. Russ Mittermeier and Rick Barongi of San Diego Zoo, has started to operate. The *in-situ* research on bonobo behavior continues.

Although good things could be said, not everything is going well. The zoos in Kinshasa, Kisangani, and Lulumbashi are either in a dreadful situation or are not operational anymore. The zoo of Nsele, the private domain of President Mobutu and managed by Dr. Bibini, recently received support from Brookfield Zoo and some private fundraising, and so could continue its operation. Some negative information, due to the strong presence of the army, put forth other questions.

The zoos in Congo fall under the responsibility of Dr. Bebi di Mantsoni. The best way to establish contacts is through the Pan-African zoo organization PAAZAP, chaired by Willie Labuschagne of Pretoria. Their last conference in June confirmed the good contacts with the persons responsible for nature conservation and wildlife in Congo.

But the situation is still highly vulnerable, as demonstrated by Garamba National Park where the last herd of 31 Northern White rhinos reportedly live. Poaching remains high. The Frankfurt Zoological Society continues to support the operation. The CBSG Office recently received a letter from Kes Hillman Smith requesting that Garamba be considered in the Adopt-A-Park Program.

The RSPCA, the U.K. Animal Welfare Group, is interested in helping zoos in the developing world and also in Congo. Roger Wheeler is the contact person. Eventually this action will be enlarged in Europe by the Eurogroup of Animal Welfare in collaboration with EAZA. Some discussions about this have already occurred.

PAAZAP is in the process of negotiating funding by

UNESCO for formation and educational programs for zoo staff. The conditions would be that the zoos respond to minimum standards laid down by PAAZAP. The Royal Zoological Society of Antwerp has already hosted several "trainees" from Congo for formal training in Antwerp. RSZ Antwerp prefers to continue such a program, given in French, in collaboration with PAAZAP, for example.

Ethiopia Report



CBSG welcomes the invitation extended by the Ethiopian Wildlife Conservation Organization to the New York Zoological Society and the Zoological Society of London to investigate cooperative conservation programs for endemic species, most particularly the Simian Jackal or Ethiopian Wolf as recommended by the SSC Canid Specialist Group. While appreciating that these species are the property of Ethiopia, CBSG urges that every effort be made to ensure that the necessary commitment is made now to prevent the further decline of these species.

Indo-Malay FIG Report



Four countries of the South East Asian region were represented: Thailand, Singapore, Malaysia, and Indonesia in spirit. In addition, regional representation from the AAZPA and the EEP was present.

Because Thailand is now in the process of developing its zoo national system, it was included in the FIG. Vietnam was also incorporated into the FIG for convenience. Thus, the FIG met and changed its name to the South East Asian FIG.

Bernard Harrison, Singapore Zoo, was appointed chairman of the FIG, and Ron Tilson, Minnesota Zoo, and Lee Simmons, Omaha Zoo, were appointed co-chairs.

Recommendations

1. All zoos in SEAZA (South East Asian Zoo Association), should develop a database on all species, numbers, and space (exhibit and off-exhibit holding areas).
2. The CBSG to assist SEAZA develop a Regional Collection Plan Priority List.
3. SEAZA to develop a set of priorities regarding endangered species programs, facilities, and expertise needs for each country in the region and for each endangered species.
4. CBSG and SEAZA to identify additional species not included in Regional Collection Priority Lists which are occasionally brought into captivity that should be kept for captive breeding because of their rarity.

A CBSG Invited Paper...

Modeling Problems in Conservation Genetics Using Drosophila

R. Frankham¹, D.A. Loebel, S.C. Borlase, J. Briton, L. Woodworth, R.K. Nurthen, D.A. Briscoe, D. Spielman and D. Craven

Introduction

The central issues in the genetic management of endangered populations are: 1) maintenance of genetic variation (as it represents evolutionary potential); 2) inbreeding depression in small populations; 3) migration between small isolated populations; 4) genetic adaptation to captivity; and 5) taxonomic uncertainties. In the first three of these topics there is relevant theory to guide genetic management. However, the theory is mostly untested, even though much of it traces to Wright's classic 1931 paper. In most cases, it is simple single locus neutralist theory that is based on unrealistic assumptions (the absence of natural selection, no important linkage effects, etc). It must be emphasized that there are significant deviations from the predictions of related theory on the relationship between inbreeding coefficients (F) and heterozygosity. Consequently, it is crucial that these fundamental untested theories be subject to experimental evaluation.

Rare and endangered species of wildlife are unsuitable for evaluating these theories. They are typically slow breeders, expensive to keep and present in low numbers so that controlled, replicated experiments are not possible. Consequently, such studies can only be done efficiently with a convenient laboratory animal.

Drosophila is an ideal model for evaluating the above-mentioned theories, procedures, and problems as it can be easily captured from the wild and rapidly and inexpensively maintained as captive populations. Most importantly it has already proven to be a reliable model for a wide range of related problems in animal breeding, and population and quantitative genetics. For example, the effects of inbreeding are similar in humans, domestic animals, outbred plants, wildlife species, and *Drosophila*. Further, the effects of population size on the evolutionary potential of populations (selection response) are similar in *Drosophila* mice, chickens, and maize. Recently, we have used *Drosophila* to investigate the following theories and problems in conservation genetics: 1) equalization of family sizes (Borlase et al., 1992), 2) harems (Briton et al., unpubl.data), 3) equalizing founder representation (Loebel et al., 1992), 4) immigration into small partially inbred populations (Spielman and Frankham, 1992), 5) fluctuating population sizes (Woodworth et al., unpubl. data), 6) N_e/N ratios in large captive populations of *Drosophila*

(Briscoe et al., 1992), and 7) genetic adaptation to captivity (Frankham and Loebel, 1992). In this presentation, I will concentrate on topics 1-4 as they are of most relevance to CBSG.

1. Equalizing Family Sizes (EFS)

Wright predicted that the consequences of small population size on inbreeding and loss of genetic variation depended on the effective population sizes (N_e). Further, he predicted that the effective population size would depend on the number of breeding individuals, on the sex ratio, the fluctuations in population size over generations, and the variance in family size. Large variation in family size is predicted to reduce N_e and equalization of family sizes to approximately double it. Consequently, equalization of family sizes has been recommended for use in captive breeding programs as it is expected to lead to lowered rates of inbreeding, and greater retention of genetic variation and reproductive fitness.

To evaluate this theory we set up ten small (four pairs) replicate populations of EFS and ten of random choice (RC) of parents (controls) and ran them for ten generations. Random mating was used in both treatments.

Levels of pedigree inbreeding were lower in EFS than RC, the rate of change and the F 's at generation (G) 10 being significantly different.

Levels of genetic variation as measured by electrophoresis at six polymorphic loci were significantly higher in EFS than in RC, as expected. Significant differences in the same direction existed for percent polymorphism and average number of alleles per locus. The estimated N_e 's from the allozyme data were 23 and 6.9 for EFS and RC, compared to a census size of 8 and an expectation of 15 for EFS. Surprisingly, we detected no differences between EFS and RC in broad sense heritabilities for abdominal bristle number. The reason for this is unclear, though linkage disequilibrium is a possible explanation.

EFS had reproductive fitness about double that in RC, and both had fitnesses much less than the outbred base population.

We can unequivocally recommend the use of EFS in captive breeding programs.

2. Unequal Sex Ratios - Harems

Many species have unequal sex ratios of parents, the most notable being harem structures. Polygyny occurs in a majority of mammals, in a minority of birds, and in some fish, reptiles and insects. In addition to species that have harems in the wild, many species in captivity are maintained with harem structure due to male-male aggression.

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Drosophila...

Harems are predicted to reduce effective sizes to closer to that of the sex with smallest number of parents e.g., if we maintain populations of size 8 with equalization of family sizes, a harem of one male and seven females, has an expected N_e of 5.1, compared to 15 for a similar population with an equal sex ratio (ESR).

To evaluate this theory, we set up replicated populations using the above Harem and ESR regimes and maintained them for eight generations.

As predicted, loss of genetic variation was significantly higher in harems than ESR and the loss of reproductive fitness significantly greater. The N_e 's were 6.6 and 13.9, respectively, for harems and ESR.

The implications of our work are clear. Harems should only be used when it is entirely impractical to do otherwise. While it may not be easy to avoid using harems due to male-male aggression, the potential benefits from circumventing harem structures are often very large. Consequently, the use of procedures such as artificial insemination, vasectomized males, rapid turnover of males, smaller harems, etc. should be seriously contemplated. While the effects of harem structures are well recognized, the issue of their deleterious consequences seems to have received less attention than it deserves.

3. Equalizing Founder Representation

Small numbers of founders are often used in establishing captive breeding programs, and these frequently contribute unequally. For example, only one male and three females were available to found the captive population of Speke's gazelle. These founders contributed unequally. It has been recommended that founder representation should be equalized in such circumstances, but details of how to do this are hazy. There is no relevant theory here, except for the first generation.

To evaluate the value of EFR, ten small populations were set up with unequal representation of the founders. These were each split into an EFR line maintained by choosing parents to equalize founder representation (EFR), and a control line with random choice of parents (RC). Random mating was used in both treatments.

EFR was effective in moving founder representation towards equality, mean founder equivalents changing from 4.41 at G0 to 4.89 at G8. However, there is a definite limit to the improvement, the highest value being 5, compared to the actual number of founders of 6. Most of the movement towards EFR was achieved in the first generation. This is a point that has not been documented previously. The contribution of four founders moved towards equality in EFR, while that of two got worse. No founders were lost in EFR, but the contributions of some founders were lost in the RC controls. Changes were limited by the initial matings. The founders whose contributions got worse were females who were mated to the over-represented male. With non-overlapping generations, it was only possible to alter the founder contributions towards equality on a within sex basis, due to the

restrictions imposed by Mendelian inheritance.

There was a small, but significant, reduction in the pedigree inbreeding levels in EFR as compared to RC.

The amount of genetic variation (polymorphism, average heterozygosity and mean number of alleles/locus) retained at G8 was significantly higher in EFR than in RC.

Since the EFR lines had lower inbreeding coefficients and higher levels of genetic variation one would expect them to have a higher reproductive fitness. However, the competitive index measures of reproductive fitness were not significantly different in EFR and RC at G8. It is possible that the fitness advantages in EFR due to lower inbreeding are being balanced by a slower adaptation to captivity than in the RC controls. Our findings indicate that relations among inbreeding, genetic variation, and reproductive fitness are not necessarily close.

EFR can be recommended for a few generations as it results in lower rates of inbreeding and increased retention of genetic variation.

4. Effects of Fitness of Immigration Among Small, Partially-inbred Populations.

Many species, both in the wild and in zoos, have fragmented distributions such that local populations are likely to suffer inbreeding depression, e.g., koalas in Eastern Australia. It has been recommended that individuals be exchanged among such populations to maintain fitness in them. However, such programs: 1) are costly for large vertebrates (e.g. elephants, giraffes); 2) may upset behavior, especially when males are introduced; and 3) may spread diseases. Consequently, the benefits need to be established and quantified.

The effects on reproductive performance of introducing a single immigrant from one small isolated partially inbred population into another were evaluated. The ten partially inbred RC populations from the EFS experiment were used. They had been maintained at a size of four pairs for 11 generations (mean $F = 0.50$), followed by six generations with about 100 per generation prior to the start of the experiment. A single male from another RC population was introduced into each RC population to form the immigration lines (IRC). All lines were maintained for three generations using four pairs/generation prior to assessing their reproductive fitnesses and that of their base population using the competitive index.

The relative fitness of the IRC lines was more than double that of the RC lines. Further, fitness improved in every one of the ten IRC lines. The introduction of a single immigrant improved the fitness to about half way back to that of the outbred base population.

There were clear benefits from introducing a single immigrant into our partially-inbred populations. We expect benefits in other outbred polymorphic species of plants and animals. The practice of deliberately exchanging individuals can be recommended in the genetic management of captive population in zoos and for species with fragmented distributions. However, the genetic benefits must be balanced against the costs and potential risks of behavioral disruptions and disease transmission.

Concluding Remarks

What is the appropriate role of laboratory animal studies in conservation genetics? Laboratory animal studies have been a regular and important part of research in animal breeding, population and quantitative genetics since at least the 1950s. Typically, new theories in animal breeding have been evaluated in *Drosophila* and mice before they were applied in domestic animals. In contrast, untested theories in conservation genetics have been widely applied in endangered species, and few laboratory animal studies. While that has been justified up to this point, it is most unwise to continue in this manner as the discipline of conservation genetics matures. Not all our theories and practices will turn out to be valid or optimum. A cautionary tale from animal breeding is provided by the use of selection indices to improve egg production strains. This theory was applied in practical breeding without being adequately tested in laboratory animals and turned out to have unpredicted problems that caused chicken breeding companies to go out of business. A small proportion of the conservation biology resources should be invested in laboratory animal research to ensure we do not have a related disasters with endangered species.

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Avian Working Group Report

The Avian Working Group met twice during the course of the CBSG Annual Meeting, discussing old and new business. The discussion of old business focused on the recently completed ICBP document "Parrots: an action plan for their conservation and management," and resulted in the following recommendation:

"The draft version 'Parrots: an action plan for their conservation and management' was presented to the CBSG Avian Working Group for review. Most of those present had no time to review the document and needed more time to comment on the proposed Plan. The Avian Working Group recognizes that this is the initial draft version and encourages the full review of the document by regional specialists with expertise with psittacines and their conservation, including field reviewers and captive management personnel."

Discussions of new and ongoing business included recently completed and upcoming workshops:

Penguin CAMP

The CAMP for Penguins was completed August 19, 1992 in Christchurch, New Zealand. A discussion review draft document was produced two days after the workshop and carried forward to the Second International Penguin Conference in Cowes, Phillip Island, Australia for review by more field biologists and ecologists. During the conference, a commitment was received by several field biologists as well as the Scientific Committee for Antarctic Research's Bird Biology Subcommittee to assist in fine-tuning the document, with the goal of completing the final draft within two years. Three penguin species were assessed as Endangered according to Mace-Lande criteria: Yellow-eyed (*Megadyptes antipodes*), Fiordland crested (*Eudyptes pachyrhynchus*), and Humboldt (*Spheniscus humboldti*).

Of particular interest to the zoo community was the following consensus of the workshop participants which was agreed upon by the field review group:

1) Magellanic penguins (*Spheniscus magellanicus*) in captivity should be managed to extinction and their spaces utilized by Humboldt penguins; and

2) No new species should be brought into captivity until formal PHVAs have been conducted, with the full participation by the responsible field managers and biologists.

Many of the field biologists and ecologists at the Second International Penguin Conference were not convinced of the importance and potential contribution of captive breeding programs to penguin conservation. Discussions held during the conference clearly indicate that it is essential that the captive community get our data and the story of our successes with this taxonomic group into the literature. This need will be an agenda item when the North American regional Penguin TAG meets in Toronto the second week of September.

Avian WG...

Hornbill CAMP

The first rough draft of the Hornbill CAMP has been completed and is being reviewed by co-chairs of the Hornbill Specialist Group. It was recently decided to also include the African Hornbill taxa of which Alan Kemp (South Africa) was the primary collaborator. A first draft is anticipated by the end of October coordinated by A. Kemp, W. Worth, C. Sheppard, and S. Ellis-Joseph.

Waterfowl CAMP

The Waterfowl CAMP has been sent out for review, and a revision is currently underway, coordinated by N. Hewston, A. Green, and S. Ellis-Joseph.

Cranes CAMP

The CAMP for Cranes was completed the second week of August. C. Mirande is coordinating completion of the document.

Upcoming CAMPs

Upcoming CAMPs include:

- Raptors - workshop will be held in Boise, Idaho, hosted by the Peregrine Fund.
- Pheasants and Quail - will be held in Antwerp in February 1993 in conjunction with the World Pheasant Association (WPA).
- Pigeons and Doves - workshop will be held in San Diego in March in conjunction with the ICBP Pigeon and Dove Specialist Group.

The Avian Working Group discussed and recommended priorities for upcoming CAMP workshops. For high priority species, key individuals to assist with organization were also recommended:

High Priority - Cracidae (S. Strahl); Musophagidae (N. Hewston); Megapodidae (G. Phipps); Ramphastidae (M. Healy)

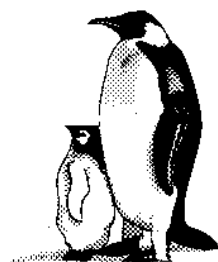
Medium Priority - Otidae (P. Gaucher); Strigiformes; Pelicanidae (G. van Tets)

Low Priority - Rallidae; Alcedinidae; selected Passerines (delay at this time)

Lowest Priority - Trochilidae; Picidae

These recommendations will be carried forward to ICBP and the ICBP Specialist Group Coordinator for discussion, ratification, and collaborative workshops with ICBP Specialist Groups.

This report was submitted by Sue Ellis-Joseph and Steve Wylie, co-chairs, CBSG Avian Working Group.



Primate Working Group Report

The development and status of the Primate CAMP and GCAP were reviewed. The Global Captive Action Plan for Primates, which began in 1991 as a single document, has been split into a CAMP (second draft) and GCAP workbook. The Regional Conservation Coordinators have outlined a progression of activities that should occur in the evolution of the GCAP:

Step 1. The development of a CAMP which has been completed for the primates.

Step 2. A regional space survey has been conducted in North America and Great Britain and is presently underway in Europe. The group recommended that similar surveys be undertaken in the other regions. The GCAP workbook summarizes the progress of each region in completing Step 3.

Step 3. Review of the CAMP and formulation of initial regional priorities. We suggest that each region work to complete Steps 2 and 3 over the next year and a half, and that a workshop to complete Step 4.

Step 4. The development of a GCAP to be completed in a two-day workshop immediately prior to the International Primatological Society meeting in Bali, Indonesia in 1994.

There was a brief discussion of concerns about the CAMP expressed at a recent SSC Primate Specialist Group (PSG) meeting. The major concerns were:

1. The publication of numbers, many of which were at best exceedingly rough "guesstimates," in the second draft of the CAMP. A statement in bold letters and large type clearly identifies that the numbers are in many instances rough guesstimates and cautions against using them as anything other than a challenge to generate better information;

2. The use of the Macc/Lande model in identifying categories of threat;

3. The importance of the ability of the PSG to act as a "watchdog" to prevent institutions from establishing ill-conceived, unauthorized captive programs. The PSG and CBSG are working to develop a set of criteria that must be considered before any new captive breeding program is initiated. It has been suggested that a review process (which would involve members of the PSG and CBSG) for evaluating proposed captive breeding initiatives be developed;

4. Inadequate opportunity for review by PSG members. The first draft was circulated to all PSG members and members were given nearly two months in which to comment - less than 1/5 responded.

The working group suggested the following principles for incorporation into the PSG/CBSG criteria:

Captive breeding programs should occur in support of, not as a substitute for, wild populations. They represent one component of a holistic conservation effort that promotes species conservation through habitat preservation, education, training,

research, and in some instances intensive *in-situ* population management. As one component of a comprehensive conservation strategy, it is important that initiation of new captive breeding programs be undertaken in a manner consistent with the following guidelines:

1. The captive breeding program should not divert resources designated for higher priority habitat conservation efforts or *in-situ* management. Recognizing that many resources available for captive breeding are not available for use in *in-situ* conservation, captive programs should be developed in a manner that generates support for conservation and education efforts in the country of origin.

2. The decision to establish or not to establish a program should be based on the best available scientific information on the species and habitat status and on the ability to manage the species in captivity. Informed decisions should:

a. be the result of consideration of the impact and effectiveness of various management options and should identify captive breeding as only one part of a comprehensive conservation strategy;

b. reflect consideration of priorities identified in the Conservation Assessment and Management Plan and Regional Collection Plans;

c. make every effort to identify and incorporate founder stock currently in captivity but not in a managed population (pets, confiscated animals, etc.), before considering removal from the wild;

d. except in cases of imminent local extinctions, reflect an evaluation (PHVA or PVA) of the impact of removing sufficient or additional founder stock from the wild population.

3. The program should be developed in collaboration and partnership with regional and local resource managers, field biologists, and captive breeding specialists. It should be reviewed by appropriate members of the SSC PSG and CBSG before initiation as follows:

a. a management committee consisting whenever possible of wildlife authorities in the range country, field biologists, and captive breeding specialists should be set up to oversee management of each species, or group of species. The management committee should be responsible for insuring that a studbook is initiated and maintained, and that appropriate planning occurs in the context of a comprehensive conservation strategy;

b. the management committee should insure that the captive population is managed in accordance with defined demographic and genetic goals that will contribute to recovery and survival of the species;

c. participating institutions should be identified on the basis of past records in husbandry, captive management, and breeding of the particular or related taxon with due regard to past records of cooperation in coordinated managed breeding programs;

d. participation in the program should be dependent on each party's signing an agreement of participation. Any party which violates this agreement should be excluded from future participation in the program.

4. Whenever possible, captive breeding efforts should be

initiated in the country of origin.

5. Ownership of animals in the captive breeding program should remain with the country of origin or with the management committee. Animals within the program should be managed without regard to commercial consideration.

6. Programs should be initiated before the population has reached the stage where so few individuals exist as to make the success of the program unlikely. The IUCN policy statement on captive breeding suggests that "Management to best reduce the risk of extinction requires the establishment of support captive populations ... when the wild population is still in the thousands". Except in "rescue" situations, programs should not begin unless there is a high probability that a sufficient founder population (e.g., 20 - 30 individuals) can be acquired over a reasonable time period.

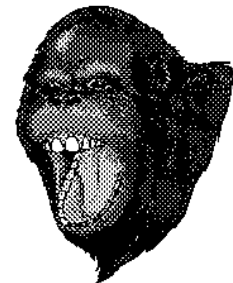
7. Husbandry protocols should be developed as the first stage in initiating captive breeding programs whenever possible. Protocols should reflect experience with closely related taxa already in captivity that can serve as "models", or, in instances where the species' biology is poorly understood, may require research with a relatively small number of wild-caught individuals. Whenever possible, preliminary research should occur in the country of origin. Following the inception of a program, the management committee should actively promote continuing research to increase knowledge of the biology of the species.

The working group reviewed the criteria suggested by the Parrot Group and found that the primate criteria overlapped extensively. It was agreed that rather than have each of the CBSG specialist groups undertake a similar process, the criteria developed by the Primate Group would be submitted to the CBSG as a whole with the recommendation that a working group be formed to review and further develop the criteria for broad application.

This report was submitted by Anne Baker, Chicago Zoological Society, co-chair, CBSG Primate Working Group.

Report of the Orangutan Working Group

A small working group met to review plans for a combined PHVA and GASP workshop for orangutan in Sumatra to be held in January 1993. The group reviewed goals and objectives for the workshop and the proposed participants list. Funding is still needed for the workshop. Contributions to date have been received from Jersey Wildlife Preservation Trust and Taronga Zoo. Other holding institutions will be approached for assistance.



This report was submitted by Tim Sullivan, SSC office.

Ursid Working Group Report



This was the first meeting of the Ursid working group. The following actions were recommended:

A) Working closely with the IUCN Bear Specialist Group, the European Bear TAG and North American Bear TAG, organize an URSID CAMP within the next year. The CAMP could be held in Europe as a central location for participants from Asia and South America. Explore the possibility of have the CAMP preceding the 1993 CBSG meeting in Antwerp.

The following issues need to be addressed:

1) Discuss/assess status of most species and subspecies in the wild;

2) How captive breeding programs can benefit and compliment *in situ* efforts;

3) Consider geographic specialization of programs or metapopulation approach;

4) Explore prioritization, by region (?) of species/subspecies for captive programs;

5) Systematic questions concerning subspecies need to be settled. Molecular genetics should be used rather than morphology since the morphology of bears is so plastic;

6) Evaluate proposed reintroduction or rehabilitation of bears, particularly spectacled bears and sun bears in which there are many orphan and confiscated animals in captivity in countries of origin;

7) Develop demographic/genetic "management strategies" for specific problems of bears; long-lived, short generation time, early maturation, production of twins/triplets;

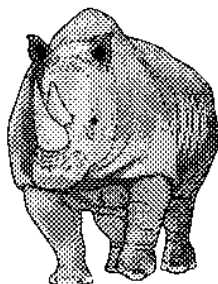
8) Address specific concerns about environment (temperature, latitude), and behavior.

B) Studbooks and initial demographic/genetic analysis for regional or international programs need to be undertaken as soon as possible.

This report was submitted by Leslie Johnston, co-chairperson Bear TAG (AAZPA).

Rhino Working Group

In May 1992, members of the Rhino Global Management Working Group met in London to develop the first draft of a Global Captive Action Plan for rhinos. The draft was subsequently subjected to a process of refinement and presented to the members of the working group meeting here in Vancouver. With minor revisions in language, the document has been approved for distribution to the various regions where it can be used in the development of the regional collection plans. Copies of the summary will be mailed



to all rhino institutions participating in their respective regional programs. Additionally, the full Rhino Global Captive Action Plan will be made available at cost to those wishing to receive a copy of the entire plan. The goals of the Rhino GCAP are to:

1. Affirm that the paramount purpose of captive programs for rhino conservation is the survival and recovery of all distinct taxa in the wild.

2. Contribute to rhino conservation by:

a. Developing, maintaining, and using captive breeding programs to provide a genetic and demographic reserve to re-establish or revitalize wild populations when the need and opportunity occurs.

b. Conducting problem-oriented research that will contribute to the management of rhino in both captivity and the wild; collaborating on such research where appropriate with field researchers; communicating and transferring the results of such research to managers of their captive and wild populations

c. Providing, where possible, financial as well as technical support for *in situ* conservation.

Considering the scope of activities that undoubtedly will be fostered by the aforementioned goals of the Rhino GCAP, there was considerable discussion regarding the implementation of the GCAP including the efficacy of creating a paid part-time or full-time global coordinator. After attempts to achieve consensus on the need for a coordinator, the conditions of employment, and a description of the position, it has been decided that a more formal proposal will be drafted and sent to all members of the working group for comment.

Discussions with representatives of the only two zoological institutions holding Northern White rhinos, Dvur Kralove and San Diego, provided insight into the methods being used to encourage reproduction. It was the consensus of the working group that efforts to induce reproduction in captive NWR must be redoubled. Both institutions indicated that the NWR would receive their highest priority and that they would entertain constructive suggestions designed to ensure the continued existence of this taxon in captivity.

Dr. Eric Miller has been asked to form a subcommittee to explore the globalization of participation in and support for Black Rhino veterinary research.

Finally, information was presented to the members of this working group to the effect that Zimbabwe's most recent census has revealed that there are only about 500 *Diceros bicornis minor* remaining in the wild in that country. This has precipitated the development of a massive dehorning plan which, as of this date, is nearly completed. However, it has also become clear to those charged with the protection of rhino populations in Zimbabwe, that further aggressive measures will be necessary if Zimbabwe is to protect the remaining, fragmented population. The working group will be devoting its attention in the coming weeks to exploring and implementing ways in which it can support these efforts.

This report was submitted by Bob Reece, The WILDS.

Lizard Report

The first CAMP workshop for lizards was held in Vancouver, BC, 1-3 September 1992, and it examined the families Varanidae (monitors) and Iguanidae, former subfamily Iguaninae (large herbivorous iguanas). A total of 131 taxa were evaluated and the results are summarized below:

Assessment of Threat Mace-Lande Criteria

	<u>Critical</u>	<u>End.</u>	<u>Vul.</u>	<u>Safe</u>	<u>Unk.</u>
Varanids (65)	0	2	23	29	11
Percent 0%	3%	35%	45%	17%	
Iguanids (66)	3	10	27	14	12
Percent 4.5%	15%	41%	21%	18%	

Recommendations:

	<u>PHVA</u>	<u>Wild Mgmt</u>	<u>Res.</u>	<u>C.B. Prgm.</u>
Varanids	5	32	57	26
Percent	8%	49%	88%	40%
Iguanids	21	42	62	30
Percent	31.8%	63.6%	94%	44.7%

Twenty-six monitor lizard taxa were recommended for captive breeding programs:

90/100 II:	<i>Varanus komodensis</i> , <i>V. olivaceus</i>
Nucleus I:	<i>V. albigularis angolensis</i> , <i>V. (prasinus) beccarii*</i> , <i>V. bengalensis*</i> (2 spp.), <i>V. dumerili</i> , <i>V. griseus*</i> (3 spp.), <i>V. (indicus) spinulosus*</i> , <i>V. prasinus</i> , <i>V. rudicollis</i> , <i>V. salvadorii</i>
Nucleus II:	12 taxa

*Denotes pending survey or taxonomic work

Thirty iguana lizard taxa were recommended for captive breeding programs:

90/100 I:	<i>Cyclura carinata bartschi</i> (C), <i>C. collei</i> (C), <i>C. nubila lewisi</i> (C)
90/100 II:	<i>C. cornuta stejnegeri</i> (E), <i>C. cyclura figginsi</i> (E), <i>C. c. inornata</i> (E), <i>C. n. caymanensis</i> (E), <i>C. pinguis</i> (E), <i>C. r. rileyi</i> (E), <i>C. r. cristata</i> (E), <i>C. r. nuchalis</i> (E)
Nucleus I:	12 taxa
Nucleus II:	6 taxa

As expected the West Indian rock iguanas (*Cyclura*) ranked particularly high in the Mace-Lande threat categories (3 critical, 9 endangered, and 4 vulnerable), and all 16 of the recognized forms were recommended for captive breeding and management. This accounted for just over 50% (16 of 30) of the total number of iguanid taxa designated for captive programs.

Jamaican Iguana PHVA Workshop

The first lizard PHVA workshop is planned for the Jamaican iguana, *Cyclura collei*, in Kingston, Jamaica, 22-24 February 1993. Thought to have been extinct for the past 50 years, this species was rediscovered in 1990 and is now the subject of an intensive field research project. Critically endangered, the adult population of this lizard may number as few as 50 adults living in the Hellshire Hills region. Eggs and hatchlings were collected from three wild nests in 1991, and 27 yearling iguanas are now being reared at the Hope Zoo with assistance from JWPT. An additional seven nests are under surveillance this year. The entire Hellshire Hills ecosystem which encompasses the full range of this lizard is under serious threat due to human activity and encroachment and the pressures appear to be mounting. Introduced predators and feral domestics pose additional problems. The workshop will be hosted by the Jamaican iguana Research and Conservation Group headed by Dr. Peter Vogel of the University of the West Indies followed by a general *Cyclura* workshop which will provide an opportunity to take an in-depth look at some of the other endangered forms in need of conservation measures. Funding for this workshop and other projects relating to the survival of the Jamaican iguana are currently being sought.

Madagascan Lizard CAMP

A CAMP workshop for the lizards of Madagascar is tentatively being planned. Already under pressure due to human activity, this group has been especially hard-hit by the pet trade in recent years. The degree of exploitation has been staggering, particularly the chameleons and many of the day geckoes (*Phelsuma*), and increasingly, rare species with restricted ranges are entering the trade. Very little data on wild populations are available for either of these groups, and it is hoped that input from Malagasy biologists will make this process more meaningful. Since over half of the world's chameleon species are endemic to Madagascar, it is possible that this workshop will be expanded in scope to cover the entire family Chamaeleontidae.

Agamidae CAMP

A CAMP workshop for the family Agamidae is tentatively being scheduled to coincide with the Second World Congress on Herpetology to be held in Australia, December 1993-January 1994.

Cyclura Genetics

Dr. Scott Davis and Ed Louis (Texas A&M) have been investigating rock iguana genetics over the past two years and now have mitochondrial DNA markers available for ten of the 16 forms. Their work with *Cyclura* began as an attempt to solve the hybrid problem that existed in the captive Grand Cayman iguana population which was preventing the development of a sound captive breeding program. With hybrids now identified and removed, a management plan can be implemented, both in the U.S. and on Grand Cayman. Once genetic profiles are established on all of the *Cyclura* then background checks can be run on any potential breeding stock prior to their integration into a program.

Lizards...

Varanid Husbandry and Reproduction

This is an area of special concern that has been designated as a high research priority by the CBSG/AAZPA Lizard Groups. Monitor lizards in general have a rather dismal breeding history in captivity. Second generation reproduction and repeatable successes are unusual and certainly the exception rather than the rule. Sexing techniques are improving but are not yet widely available to the entire zoo community. Though most varanids could benefit from increased research and husbandry activities, the specialized Asian forest-dwelling monitors (*dumerili*, *prasinus*, *rudicollis*, *olivaceus*, *salvadorii*) have been designated to receive special attention.

This report was submitted by Rick Hudson, chairman, CBSG/AAZPA Lizard Advisory Group, Fort Worth Zoological Park.

Antelope Working Group Report

The CBSG Antelope Working Group, chaired by Karen Sausman, has active members from the IUCN Antelope Specialist Group, the American, British, European, African and Australian regional groups and the newly formed Gulf States group.

The Antelope Conservation Assessment and Management Plan is now in its second draft. This document has grown out of the information compiled over a series of meetings that have occurred during the past three years.

The first organized presentation of the status of antelope in captivity and in the wild occurred with the development of an Artiodactyl Survey by Karen Sausman three years ago. That survey was followed by a desert antelope workshop attended by individuals from the US, Australia, Europe and the Gulf States.

The next step was the preparation of the first draft of the Antelope Conservation Assessment & Management Plan last year. That draft was submitted to members of the CBSG Antelope Group and members of the IUCN Antelope Specialist Group. Members of both of these groups met in Palm Desert, California in January 1992 to review the draft and prepare a second draft. This second draft was available for review at a second meeting of the group in South Africa in June. The June meeting, chaired by Ulie Seal, was attended by several individuals from the African range countries who were able to provide more current information on various taxa.

The second draft of the Conservation Assessment and Management Plan (CAMP) for Antelopes contains reviews of 395 taxa. Of these 395 taxa, 135 are currently held in captivity in numbers ranging from a few individuals to thousands. The working group reviewed the 395 taxa and used the Mace-Lande scale to assign a degree of threat to 163 forms: 9 critical; 21 endangered; 46 vulnerable; and 87 safe. Draft II recommends

captive breeding programs for 138 forms.

In late October, the National Wildlife Research Center in Saudi Arabia is hosting a genetics workshop on the genus *Gazella*. This important meeting will, hopefully, produce very useful information on the status of several of these taxa.

It continues to be very apparent that several taxa are critically endangered due to political unrest in their countries of origin: Swayne's hartebeest and mountain nyala in Ethiopia; saiga in eastern Europe; the gazelles of Yeman; giant sable in Angola; and the list continues to grow.

A Global Captive Action Plan (GCAP) will be prepared from the modifications of the draft CAMP, from the information gathered at the South African meeting, and from input from this CBSG meeting. We hope that this document will be of value to the various regional antelope groups in preparing a long range strategy for the survival of many of these forms.

I would like to take this opportunity to thank all of those individuals that have given so generously of their time and the information available to them to help prepare these working documents.

This report was submitted by Karen Sausman, Living Desert.



Marine Mammal Working Group Report

Studbooks

Studbook petitions have been approved by the AAZPA Wildlife Management Committee for two marine mammal species kept within North American zoological facilities: the bottlenose dolphin (*Tursiops truncatus*) and the West Indian manatee (*Trichechus manatus*).

For the European Community (E.C.), an inventory for the bottlenose dolphin in SPARKS format exists. The need for such an inventory originated from the proposal for minimum criteria to word import permits. These minimum criteria have not yet been adopted as they will be reconsidered after the entering into force of an E.C. guideline for zoos. This inventory is not the result of the bottlenose dolphin being endangered, but merely for political reasons while in the U.S. the studbook was initiated for genetic and demographic management purposes.

The CBSG Marine Mammal Working Group would urge the E.C. to petition for a regional studbook as there are serious indications that this species might be endangered as habitat destruction is occurring.

In the U.S. studbook there is an annotation whether the registered animal originates from the Atlantic, the Pacific, Mexico, or Hawaii as this annotation seems important to avoid mixing of the population. In Japan, there is a studbook for the bottlenose dolphin in SPARKS format and approved by JAZGA.

It was also noted that in Australia, the Turks, and Caicos

Islands, there was a forced program for reintroduction without sufficient planning, so the program was not successful. In the future, we would recommend that more planning and research needs to be considered before starting any reintroduction.

Studbook petitions are currently in preparation for walrus (*Odobenus rosmarus*), harbor seal (*Phoca vitulina*), gray seal (*Halichoerus grypus*), northern fur seal (*Callorhinus versius*), California sea lion (*Zalophus californianus*), beluga (*Delphinapterus leucas*), white-sided dolphin (*Lagenorhynchus obliquidens*), and killer whales (*Orcinus orca*), and will be filed with the AAZPA WCMC in the near future. Brief summaries of petition status and a brief demographic synopsis for each species were available.

In Japan, there is a studbook for the California sea lion, the harbor seal, the sea otter, and the southern sea lion, while in Europe a studbook for the California sea lion has been initiated. Frequent contacts between regional studbook keepers should be encouraged.

As for the beluga, we would urge the European and Japanese institutions to join the U.S. studbook because of the limited number of animals involved.

Monk Seal

The monk seal item has been again addressed and the Marine Mammal Working Group endorses the action taken to initiate a PHVA workshop for the Mediterranean monk seal.

We encourage cooperation by all interested groups and parties and we would like to encourage coordination of all resources. Urgent actions should be taken.

Freshwater Dolphins

China requested the CBSG to conduct a PHVA for the Baiji. Fewer than 200 are left in an endangered environment. By the Mace-Lande criteria they would be assessed as Critical. We welcome the PHVA workshop.

Beluga Whale

There are 36 beluga whales in North America, with 33 founders (8.25) and three captive-born animals, two half-sib males at the New York Aquarium, and one young of the year male calf at Sea World of Texas.

This is a very small population for a viable breeding population. The age distribution is clustered in the 2-12 year range and there are several age categories with no representation. The three recent successful births are encouraging and in the past few years new breeding colonies have been established around young animals which have the potential to produce in the future.

Since this is not threatened in the wild, it would seem advisable to bring additional wild stock into these breeding colonies to establish a more genetically-diverse population. A studbook application for the North American region is in the process of being compiled by the New York Aquarium.

This report was submitted by Paul van den Sande and Brad Andrews, co-chairs, Marine Mammal Working Group.

Report of the Snake Working Group

Reorganization of the Herpetological Working Groups

As presented in the CBSG News (Vol.3, No.2), the Reptile and Amphibian Working Group has now been subdivided into five taxonomic working groups comprising amphibians, chelonians and crocodylians, tuataras, lizards, and snakes. This report represents a summary of the work conducted by the Snake Working Group in 1992.

CAMP Workshop on the Primitive Snakes

The first CAMP for snake taxa was conducted from 1-3 September 1992. The primitive snakes evaluated included 159 taxa comprising the families Bolyeriidae (Round Island boas), Tropicopheidae (dwarf boas), Pythonidae (pythons), and Boidae (boas). The results of this CAMP will be forwarded to academic herpetologists, wildlife biologists, and zoological collection managers for additional analyses, review, and comment. The draft document will then be revised into a first edition targeted for publication by August, 1993. I thank my colleagues and CBSG for their dedication and hard work in completing this task.

Future Objectives of the CBSG Snake Working Group

Upon the request of the CBSG chairman, the Snake Working Group has formulated a draft agenda for the organization of additional snake CAMP's with the goal of analyzing the remaining 12 taxonomic families of ophidians (ca. 3,850 species) within the next three years. Taxa targeted for CAMP analyses in 1993 include the Uropeltidae (Asian shield-tail snakes), Colubridae (endemic Malagasy species only), Atractaspididae (Mole vipers), and the Viperidae (vipers).

Snake Working Group Assistance to Regional Programs

The CBSG Snake Working Group is currently developing international working relationships with initiatives from North America (AAZPA), Africa (PAAZAB), Australia (AMSP), and Brazil (SZB). We hope to further develop such regional relationships and will concentrate in the coming year on establishing a working arrangement with the Southeast Asia Zoological association at the request of these colleagues. The CBSG Snake Working Group strongly recommends that the IUCN/SSC attempt to reorganize and activate a Snake Specialist Group as the conservation of these unique reptiles deserves more action than can be offered by this CBSG working group. However, until such time as this specialist group is active, the Snake Working Group offers its expertise concerning the conservation and management of these animals.

This report was submitted by John McLain, Acting Chair, CBSG Snake Working Group.

Reptile Conservation Assessment and Management Plan for Boas and Pythons

Overview

Boas and pythons are generally declining in numbers due to skin trade and habitat loss. Additionally, many insular species have experienced population declines due to predation or habitat destruction by feral domestic or introduced wild animals.

Due to this alarming trend, a Conservation Assessment and Management Plan (CAMP) was prepared for these snakes on 1–3 September 1992. The CAMP process utilized the expertise of individuals from a variety of disciplines and backgrounds to gather information in helping define the conservation needs of boas and pythons. The process defined, or attempted to define, the current taxonomic status, range, population status, population fragmentation, population trend, degree of endangerment, and threats in boas and pythons. Recommendations were then made (based on information gathered) regarding *in situ* and *ex situ* management indicated.

A strength of this process was that it fostered communication and cooperation among individuals with the common goal of conserving boas and pythons. It also provided information, direction, and inspiration for further conservation efforts with these groups of animals on global, regional, and local levels. A weakness of the process was the necessity to make assumptions based on few facts. Following is a description of the CAMP process used for boas and pythons:

Taxonomy and distributions used in the Boa and Python CAMP were taken from Stimpson (1969), Cogger (1983), and McDowell (1991). The population size of most snake species is unknown, as many are fossorial and secretive. Population estimates in nearly all snakes evaluated were crude estimates and may be as much as an order of magnitude in error or perhaps more in some cases. In the absence of actual field data, many insular species were estimated at a density of five per ha. This estimate was based on published data. The density estimate was then multiplied by the amount of appropriate habitat within the known range of the snake. General population estimate categories used for some species were <250, <2,500 <10,000, >10,000. However, during the later stages of the CAMP process a category of >1,000,000 was added.

Multiple populations were indicated for a given taxon only if they were clearly evident (i.e., the taxon occurred on two islands). It is acknowledged that many taxa have fragmented populations, and that gene exchange may not occur between them. But unless this was clearly defined, separate populations were not recognized in the CAMP process. Therefore, the number of populations listed is conservative and is an underestimate in many cases.

Population trends were estimated as increasing, decreasing, or stable, and were based on estimated amounts of habitat loss, hunting by humans (for food, oil, or skins), predation (primarily by feral domestic or introduced wild animals), or known population estimates over the past few years.

The area of a species' geographic distribution was estimated from its known range. This area is an overestimate in many cases, as a species characteristically does not occupy all the area within its range. Where appropriate habitat area within a species' range was known, more accurate population estimates were made. Such estimates were made for many of the insular forms. Where more precise estimates were not known, general area categories of <50,000 sq km, <50,000 sq km (but on an island), 50-99,000 sq km, 100-499,000 sq km, 500-999,000 sq km, and > 1,000,000 sq km were used.

The Mace/Lande criteria of Critical, Endangered, Vulnerable, and Safe were used as described in the CAMP manual provided. Assignment of taxa to these categories was often based on uncertain assumptions, and at times it was felt designations were arbitrary. If a species was heavily utilized by the "skin trade," a minimal classification of Vulnerable was assigned.

The categories of disease, hunting (for food, skin, or other purposes), loss of habitat, predation (by natural, introduced, or feral predators), and trade in the live animal market were used as threat categories contributing to population decline. Information about the impact of these threats came from field experience, CITES, and trade statistics. Live animal trade was noted as a threat only in species traded in high volume. No diseases were identified as a threat.

PVA workshops were recommended for species with extremely small populations, and for species of conservation concern that range in areas containing other taxa for which PVAs may be beneficial. Wild population management was recommended for species impacted by the skin trade in order to more closely control such trade.

Research recommendations to enhance conservation efforts were made in the areas of taxonomy, husbandry, and population surveys. Taxonomic research was recommended for taxa of questionable status. While such investigations could be beneficial for many taxa, only the most obvious cases of questionable status were noted. Husbandry research was indicated for those species with known husbandry problems, or for species with which husbandry experience was lacking. However, it was felt that with some species in which experience was lacking, husbandry techniques utilized in similar species could be adopted. Population surveys are needed for nearly all snake species. However, such research was indicated only in species of conservation concern where significant questions about population status arose.

The number of captive animals was taken from ISIS (30 June 1992) and Slavens (1990). Many species are represented in the private sector in substantial numbers, and are often not reflected in the above inventories.

The recommendations made for the level of the captive programs follow those categories listed in the CAMP manual. All taxa classified as Critical and some listed as Endangered

(Mace/Lande classification) were placed in the captive program category 90/100 I. All classified as Vulnerable or Endangered were placed in either the 90/100 I, 90/100 II, or Nucleus I categories. Placing taxa in the Nucleus II category was more subjective. Those eliminated from captive programs had safe, stable populations, and had no known conservation concerns.

Assessment of Threat

	<u>Crit</u>	<u>End</u>	<u>Vul</u>	<u>Safe</u>	<u>Unk</u>
BOAS	2	7	17	58	0
PYTHONS	0	4	9	24	1
DWARF BOAS	0	2	5	26	2
ROUND ISLAND BOAS	2	0	0	0	0
TOTAL	4	13	31	108	3

Intensive Action Recommendations

	<u>PHVA</u>	<u>More In-situ Management</u>	<u>Research</u>	<u>Captive Breeding</u>
BOAS	15	19	56	23
PYTHONS	2	8	23	25
DWARF BOAS	1	0	13	9
ROUND ISLAND BOAS	2	2	2	2
TOTAL	20	29	94	57

Recommendations for Captive Breeding Programs

	<u>90/100-I</u>	<u>90/100-II</u>	<u>NUC-I</u>	<u>NUC-II</u>	<u>Pending Research</u>
BOAS	4	5	9	5	0
PYTHONS	1	3	5	16	0
DWARF BOAS	0	2	4	1	2
ROUND ISLAND BOAS	2	0	0	0	0
TOTAL	7	10	18	22	2

Recommended Research

	<u>Taxonomic</u>	<u>Surveys</u>	<u>Husbandry</u>	<u>Total</u>
BOAS	38	35	10	83
PYTHONS	13	10	5	28
DWARF BOAS	10	8	7	25
ROUND ISLAND BOAS	2	2	2	6
TOTAL	63	55	24	142

This report was submitted by John McLain, CBSG/AAZPA Snake Advisory Group, San Antonio Zoo.

Canid Working Group Report

The group met on 4-5 September to discuss recommendations for a course of action for preserving canids and assisting in global conservation of these species. The following are some of the recommendations:

1. The Canid CAMP, held in May 1992, was discussed and the process for evaluating all canid and hyena species both *in situ* and *ex situ* was explained. The group endorsed the recommendations of the Canid CAMP. The CAMP results should be published and distributed to all regional areas within the next thirty days.

2. The group endorses the recommendation of the Ethiopian Working Group to develop further relation with the Ethiopian governments on the conservation of the Simian Jackal (Ethiopian wolf). The group recommends both *in situ* and *ex situ* conservation for this species and encourages all parties to work toward the preservation of this species,

3. The group recommends work be done on the Swift fox to answer the following questions:

a. Taxonomic work on the various subspecies of the Swift fox throughout its range.

b. The Swift fox Recovery Program should be an international effort between the Canadian and United States governments. This would encourage a joint effort on determining if there are still viable populations that would assist the recovery program.

c. A survey should be undertaken to determine if there are Swift foxes in various rehabilitation or nature centers that could be included in the captive/controlled breeding of this species for the reintroduction program.

4. Assistance should be given the government of Paraguay in the development and management of bushdogs. Currently there is a group of 39 animals in a breeding area that has been removed from an area that is scheduled for a local hydro-electric dam. They need assistance in identifying animals (they need a tattoo kit) and they need to be encouraged to begin a vaccination program for this captive group. Currently, there is discussion between the Brazilian and Paraguayan governments on a joint management program.

5. The East African wild dog is the second highest priority species for conservation work. A PVA was held and the recommendations from this PVA was to begin an *in situ* controlled breeding program for this species in Tanzania and an *ex situ* breeding program.

6. The Asiatic wild dog (Dhole) is in need of conservation work. Captive/controlled breeding of this species has been recommended by the Canid CAMP. The group encourages a survey of zoos to determine the number of animals that may be housed in the facilities to develop the nucleus of a controlled breeding group.

7. The group encourages the Mexican wolf group, if they have not yet done so, to do genetic analysis of the captive population to determine viability of the population.

8. The group should explore the feasibility of developing a

Canids...

captive/controlled breeding program for the Island Gray fox, which is endemic to the Channel Islands off the coast of California, with the U.S. Navy which controls the islands.

9. The group recommends that studbook-like reports or pedigrees be initiated on all locally threatened and endangered species in all regions held in zoos/breeding centers.

10. The group encourages the North American maned wolf group to continue to work the captive management problems for this species.

This report was submitted by Jack Grisham, Catrione Matheson, Clio Smeeten, and Dr. Khan.



1992 CBSG Report: Felids

The following is a brief overview of the activities of captive breeding programs concerning felids. Contributors to this report were: Abdul-Wahed AL-Sceihabi, Gordon Blankstein, Arnaud Greth, Warren Johnson, Abdulrahman M. Khoja, Bohumil Král, Jeremy Malonson, Jill Mellen, Steve O'Brien, Tim O'Sullivan, Pat Quillen, Takuji Shimada, Miranda Stevenson, Sally Walker, and David Wildt.

- Peter Jackson, Chair of the IUCN Cat Specialist Group and Kristin Nowell are working on the IUCN Cat Action Plan which should be completed within the year.

- The Carnivore Taxon Advisory Group of the Australian Species Management Program (ASMP) completed the first edition of a Carnivore Action Plan (February, 1992). This plan contains an aggressive program detailing present and recommended future captive breeding efforts for felid species maintained in Australian zoos.

- The Zoo Outreach Organization of India recently produced the following document: Husbandry and Management Survey of Seven Species of Indigenous Lesser Cats in Indian Zoological Gardens, 1989 (funded by the CATS Fund, Albuquerque, New Mexico USA).

- A Felid Taxon Advisory Group is being developed within the Joint Management of Species Group (JMSG) of Great Britain and Ireland, chaired by Sean McKeown of Fota Wildlife Park. The potential exists to combine efforts with a similar program developed by the European Executive Program (EEP).

- The Institute for Conservation of Nature (ICONA) and Estacion Biologica de Donana is developing a captive breeding program for Iberian lynx (*Felis pardina*) at Donana National Park (2.1 animals).

- AAZPA Felid Taxon Advisory Group (TAG) met for a mid-year meeting in April 1992. Three primary achievements of this meeting were: 1) development of a Regional Collection Plan for felids held in North American institutions (to be reviewed and updated annually); 2) performing a CAMP for felids in conjunction

with the CBSG; and 3) making recommendations for distribution of Ralston Purina Big Cat Survival Funds administered through the Conservation Endowment Fund of AAZPA. Distribution for 1992:

1. Population, habitat, viability assessment in the Asian lion with emphasis on genetic management of wild and captive populations: principal investigator, Michael Fouraker (Knoxville Zoo).

2. Pathology effects of melengesterol acetate in felids: principal investigator, Linda Munson (University of Tennessee).

3. Molecular genetic approach to taxonomic and phylogenetic relationships in South American felids and Asian small cats: principal investigators, Stephen O'Brien and Lee Simmons (National Cancer Institute, Henry Doorly Zoo).

4. São Paulo International Felid Breeding and Conservation Project: principal investigator, Pat Quillen and Jill Mellen (Society of Scientific Care, Metro Washington Park Zoo).

5. Publication of 1992 Felid Action Planning Book and global distribution: principal investigators, U. S. Seal, Jill Mellen and David Wildt (Captive Breeding Specialist Group, Metro Washington Park Zoo, National Zoological Park).

6. A population and habitat viability assessment workshop for Sumatran tigers: Training Indonesian PHPA staff: principal investigator, Ron Tilson (Minnesota Zoo).

7. Reproductive strategies for understanding, managing and conserving wild felids: principal investigators: David Wildt, Ron Tilson, U.S. Seal, Gerry Brady, Jack Grisham, Michael Fouraker, Susan Millard, Randy Rockwell and Dan Wharton (National Zoological Park, Minnesota Zoo, Captive Breeding Specialist Group, Potter Park Zoo, Oklahoma City Zoo, Knoxville Zoo, San Diego Zoo, Jacksonville Zoo, New York Zoological Society) (re-endorsement for second year funding).

1992 Executive Summary - AAZPA Felid Taxon Advisory Group

Availability of captive space for felids (both present and future) was assessed via a comprehensive survey that evaluated 95% of the AAZPA-accredited institutions. Currently, there are: 89 enclosures devoted to felids <10 kg (139 adults and 16 juveniles); 64 enclosures devoted to felids 10-20 kg (272 adults and 134 juveniles); 664 enclosures devoted to felids >20 kg (1,174 adults and 180 juveniles); 32 enclosures devoted felids (species unspecified) (8 adults and 1 juvenile) for a total of 949 enclosures housing 1,593 adults and 331 juveniles.

Long-range priorities for Regional Collection Plans for North American institutions were established by the Felid TAG based upon information developed via the CAMP/GCAP processes. Intensive management plans were recommended for the following species:

Africa: cheetah, lion, black-footed cat, golden cat, serval, caracal, leopard

Asia: Siberian tiger, Sumatran tiger, Indochinese tiger, Asian lion, clouded leopard, rusty-spotted cat, Pallas' cat, sand cat, golden cat, marbled cat, fishing cat, leopard cat

Europe: none

North America: Florida panther, Texas ocelot, North American puma, Canadian lynx, bobcat

South American: tiger cat, jaguar, Pampas cat, margay, ocelot, jaguarundi, Geoffroy's cat

Recommendations include managing generic populations to extinction.

The Felid TAG established a 1992-1993 Regional Collection Plan. This plan included a recommendation of: 1) no breeding for bobcat, lynx, generic leopards, generic lions, puma (except Florida panther), jaguar; 2) establishing nuclear populations (i.e., 25 pairs) for serval, caracal, rusty-spotted cat, black-footed cat, *tigrina*, Pallas' cat, fishing cat, ocelot, (animals of known origin); and 3) following SSP plans for clouded leopard, snow leopard, cheetah, tiger.

No other species of felids currently are recommended for breeding or maintenance in North American institutions.

1992 Executive Summary - Captive Breeding Specialist Group

All taxa (species and subspecies) in the family Felidae are reviewed on a taxon-by-taxon basis to assign a category of threat and to recommend captive programs as well as other intensive management action. Currently, 37 species and 264 distinct taxa are recognized in the family Felidae.

Approximately 5,500 living felid specimens are registered with ISIS. The number of living mammals registered with ISIS (65,000) represents about 25% of the total mammalian specimens estimated/reported to be maintained in the world's 1,100 zoos. Hence, the number of felid captive "spaces" in the world's zoos is conservatively estimated to be at least 11,000.

Of the 264 taxa, 195 (74%) are assigned to one of three categories of threat according to Mace-Lande criteria, while 69 (26%) are considered Safe (i.e., not under threat at this time):

Critical	31 (11.5%)
Endangered	60 (23.5%)
Vulnerable	104 (39%)
Safe	69 (26%)

Of the 264 taxa, 98 (37%) are recommended for one of four levels of captive program:

90/100 I	25 (10%)
90/100 II	18 (7%)
Nucleus I	9 (3%)
Nucleus II	46 (17%)

Of the 264, 30 (11%) are recommended for population and habitat viability analyses (PHVAs).

Of the 264 taxa, 80 (30%) are recommended for more intensive *in situ* management.

Of the 264 taxa, 120 (46%) are recommended for research:	
Taxonomic research	101 taxa (38%)
Surveys	120 taxa (46%)
Husbandry research	39 taxa (15%)

This report was submitted by Jill Mellen (Metro Washington Park Zoo) and David Wildt (National Zoo), co-chairs, AAZPA Felid TAG

Felid Saudi Arabia Issues

The 1992 Working Group of the Felid CBSG Meeting received two very real questions, both from our constituents in Saudi Arabia. The Felid Working Group recognizes that any programs initiated would be at the invitation of the appropriate governmental agencies of Saudi Arabia. Suggestions listed below simply represent ideas for potential action.

Their questions were as follows:

1. A. Khoja of N.W.R.C. (P.O. Box 1086), TAIF - Saudi Arabia described a critical situation with regard to an *in situ* population of *Panthera pardus nimr* (Arabian leopard) under his management direction. The total *in situ* population of *P. p. nimr* is thought to be less than 100 individuals; the area under Mr. Khoja's jurisdiction is thought to contain about 20 individuals. This population of leopards is heavily persecuted by local people; the cats are shot or poisoned because of real or presumed threats to livestock. Mr. Khoja's projection is that without immediate intervention, this population of leopards will be completely exterminated in the near future. The question he posed to the CBSG Felid Working Group: what are his options in order to preserve this very rare leopard?

Options evaluated were as follows:

a) initiate an aggressive *in situ* protection program for the leopards, perhaps offering reimbursement to local people for any livestock lost to leopard predation. The advantage of this program is that it would afford protection for other species in the area. Disadvantages include a potential for poaching to continue in spite of protection attempts.

b) capture a substantial number of these leopard for a captive program and initiate a captive breeding program. This assures the existence of this population, but potential for reintroduction of this cat is dubious. Also, capture of leopards will be extremely difficult.

c) initiate the *in situ* program outlined in (a) above, but make a concerted effort to obtain orphaned or injured leopards for the simultaneous development of a captive breeding program. The disadvantage of this approach is that the number of animals needed to establish a viable captive breeding program may not become available.

d) conduct a PHVA (as part of a broader conservation effort covering more than one taxon) to evaluate the most appropriate of the approaches described above.

Related Comments: There are several *P. p. nimr* in captivity: 1.1 owned by H.R.M. Sultan of Oman and 1.0 (wild-caught less than a year ago) in private hands in Dubai. Leopard tracks were recently reported near Al-Mdina Road, Saudi Arabia.

Suggested Contacts: Peter Jackson, IUCN Cat Specialist Group, George Rabb, Chair of SSC, Alan Shoemaker, International Studbook Keeper of Rare Leopards, Melody Roelke and Dennis Jordon of the Florida Panther Recovery Program. Issues described regarding *P. p. nimr* are similar in many ways to those problems currently being addressed with the Florida

Felids...

Panther. The Florida Panther Program supports both an aggressive *in situ* program and a captive breeding program.

2. Arnaud Greth also of N.W.R.C. (P.O. Box 1086), Taif - Saudi Arabia posed a second question to the group. A 200-km² reserve is currently being expanded to 5,400 km². A range of ungulate species including Arabian oryx have been reintroduced into this reserve. In the next five to ten years, it is their intention to reintroduce cheetahs into this reserve. Mr. Greth's question was whether or not captive Arabian cheetah (*A. j. venaticus*) were available for potential reintroduction.

It was our collective understanding that none of *A. j. venaticus* exist in captivity. Steve O'Brien suggested that so little variation exists among individuals from any of cheetah populations that introduction of African cheetahs would be appropriate in this situation. However, our collective best guess is that not all of our colleagues would agree with a decision to attempt such a reintroduction with African animals.

Related Comments: Reintroduction of cheetahs may have a negative impact on existing leopard populations.

Suggested Contacts: Peter Jackson, IUCN Cat Specialist Group, George Rabb, Chair of SSC, Mark Stanley Price, IUCN/SSC Reintroduction Committee (guidelines for reintroduction), Laurie Marker-Kraus, International Studbook Keeper for Cheetahs, and Jack Grisham, AAZPA SSP Coordinator for Cheetahs.

This report was submitted by Jill Mellen, co-chair, AAZPA Felid TAG.

Equidae Report

Zebras, Asses, & Horses: A Global Survey & Action Plan for the Conservation of Wild Equids 1992-1996 is in press. This is edited by Patrick Duncan, chairman of the IUCN/SSC Equid Specialist Group. This will contain the most recent data available on the Group.

Plans are under discussion for a Mountain Zebra PHVA workshop in South Africa in 1993. This would probably cover both subspecies as a metapopulation. There is also a plan for a GASP workshop for Grevy's and Hartmann's Zebras for 1993/94 possibly in the USA.

An EEP Equid TAG meeting was held in Edinburgh on 6 July 1992. Minutes of this meeting raise questions regarding the taxonomic uniqueness of some reported subspecies of wild ass and also of Plain's zebras.

There is a proposal for the introduction of onager submitted by Dr. Arnaud Greth as follows: the Syrian wild ass (*Equus hemionus syriacus*) became extinct at the beginning of the 20th century. The most closely related subspecies is *Equus hemionus onager* could be introduced in the north of Saudi Arabia and this might be desirable as the situation of the subspecies in Iran,

although not known, is almost certainly critical.

A small founder population (1.2.2) has been gathered at the National Wildlife Research Centre in Taif, Saudi Arabia and could be available for a feasibility study. If successful, other captive animals from the world herd could be added to the program.

Przewalski Horse

Effective measures continue to manage the captive population within the EEP and the SSP at viable genetic and demographic levels. The formal plans of the Global Przewalski Management Group to re-establish the species within the Dzungarian Gobi Park B have made no progress since the 1991 report, due to lack of funding from major sources. This is in part attributable to political and economic forces within Mongolia. Animals have been sent to Mongolia by the Dutch Foundation and located in fenced compounds 100 km from Ulan Bator. We have no official knowledge of this program but understand that there have been fatalities. Some animals may have come from Askania Nova. This is also true of animals placed in a fenced area near Gobi B by a Mr. Christian Oswald who has commercial dealings with Mongolia. Neither of the above mentioned schemes meet acceptable reintroduction criteria.

There is also anecdotal information that animals from the Aspinall U.K. herds have been sent to China. Again this is outside any formal management program. Significant progress with the long-term reintroduction programme in Mongolia, which would be linked to habitat and ecological rescue of the Gobi Park B, requires significant funding. To achieve this, the P. horse needs to be designated a World Heritage Species. If a mechanism cannot soon be found to accomplish this, it might be helpful if IUDZG would officially nominate the P. horse as an "International Heritage Species".

Captive Breeding of the Brow-antlered Deer

The brow-antlered deer (Sangai; *Cervus eldi eldi*) is one of the most threatened cervids in the world. Its population is less than 100 in the Keibul Lamjao National Park of Manipur. A captive breeding program in Manipur Zoological Garden was undertaken as early as 1978. A 2.8-ha enclosure in the Zoo hosted a male stag, descended from a wild female, as well as a captive-bred stag and two does. The population increased to ten animals within seven years. A series of catastrophes, including a flash flood, decreased this population to one stag. This stag was an offspring of the wild stag.

Sally Walker of the Zoo Outreach Organization led the drive to develop a captive breeding program for the brow-antlered deer in Manipur. It has been agreed that two does from the Nehru

Zoological Garden, Hyderabad, would be transferred to Manipur by the end of 1992.

As part of the program, the Zoo Authority of Mysore has transferred a sub-adult stag on breeding loan to Manipur. The Mysore population (6.2) are of Calcutta and Delhi origin, but are different from animals of the Delhi and Hyderabad Zoos. The offspring of this program should improve the national herd which is maintained in 14 different zoos in the country.

This report was submitted by Sally Walker, Zoo Outreach Organization.

Chiropteran Action Plan Working Group

There are still efforts underway to obtain founding stock for the Pemba Island fruit bat (*Pteropus voeltzkowi*) and the Livingstone's fruit bat (*Pteropus livingstonii*), deemed to be among the most endangered of the megachiropterans. Permit holdups have been stalling efforts to acquire the Pemba Island fruit bat, whereas logistical problems have hindered recovery efforts for Livingstone's fruit bat. The Jersey Wildlife Preservation Trust (JWPT), the coordinators of the Livingstone's fruit bat project, have recently acquired five males and one female of this species. All the bats are in good condition although, regrettably, the female gave birth to a female infant on the evening prior to crating. The infant was found dead in the traveling crate on arrival at Jersey Wildlife Preservation Trust. JWPT will return to the Comores next year in order to secure additional founders.

Since the last CBSG meeting, two regional advisory groups for bats have been formulated, one being the AAZPA Chiropteran Advisory Group and the other the Australian Placental Mammal Group. At the Southeast Asian Working Group Meeting at this conference, it was recommended that zoos in that region develop a similar advisory group. In addition, members of the European zoo community are also encouraging the formation of a bat TAG. These various groups will help facilitate cooperation and communication between regions.

The first international studbook for bats has now been created for the Rodrigues fruit bat (*Pteropus rodricensis*). Bryan Carroll, Curator of Mammals at JWPT, is the International Studbook Keeper. Steve Wing, General Curator of the Folsom Children's Zoo, Lincoln, Nebraska, has petitioned for an American Regional Studbook and SSP for this species to assist Mr. Carroll. This studbook will serve as a model for future breeding programs.

At this meeting, the Chiropteran Action Plan Working Group was able to set the groundwork for a Conservation Assessment Management Plan (CAMP) workshop for the family Pteropidae. The Lube Foundation in Gainesville, Florida has graciously offered to host the workshop, which will be held next spring. The Lube Foundation is an appropriate site to hold such

a workshop since they have been dedicated to bats since the foundation's inception. The CAMP process will help determine priority species for captive breeding programs.

This report was submitted by Nina Fascione, AAZPA Chiropteran TAG.

An Action Plan for the White-Winged Wood Duck

The White-winged Wood Duck *Cairina scutulata* is a very unusual duck restricted to small streams, ponds and swamps amongst flat areas of tropical moist or swamp forest in Southeast Asia. The Wildfowl & Wetlands Trust has recently completed a study of the status of the Wood Duck in the wild and the conservation actions needed to ensure its survival. The ICBP, Asian Wetland Bureau and 50 Asian countries assisted in a major review of current and historical data, documenting the species decline, habitat needs, and biology. This information was used to make a comprehensive conservation plan for each range country.

In the last century, the Wood Duck was very widespread, occurring in Northeast India (Assam, Arunachal Pradesh, Nagaland, Meghalaya, Manipur, Tripura), Bangladesh (Chittagong Hills), Burma, Laos, Vietnam, Thailand, Cambodia, Malaysia, and Indonesia (Sumatra and Java). It was considered "common" by early British ornithologists exploring densely-forested lowland plains in India, Burma, and peninsular Thailand (Hume, 1880; Robinson, 1910; Stanford, 1939). Since then, there has been a drastic decline caused mainly by the devastation of lowland forests. Forest is essential for roosting and breeding, although Wood Duck survive and breed in some areas of degraded or secondary forests. Hunting has also played a major role in the decline. For example, in one Bangladesh population in the 1970s, 74% of ducklings were taken by hunters (Husain, 1982).

Wood Ducks are now thought to be extinct in Malaysia and Java, but 40 small populations survive in remaining areas of forest in India, Bangladesh, Burma, Thailand, Vietnam and Sumatra. The current status in Laos and Cambodia is still unknown. The known surviving world population is only 220 individuals. This is likely to be an underestimate as few areas have been well surveyed and the ducks' shy, retiring habits make them difficult to locate. Future surveys may identify larger or new populations, but the total world population is probably less than 2,500 and is likely to have declined by more than 95% this century. Under the IUCN Mace-Lande criteria, the species is certainly Endangered and possibly Critical.

Many of the remaining Wood Duck populations will probably be eliminated within a few years by continuing habitat destruction and hunting, even some of the 10 populations are situated in Protected Areas. Other populations may be too small

Wood Duck...

and isolated to be viable in the long term. Hence conservation action is urgently required to prevent the extinction of the Wood Duck. Most importantly, there is a need for a major improvement in habitat protection. New protected areas are required. In the existing protected areas, problems of illegal logging, poaching, and disturbance must be controlled, and habitat management is needed. There is also a need for widespread surveys to clarify which of the 40 populations are largest and of highest priority, and to look for additional populations. There must be field research of the bird's ecology to improve understanding of habitat needs and to establish what is limiting the populations to their low density. The limiting factors are likely to vary between locations and include a shortage of suitable tree holes for nesting, excessive hunting, and a shortage of suitable feeding sites at the height of the dry season when most wetlands have dried up.

The Wildfowl & Wetlands Trust is already implementing some of the recommendations in the action plan. In a joint project with the Thai Royal Forest Department, they are undertaking systematic surveys of 12 key sites in Thailand. In Sumatra, they are participating in surveys of key sites and, along with the IUCN Captive Breeding Specialist Group and Asian Wetland Bureau are planning a Population and Habitat Viability Analysis workshop. The Wildfowl & Wetlands Trust also has a long-established captive breeding program for the species, and has Wood Duck on display at four of its eight centers. Other conservation organizations working in Southeast Asia are also urged to take an interest in the action plan and do what they can to help in its implementation.

For more information, see: Green, A.J. 1992. The status and conservation of the White-winged Wood Duck *Cairina scutulata*. IWRB Special Publication 17. 115 pp. This publication is available from The Research and Conservation Department, The Wildfowl & Wetlands Trust, Slimbridge, Glos., GL2 7BT, UK. Price £10.00 plus £3.50 postage and packing, payable to "The Wildfowl & Wetlands Trust".

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This report was submitted by Dr. Andy Green, Senior Research Officer (Threatened Species), The Wildfowl & Wetlands Trust, Slimbridge, Gloucester, GL2 7BT, U.K.

Systematics

A fundamental component of conservation strategies for threatened species is the systematic classification of species and significantly differentiated populations below the species level (subspecies). Uncertainty over the units of conservation leads to confusion in developing management plans and risks critical mistakes in establishing priorities in cases where taxonomy is based on inadequate descriptions with only historic precedence to affirm their precision. The availability of new theoretical and experimental methodologies, combined with a worldwide enthusiasm for conserving endangered fauna particularly among curators of zoological collections, provides a timely opportunity to address taxonomic and phylogenetic relationships of living species in a systematic manner.

In order to develop an effective conservation plan for any species, there should be a consensus on the object or unit of conservation. Ultimately the units must be defined based on the best available criteria particularly for endangered species. This has not yet been done for many of the taxonomic units which are the objects of conservation plans.

Inappropriate taxonomy leads to two general classes of errors: 1) incorrect lumping of distinctive groups that contributes to unnoticed loss of accumulated adaptations; 2) incorrect splitting of species or subspecies so that limited resources are expended on units that might not have received emphasis if taxonomic information were available. Also, interest groups with effective legal representation can exploit "loopholes" in endangered species legislation based on taxonomic uncertainty (e.g. as has occurred with the "Hybrid Policy" of the USFWS). For each of these reasons more precise identification of taxonomic and phylogenetic relationships are required.

This report was submitted by Steve O'Brien, National Institutes of Health

CBSG Panda Pledge

CBSG welcomes the recent initiative to establish an international cooperative effort under the aegis of the Species Survival Commission and stands by its previous resolutions on the management of Giant Pandas in captivity. CBSG furthermore pledges its technical assistance as and when requested by the parties concerned.



Development of Criteria for Establishing New Captive Breeding Programs

Most of our efforts at the CBSG meeting this year centered around drafting a set of criteria that could be used to guide the development of new captive breeding initiatives. After a first attempt at this, we reviewed the criteria suggested by the Parrot Group and found that our suggested criteria overlapped extensively with those that they had already developed. We believe that many of the taxon specialist groups will be attempting to develop such criteria, especially as they begin to develop their Conservation Assessment and Management Plans. In the interest of efficient use of human resources, we suggest that a broadly-based working group charged with the development of general guidelines for the initiation of new captive breeding programs be formed. The Primate Working Group herewith submits draft guidelines for review and further development.

Draft Guidelines for Developing New Captive Breeding Programs

Captive breeding programs should occur in support of, not as a substitute for, wild populations. They represent one component of a holistic conservation effort that promotes species conservation through habitat preservation, education, training, research, and in some instances intensive *in-situ* population management. As part of a comprehensive conservation strategy, it is important that initiation of new captive breeding programs be undertaken in a manner consistent with the following guidelines:

1. The captive breeding program should not divert resources designated for higher priority habitat conservation efforts or *in-situ* management. Recognizing that many resources available for captive breeding are not available for use in *in-situ* conservation, captive programs should be developed in a manner that generates support for conservation and education efforts in the country of origin.
2. The decision to establish or not to establish a program should be based on the best available scientific information on the species and habitat status and on the ability to manage the species in captivity. Informed decisions should:
 - a. Be the result of consideration of the impact and effectiveness of various management options and should identify captive breeding as only one part of a comprehensive conservation strategy.
 - b. Reflect consideration of priorities identified in the Conservation Assessment and Management Plan and Regional Collection Plans.
 - c. Make every effort to identify and incorporate founder stock currently in captivity but not in a managed population (pets, confiscated animals, etc.), before considering removal from the wild.
 - d. Except in cases of imminent local extinctions an evaluation (PHVA or PVA) of the impact of removing sufficient or additional founder stock from the wild population.

3. The program should be developed in collaboration and partnership with regional and local resource managers, field biologists and captive breeding specialists. It should be reviewed by appropriate members of the SSC (including field biologists and captive managers) before initiation.

- a. A management committee consisting whenever possible of wildlife authorities in the range country, field biologists and captive breeding specialists should be set up to oversee management of each species, or group of species. The management committee should be responsible for insuring that a studbook is initiated and maintained, and that appropriate planning occurs in the context of a comprehensive conservation strategy.

- b. The management committee should insure that the captive population is managed in accordance with defined demographic and genetic goals that will contribute to recovery and survival of the species.

- c. Participating institutions should be identified on the basis of past records in husbandry, captive management and breeding of the particular or related taxon, and with due regard to past records of cooperation in coordinated managed breeding programs.

- d. Participation in the program should be dependent on each party's signing an agreement of participation. Any party which violates this agreement should be excluded from future participation in the program.

4. Whenever possible, captive breeding efforts should be initiated in the country of origin.

5. Ownership of animals in the captive breeding program should remain with the country of origin or with the management committee. Animals within the program should be managed without regard to commercial consideration.

6. Programs should be initiated before the population has reached the stage where so few individuals exist as to make the success of the program unlikely. The IUCN policy statement on captive breeding suggests that "Management to best reduce the risk of extinction requires the establishment of support captive populations ... when the wild population is still in the thousands". Except in "rescue" situations, programs should not begin unless there is a high probability that a sufficient founder population (e.g. 20 - 30 individuals) can be acquired over a reasonable time period.

7. Husbandry protocols should be developed as the first stage in initiating captive breeding programs whenever possible. Protocols should reflect experience with closely related taxa already in captivity that can serve as "models", or, in instances where the species' biology is poorly understood, may require research with a relatively small number of wild caught individuals. Whenever possible, preliminary research should occur in the country of origin. Following the inception of a program, the management committee should actively promote continuing research to increase knowledge of the biology of the species.

Health Management Working Group Report

Priorities

The following priorities were set by the Health Management Working Group:

I. Establish a global network of professionals currently involved in multi-disciplinary health management of threatened populations.

A. Development of this network will interface with existing database of professionals involved in the Health Management aspects of threatened populations.

B. Individuals will be identified to maintain currency of the data base.

C. The data base will be made available through the IUCN/SSC.

D. The database will include veterinary and other health advisors for all specialty groups dealing with threatened species. This database will be cross-referenced by areas of expertise and interest and will be both taxon- and discipline- based.

II. Establish a comprehensive data base of diagnostic procedures relevant to the health management of threatened populations. This data base will also include individuals or institutions that perform such tests.

A. To include a description of each test cross-referenced by application.

B. To include a statement concerning the current knowledge relative to the interpretation of these tests.

C. To include sample collection, preparation and shipment protocols.

III. To provide a central location for distribution of health management protocols concerning reintroduction, necropsy, immunization, etc.

IV. Encourage the development of disease data bases for all taxa.

V. Encourage the identification of research priorities for health management that may impact collection management or survival of a species.

VI. Encourage communication between *in situ* and *ex situ* health management professionals for an open exchange of information.

Suggestions

The activities of professionals involved in the health management of *in situ* and *ex situ* populations of threatened species are interdependent. This relationship should be reflected in the membership, structure and activities of the Veterinary Specialists Group (VSG) by:

1. Expansion of the membership to reflect the integrated nature of the activities of these professionals.

2. Greater participation of the entire membership in the activities of the VSG.

3. Increased communication between the VSG and other health management groups and organizations concerned with threatened populations of animals.

4. Encouragement of regular meetings and newsletters to serve the expanded membership.

5. Promoting cooperation between the captive and wildlife communities to reduce duplication of efforts and thus avoid the ineffective use of precious conservation resources.

The Health Management Working Group encourages the discussion of the recommendations put forth by the group at the November, 1992 meeting on the Implications of Infectious Diseases for Captive propagation and Reintroduction Programs of Threatened Species.

This report was submitted by Peregrine Wolff, Minnesota Zoo.



Education Report

The CBSG Education Core Support Group consists of representatives from all parts of the world who can serve as resource persons for their region.

Steve Hage and Peggy Harvey have prepared a Conservation Education Model for an overview of starting an education program or supporting a training program.

At the International Zoo Educator Congress held in Sydney, Australia late in August at Taronga Zoo, two papers featuring CBSG were presented. Steve Hage and Peggy Harvey presented a paper entitled "CBSG and IZE, Conservation Education Partners" and Sally Walker presented a paper entitled "Talking Up to your Audience" which highlighted the use educators could make of the excellent CBSG Briefing books and Workshop Reports for resource materials in education.

The Jersey Wildlife Preservation Trust Zoo Educator Course Report is almost like a manual of how to create an education program. The International Zoo Educator Course will be offered again this coming spring at Jersey. Educators or persons with major responsibility for education from developing countries may apply through course director, Phillip Coffey, at Jersey Wildlife Preservation Trust.

This report was presented by Sally Walker.

Factors to be Considered in Developing a Genetic Resource Bank (GRB) for a Taxon/Species: Guidelines for Writing a GRB Action Plan

The cryopreservation of germ plasma and embryos combined with assisted reproduction could play a vital role in the preservation of bio- and genetic diversity. At the 1991 meeting of the Captive Breeding Specialist Group (CBSG) in Singapore, a strategy was presented and approved for beginning to establish genetic resource banks (GRBs) at the species and/or taxon specialist group level (see Rall et al., 1991 CBSG Meeting Proceedings for the advantages and details associated with GRBs). In brief, the species or taxon specialist group petitions the CBSG GRB Coordination Committee for assistance in developing an Action Plan, a written document that will guide all aspects of collecting, storing and using germ plasma as well as other biological materials from threatened and endangered species/subspecies/populations. The following is the format and outline to be followed in developing such written action plans.

General Components and Specific Factors of an Action Plan for a Specific Taxon/Species (Document Structure):

I. Summary:

Synopsis (one page) providing brief description of justification, goals and overall conservation plan in the context of a GRB.

II. Justification:

1. Provide specific short- and long-term goals for the GRB.
2. Describe in detail how a GRB will contribute to conservation *ex situ* and/or *in situ* of this taxon/species including, if appropriate, usefulness to sustainable development.

III. Current knowledge of life history and natural reproduction:

1. Assemble information on sexual maturity, reproductive senescence, seasonality, duration of the reproductive cycle, induced versus spontaneous ovulation, time of ovulation, duration of pregnancy/incubation, post-partum estrus, clutch interval, litter size/clutch, embryonic and post-natal mortality.
2. Indicate reproductive success as influenced by genetic, nutrition, disease and management events.
3. Describe extent of technology available for monitoring/managing animal health and provide any available evidence for vertical transmission of diseases.

IV. Current knowledge of assisted reproduction:

1. Indicate prior success at stimulating ovarian activity and/or estrous activity using exogenous hormones and drugs.
2. Indicate prior success at monitoring hormonal status using circulating blood hormones or hormonal metabolites measured in voided urine, feces or saliva.
3. Indicate prior success at cryopreserving sperm, oocytes and embryos based upon *in vitro* function assays.
4. Indicate prior success at artificial insemination with fresh or frozen-thawed sperm.

5. Indicate prior success at embryo transfer using fresh or frozen-thawed embryos.

6. Indicate prior success at *in vitro* fertilization using fresh or frozen-thawed gametes.

7. Indicate prior success at oocyte maturation followed by *in vitro* fertilization and transfer using fresh or thawed embryos.

8. If no information is available on species of interest, indicate prior success in each area in a closely-related species.

V. ISIS, studbook and regional collection plan status:

1. Provide information on total number of males and females in ISIS, global and/or regional studbooks and, when appropriate, in private collections.

2. Indicate demographic distribution of populations and individuals.

3. Provide priority of the species in the context of the global/regional taxon masterplan.

4. Identify founders and founder-lines.

5. Prioritize individual donors including providing location, age class and reproductive history/current status.

VI. Status in the wild:

1. Indicate known or predicted animal numbers in various geographic regions.

2. Provide relevant population and habitat viability assessment (PHVA) results including the status of *in situ* management programs.

3. Indicate prior success (if any) at reintroduction of captive born animals to the wild.

VII. Accessibility of existing animals for banking:

1. Identify and indicate accessibility of wild populations and individuals (*in situ* and *ex situ*).

VIII. Type and amount of germ plasma (and other biological materials) to preserve:

1. Define short and long-term management and genetic goals.

2. Describe how the banking program will meet stated management and genetic goals.

3. Using computer modeling, calculate the minimum number of available individuals (beginning with founders or founder-lines) to meet plan objectives.

4. Identify materials to be stored (i.e., sperm, oocytes, embryos, cell lines, blood cells, tissues, DNA, body fluids [serum, milk, urine, saliva]).

5. Using computer modeling, calculate amount of material needed from available, individual founders over a specific interval to meet plan objectives.

IX. Technical germ plasma collection, storage, use and ownership

If no or limited technical information is available, proceed to conduct research to satisfy the following needs:

GRB Action Plan...

1. When appropriate and needed, identify generic animals available for basic research purposes.
2. Safe and effective methods for collecting germ plasm, including anesthetic procedures, gamete collection, ovulation induction and estrous synchronization.
3. Established baseline gamete/embryo norms (i.e., sperm numbers, sperm morphology, quality grades for embryos) and *in vitro* assays for determining biological viability.
4. Procedures for ensuring known health status of donors.
5. Comparative studies examining the impact of various cryobiological factors upon post-thaw viability of required biological materials.
 - a. cryoprotectant solutions and pre-freeze processing/equilibration.
 - b. normal microbial flora associated with collected germ plasm.
 - c. pre-freeze quality of germ plasm.
 - d. freezing method including cooling techniques.
 - e. storage conditions including temperature requirements and storage containers.
 - f. warming conditions.
 - g. post-thaw processing in preparation for use, especially cryoprotectant dilution.
6. Adequate post-thaw viability as determined by:
 - a. gross morphology/quality.
 - b. *in vitro* function assays (i.e., sperm longevity, oocyte penetration tests, embryo development in culture).
 - c. *in vivo* function assays (i.e., established conceptions in conspecifics or closely related taxa following artificial insemination, *in vitro* fertilization and/or embryo transfer).
7. Establish criteria for the minimum acceptable viability of germ plasm (and other biological materials) after thawing to meet management/genetic needs (i.e., minimum numbers of motile, undamaged sperm or minimum embryo quality grade capable of resulting in conception).
8. Potential for using frozen germ plasm with other reproductive biotechniques including interspecific embryo transfer, sperm microinjection, zona piercing, cloning, sexing, assisted embryo hatching and ultrasound-assisted aspiration and deposition.
9. Understanding the impact of disease(s) on the effectiveness and safety of banking and using biological materials.
10. Assembled information on research resources (i.e., current investigators/institutions and new/ongoing research findings) available in a computerized database.

If cryopreservation technology is available, proceed to formal banking:

1. Indicate that optimal technology is to be used based upon previous empirical studies.
2. Describe how health status of donors is to be determined to prevent disease transmission via movement of germ plasm or other biologicals.
3. Assemble the information to precisely identify all stored

aliquots of each biological material in a central database system.

4. Establish and describe a labeling procedure containing key/coded information that is placed upon each stored sample container.
5. Identify primary and secondary (back-up) locations for stored materials and the database.
6. Describe quality control program to be used ensuring that the following is included:
 - a. periodic post-thaw viability checks of frozen materials.
 - b. a system for routine examination of donors for disease.
 - c. multiple alarm systems to monitor security from unauthorized access and to ensure proper function of all low-temperature refrigerators and safety equipment.
 - d. back-up power generators to ensure continuous operation of alarm systems, safety equipment and low temperature freezers.
 - e. back-up storage space on-site in the event of individual freezer failure.

For use of stored materials:

1. Describe a plan that allows frozen materials to contribute to conservation and genetic management including information on:
 - a. individuals and institutions allowed access to the biological materials.
 - b. how biological materials will be released.
 - c. how the various biological materials will be used.
 - d. the geographic region of use including the potential problems associated with import/export restrictions (i.e., disease transmission).
 - e. proper storage and handling of biological materials after release.
2. Indicate the circumstances under which stored materials will be provided.
3. Indicate the circumstances under which stored materials will be provided free-of-charge or sold.
4. Indicate the strategy, preferably a computerized database, for assembling and disseminating follow-up information on the usefulness of the distributed materials.

For ownership of stored materials:

1. Determine ownership (individuals or partnerships) of frozen biological materials (i.e., institution owning donor, the taxon specialist group or country of animal origin).
2. Determine ownership of offspring resulting from the use from stored germ plasm.
3. Define how patents resulting from research using this material will be handled.

X. Resources and funding

1. Define personnel resources and expertise available for each phase of the banking process.
 - a. cryobiologists
 - b. gamete biologists
 - c. embryologists

- d. veterinarians
 - e. population biologists
 - f. molecular geneticists
 - g. registrars (database specialist)
 - h. captive breeding specialists
 - i. field biologists
 - j. representatives of taxon/species coordination and management groups
2. Define facilities resources (including buildings, equipment, supplies) for:
- a. personnel charged with the systematic collection of materials.
 - b. primary storage site.
 - c. secondary storage site(s).
 - d. the computerized database.
3. Identify sources of short- and long-term funding for:
- a. personnel charged with the systematic collection of materials.
 - b. secondary storage site(s).
 - c. the computerized database.
 - d. distributing stored materials.
4. Identify plan to assure the transferability of the stored collection if those responsible are unable to maintain the bank in perpetuity.

The principal authors of this report are: David E. Wildt, National Zoological Park, Smithsonian Institution, Washington, DC; Patricia Schmidt, Veterinary Resources Program, National Institutes of Health, Bethesda, MD; and William F. Rall, National Zoological Park, Smithsonian Institution, Washington, DC.

Draft Resolution...

Designating Decade of the Nineties As the "Save the Wildlife" Decade

RECALLING the Resolution I8.2Y adopted unanimously by the General Assembly of IUCN at its 18th session in Perth, Australia, December 1990: "Conservation of wildlife through wise use of Renewable Natural Resource;"

RECALLING the joint CBSG-IUDZG resolution on the Earth Summit in Rio de Janeiro, Singapore, September 1991 instructing the secretariats of CBSG and IUDZG to ensure that the international zoo community is represented at the NGO conference before the UNCED meeting as well as attending UNCED itself;

RECOGNIZING the mission of the IUCN/SSC Captive Breeding Specialist Group: "to conserve and establish viable populations of threatened species through captive propagation

programs and through intensive protection and management of small and fragmented populations in the the wild;"

CONSCIOUS of the important role zoos can execute in joint efforts with *in situ* conservation and propagation;

REALIZING that this decade may represent the last opportunity to save wildlife on this planet;

CONSIDERING the deliberations in this Annual Meeting of CBSG,

WE RESOLVE to designate this decade of the 90's as the "Save the Wildlife Decade."

Submitted by General D. Ashari and ratified by the CBSG annual meeting delegates.

Elephant Captive Breeding in Myanmar

(The following information was received by CBSG and is presented here for your information and response.)

April 9, 1992

Mr. Ulysses S. Seal
Chairman
Captive Breeding Specialist Group

Dear Sir:

I am a woman veterinarian from the Union of Myanmar (formally known as Burma) who is currently conducting research on elephant reproduction. I hope you will take an interest in our effort to develop an artificial insemination project and I would like to take the liberty of sending you the abstracts of my articles "Electroejaculation and Semen Characteristics in Myanmar Timber Elephants" and "Development of Artificial Insemination in Myanmar Elephants - Elephas maximus" which I had presented at the Forestry Science Research Congress in Yangon, Myanmar. If possible, I would ask you to publish our efforts on reproduction of Asiatic elephants in the CBSG newsletter.

I want to exchange knowledge about Asiatic elephants. I would appreciate it if you could kindly help me find some personnel who have had past experience with reproduction of Asiatic elephants. The Ministry of Forestry of the Government of the Union of Myanmar would like to do collaborative work in this field. We have 3,500 working elephants for timber production and about 3,000 wild elephants. We estimated that total population of elephants were decreasing by 5-7% each year.

The major problem is that the timber elephants do not constitute a self-perpetuating population due to their very low calving rate (mean intercalving interval = 18.9 years estimated by FAO consultant to Burma, Dr. Greame Caughley, 1980) and

Myanmar...

high mortality rate (about 5%). The timber elephant population is normally augmented by capture of wild elephants, but the availability of appropriate-sized wild elephants appears to be declining in the wild. Captive breeding has become the alternative to replenish the declining population of timber elephants. A successful natural breeding program needs to be implemented while we still have an ample stock of resources.

We are now detecting estrous cycles in females (about 20-40 cows annually) by measuring blood progesterone by radioimmunoassay. As my institute has a limited facility to do such work, I would like to know of any institutions in the United States or elsewhere who would be interested in doing collaborative work in this matter and to whom I will ship blood samples.

The Ministry of Forestry invites any professionals to visit Myanmar and appreciates their very wise contributions to our research work.

I am looking forward to hearing from you.

Yours truly,

(Khyne U Mar) B.V.S., M. Phil., F.R.V.C.S. (Swed.)
Department of Animal Husbandry
Institute of Animal Husbandry and Veterinary Science
Yezin P.O. 05282, Pyinmana, Myanmar

Electroejaculation and Semen Characteristics in Myanmar Timber Elephants

Daw Khyne U Mar¹, U Myint Thein¹, U Aung Tun Khaing¹, U Wan Tun², and U Thaug Nyunt³

¹Institute of Animal Husbandry and Veterinary Science, Pyinmana, Myanmar; ²Myanmar Timber Enterprise, Taungoo, Myanmar; ³Myanmar Timber Enterprise, Yangon, Myanmar

ABSTRACT: Six bull elephants between 16 and 31 years of age (mean = 21 years) were used in this study. Semen quality was evaluated in field conditions using a light microscope immediately after electroejaculation (EEJ). The sperm morphology was studied in wet preparations made from formal-saline fixed samples under phase-contrast microscope and in Giemsa-stained smear preparations using a light microscope. Morphological abnormalities were recorded as a percentage of the total number of counted spermatozoa. Morphological categories used in this study were: abnormal detached (loose or tailless) heads, abnormal acrosomes, proximal and distal cytoplasmic droplets, pouch formation, abnormal midpiece, and abnormal tails (simple bent, coiled and double-folded). Detached (loose or tailless) heads were found in 20.5% of the samples while acrosome defects were found in 245 of the bulls. Pouch formation, distal cytoplasmic droplets, coiled tails, and double-folded tails were found in 0.5% of the samples. Although this study failed to clarify the statisti-



cally-significant standard norms of semen characteristics for Myanmar elephants due to the limited number of bull elephants successfully ejaculated by EEJ, the total incidences of normal and abnormal morphology as well as data regarding EEJ were recorded and observed for the first time in the Union of Myanmar. In the future, further investigations are needed to clarify the standard norms of semen characteristics in order to determine the acceptable values of sperm abnormalities and to indicate the differences between individuals. Serious attention should be paid to record as much detailed information as possible for every adult bull elephant by veterinarians and authorities concerned of the Ministry of Forestry. These findings emphasized the importance of selecting the best bull sires for successful natural and artificial breeding in Myanmar elephants. These investigations were carried out in Ngalaik Reserved Forest in February, 1992 with the collaboration of Mrs. and Dr. Michael J. Schmidt, Washington Park Zoo, Oregon, U.S.A.

Development of Artificial Insemination in Myanmar Elephants

Daw Khyne U Mar, Institute of Animal Husbandry and Veterinary Science, Pyinmana, Myanmar;

ABSTRACT: So far, no elephants have been reproduced successfully by artificial insemination (AI). Researchers have determined the estrous cycle in cow elephants, which come into heat regularly about every 13-16 weeks. After tracing the hormonal pattern of progesterone by radioimmunoassay, zoo veterinarians were able to identify when the cows would ovulate in order to attempt AI. Four main problems need to be solved: 1) understanding the estrous cycle of female elephants in order to correctly time AI; 2) developing a safe and reliable method of collecting semen from bulls; 3) developing a way to preserve elephant semen for storage and transportation and; 4) devising a method for insemination through the cow's twisting 3-4 foot long urogenital canal. Timber production, which is the second largest source of Myanmar's export earnings (about \$100 million U.S. per year), is still dependent to a large extent on elephant logging. The ultimate goal of AI for elephants is not only to maintain the numbers of domestic working elephants but also to establish a reserve stock of new-generation elephants by preventing or reducing inbreeding.

Polynesian Ultramarine Lory Translocation Successful

The ultramarine lory, *Vini ultramarina*, is one of the least known and most threatened of all the insular lory species. Known only from the Marquesas archipelago, it is a species of special concern for the Marquesan islanders as well as the Office of Environment for French Polynesia. Its distribution included the islands of Nuka Hiva, Ua Pou, Hiva Oa, and Ua Huka, but it has been extirpated from all but the latter island. A special expedition in November, 1991, co-sponsored by the Office of the Environment (F.P.) and the Zoological Society of San Diego (ZSSD), found no lorries on Nuka Hiva or Ua Pou and a population of between 1,000 and 1,500 individuals on Ua Huka. Although this population is fiercely protected by the Ua Hukan islanders, its future is of much concern due to the prospect of the construction of a wharf to be built in 1993. Such development will allow the docking of large cargo ships which will lead to the potential invasion of exotic rat species and further activities, i.e. industry, agriculture, and urban development. Such activities, in addition to cats, a large goat population, possible presence of avian malaria, and the introduction of the common mynah and great horned owl have led to the extinction of the ultramarine lory on all of the other islands.

In accordance with the draft recommendations of the ICBP/IUCN/CBSG Parrot Action Plan for *V. ultramarina*, the Zoological Society of San Diego undertook the first step of an experimental translocation of this lory species from Ua Huka to Fatu Hiva, the most southerly of all the Marquesan Islands. This decision was based on the prehistoric evidence of the presence of the ultramarine lory in Fatu Hiva and the pristine nature of the island, having few of the environmentally-negative features of Ua Huka; i.e. no wharf, introduced rat species, no introduced avian competitors or predators (mynah, owl, harrier), and a controlled goat population which has allowed the island to maintain good primary and secondary forest cover. In addition, Fatu Hiva has many of the plant species known to be food plants for the lory, including kava, banana, coconut, coral tree, "ahaia," mango, "tamanu," and Tahitian mango.

In August, 1992, ZSSD staff, accompanied by personnel from F.P. Office of the Environment and the rural Economy Service, travelled to Ua Huka and spent 10 days mist-netting ultramarine lorries. Hampered by the unseasonable rains caused by Hurricane Omar, the total capture was seven lorries. These birds were kept for six days before being transferred by boat to Fatu Hiva. In Fatu Hiva, the inhabitants of Omoa visited the birds while still in their holding cages and learned about the translocation program. The birds were released in a foothill valley above Omoa in an area rich in food plants, especially coconut and banana. All the birds were released at first light and began to feed on coconut flowers within minutes. Within one hour, the birds' foraging activities took them high into the hills and out of contact with the human observers.

The birds will be monitored in the future by an employee of the Rural Economy Service who will make field observations, as well as collect data from other island residents. This translocation program will continue on an annual basis to provide enough founder birds to establish this species on Fatu Hiva.

This translocation project is just one component of a comprehensive joint conservation program between the government of French Polynesia and the ZSSD, which includes field research, continuous monitoring of endangered bird populations, translocations, and captive-rearing.

This report was submitted by Cyndi Kuehler, Curator of Zoology, and Alan Lieberman, Curator of Birds, San Diego Zoo.

Publications of Interest...

The GreenDisk. In-depth environmental information source provided to subscriber on disk formatted for their own personal computer system. To subscribe, send check or money order (\$35 U.S. for 6 issues) to: The Green Disk, Box 32224, Washington, D.C. 20007, USA.

Biodiversity and Conservation. This new quarterly international journal is devoted to the publication of articles on all aspects of biological diversity, its description, analysis and conservation, and its controlled and rational use by humans. Write: Journals Promotion Dept., Chapman & Hall, 2-6 Boundary Row, London SE1 8HN UK.

Applying Ecological Principles to Captive Primate Environments: Needs and Environmental Design for Colony Management. Topics covered include primate perception, communication, society, reproduction, ecology, and enclosure design. Sold at cost (\$15.50 in U.S.; \$17.00 outside U.S.). Write Bruce Clark, 1958 Brame Place, Toledo, OH 43613-4515 USA.

Proceedings V International Otter Colloquium Hankensbuttel. Reuther, C., and R. Rochert (eds.). The proceedings review data on the biology, distribution, decline, and conservation of otters in Europe, Asia, Africa, North and South America. More than 1,000 references. Proceedings are contained in the journal, *Habitat*, No. 6, 1991. Write Aktion Fischotterschutz e. V., Otter-Zentrum, W-3122 Hankensbuttel, Kreissparkasse, Hannover.

Monotreme and Marsupial Bibliography. A comprehensive, keyword-indexed bibliography of monotreme and marsupial literature titles for the period 1987-1992 is available from the Monotreme and Marsupial Taxon Advisory Group. To order, send a check or money order for \$45 to: Miles Roberts, Department of Zoological research, National Zoological Park, Washington, D.C. 20008 USA.

CBSG Activities Schedule

Below is a schedule of meetings and activities undertaken CBSG personnel. Individuals wishing more specific information can contact the CBSG office. Abbreviations are: (S) = Ulysses Seal, (E-J) = Sue Ellis-Joseph, (M) = Judi Mikolai, (L) = Lisa Laqua

October

- 15 - 17 Yokohama: SSCJ & Workshops (S, Kawata)
 21 - 22 Naples, FL: FL Panther Genetics Workshop (S)
 26 - 31 Brazil: Lear's & Spix's Macaw PHVA Workshops (S)

November

- 4 - 8 Switzerland: SSC Meeting (S,E-J)
 9 - 11 London: Categories of Threat Workshop (E-J)
 10 - 13 Oakland: AAZPA/AAZV/CBSG Disease Workshop (S)
 12 - 13 Salisbury, MD: IWWA Conference (E-J)
 14 Oakland: Zoo Vets (&WLDA) Mtg (S)
 14 - 26 Indonesia: Sumatran Tiger PHVA (+WWWD PHVA) (S)

December

- 3 - 5 Kuala Lumpur: Asian Zoo Mtg (S)
 6 - 18 Hawaii: Forest Birds CAMP & PHVA (S,E-J)

1993

January

- 2 weeks Thailand (S)
 3rd week Indonesia: Orang PHVA (S)

February

- 4 - 7? Antwerp: Galliformes CAMP (S,E-J)
 Edward's Pheasant PHVA
 10 - 15 Rotterdam: Mustelid, Viverrid & Procyonids & Otters CAMP (S)
 18 - 20 Jamaica: CBSG Strategic Planning Steering Committee (S,E-J)
 22 - 24 Jamaica: PHVA-Jamaican Iguana (S)
 26 - 28 Puerto Rico: Crested Toad PHVA

March

- 3 - 5 Minnesota: Freshwater Mussel PHVA
 10 - 14 San Diego: Pigeons CAMP (S,E-J)
 15 - 17 San Diego: Sheep, Goats & Saiga CAMP (S)
 8 - 19 San Diego: Deer GCAP (S)
 21 - 24 Orlando FL: So. Regional AAZPA mtg.-Bird Curators Workshop (E-J)
 22 - 24 Gainesville: Bats (S)
 28 - 3 Apr Adelaide

April

- 2nd week? Kew: PHVA Selected Plant Species (S)
 CAMP Threatened Plants of St. Helena Island (S)
 ? Morocco: M Monk Seal, PHVA & Others (S)
 22. Houston: Lecture
 25 - 29 Boston: Third Aquarium Congress

June

- 1-4 China: Baiji PHVA Workshop (S,E-J)
 ? Africa: Mountain Zebra PHVA PAAZAB
 19 - 23 Guatemala: AMAZOO, Regional CBSG (20th); PHVA's
 28 - 30 Salzburg: EEP (tentative)
 1 week Cambridge: Penguin CAMP Review (E-J)

July

- 7 - 10 ?: Turtles & Tortoises CAMP
 2 weeks Hawaii: Birds (S,E-J)
 26 - 8 Aug Madagascar: CAMP's & PHVA's (S,E-J)

August

- 15 - 30 Botswana: Crane Workshop

September

- 2 - 4 Antwerp: CBSG & IUDZG
 12 - 16 Omaha, NE: AAZPA Annual Mtg

October

- 10 - 16 India: Lion-tailed Macaque PHVA (S)
 17 - 23 Indian Lion (S)

Continued from page 1...

information. We are using the GIS tools to assess the risk of extinction of local animal populations and of the habitat which they use. Analysis of future threats to local populations, based upon current trends and possible threats, has been the most difficult factor to estimate in developing risk of extinction estimates for threatened species and habitats. This effort to develop quantitative simulation models is important for producing credible management strategies that can be used by local protected area and wildlife managers.

These tools, now established on notebook computers, offer the potential for on-the-ground use by local managers and biologists as management tools as well as providing a feasible methodology for continuing monitoring of species and habitat status. If funding were available, it would now be possible to put these tools into the hands of about 5,000 professionals worldwide and have the basis for a current assessment of all the world's protected areas and the majority of endangered species. The information provided for local management needs by these tools would be of such value to them that there would be no local personnel costs. This approach would provide the essential tools for a continuing monitoring program. It is time to quit bemoaning our lack of information and undertake an *in situ*-based program to gather this much-needed global database. The entire program could be put in place with all hardware, software, and training provided to the local biologists and a central database office established to process the locally developed information which could be provided on disk or by modem on a monthly basis. It would cost about \$20,000,000 (U.S.) and require about five years to have in place. The proposed program would not conflict with any of the GIS programs in place since none take this local approach to data collection. Indeed, it would be a significant and very economical addition and contribution to these programs. Your thoughts on this are welcome.

Ulysses S. Seal, CBSG Chairman

MAY WE DISCUSS ANOTHER ISSUE?



The *CBSG News* is currently distributed to a network of over 5,000 CBSG members and conservation professionals in 170 countries. In order to keep up with increasing expenses for the printing and distribution of the *CBSG News*, we are asking for contributions from readers in hard-currency countries who feel they can afford to help us defray these costs. If you would like to assist the CBSG with these expenses, please take a moment to fill out the coupon below. *Suggested contribution is \$25 (U.S.) - sorry, but we cannot accept credit cards or non-U.S. currency.*

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- I cannot contribute at this time, but would like to continue receiving the *CBSG News*
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