

01 January 2007

Zoological Society of Buffalo Board of Directors
Research and Conservation Committee Members
Buffalo Zoo Staff Members

Dear Colleagues:

The Zoological Society of Buffalo, Inc. is pleased to present the 2006 Annual Report on Research and Conservation at the Buffalo Zoo. This report is indicative of the high priority that the Board of Directors and professional staff place on the institutional commitment to furthering our understanding of nature, and the Buffalo Zoo's role in conserving the bio-diversity of the world's plant and animal life through captive conservation efforts.

This report also demonstrates the possibilities that the Zoo's collection can hold for researchers. Further, it should serve as an invitation to all interested parties to submit proposals to the Research and Conservation Committee to conduct non-invasive research projects at the Zoo.

We are proud of the role that the Buffalo Zoo is playing in research and conservation. As an institution, and as the professional representatives of that institution, we remain committed to our program and encourage the collaborative efforts of staff, researchers and conservation organizations.

Sincerely,

Donna M. Fernandes, Ph.D.
President and CEO

Gerald D. Aquilina
General Curator

James T. Albert, DVM
Associate Veterinarian

***BUFFALO ZOOLOGICAL GARDENS
RESEARCH AND CONSERVATION COMMITTEE
ANNUAL REPORT 2006***

***RESEARCH AT THE
BUFFALO ZOOLOGICAL GARDENS***

The Zoological Society of Buffalo Inc., within its Mission Statement emphasizes as priorities the “advancement and encouragement of the science of zoology; and the practice of conservation of wildlife in the world”. The Society, through the Research and Conservation Committee, promotes research at the Buffalo Zoo and extends an invitation to interested parties to initiate projects utilizing the Zoo’s animal collection.

THE RESEARCH AND CONSERVATION COMMITTEE

The Committee is structured to represent zoo, academic and community interests. The composition of the Committee is determined by the President/CEO of the Zoo and is renewed on an annual basis. The Zoo is deeply indebted to the following individuals for their expertise, service and commitment to conservation and research:

- Donna Fernandes, Ph.D. - President/CEO, Zoological Society of Buffalo
- Michael Noonan, Ph.D. - Canisius College
- Ed Standora, Ph.D. - SUNY College at Buffalo
- Carol Berman Ph.D. - SUNY at Buffalo
- Beth Marks - Zoological Society of Buffalo Board Liaison
- Sandy Mendel - SUNY at Buffalo
- Jeffrey Wyatt, DVM - Seneca Park Zoo, Rochester, NY
- Barbara Carr - Executive Director, Erie County SPCA
- James T. Albert, DVM - Associate Veterinarian, Zoological Society of Buffalo
- Gerald D. Aquilina - General Curator, Zoological Society of Buffalo

In addition to their service on the Research and Conservation Committee, all of these individuals also serve on the Institutional Animal Care and Use Committee (IACUC). This committee inspects, reports and oversees all research and research sites at the Zoo in accordance with the regulations governing research as mandated by the United States Department of Agriculture.

Research Projects Supported in 2006

The Zoological Society of Buffalo recognizes that important contributions are made to the Zoo and to the profession by research efforts. The Society also recognizes that research benefits society at large by contributing to our collective knowledge of nature. Research projects conducted or contributed to as a result of Committee approval and/or cooperation with AZA requests in 2006, and those projects continued from previous years are listed below.

“Gauging Bite Strength at Different Gapes of Lions and Tigers”

Frank Mendel, PhD. SUNY Buffalo Department of Anatomy. Fluid filled, gauged, puncture proof, non-toxic hoses of different diameters were presented to lions and tigers in order to gauge their bite strength. Data collected will be applied to extinct sabertoothed cats.

“Electrocardiography in Elephants”

Susan Bartlett and Noha Abou-Madi, DVM, MS Cornell University. This study is assessing the most effective and accurate techniques to perform electrocardiography on elephants. Normal ranges for P-QRS-T complexes and the effects of body weight, sex, age, and species will be established.

“Correlations of arousal and vocal output in Asian elephants”

Jennifer Schneider, graduate student Department of Biology, SUNY at Buffalo
The purpose of this study is to examine the relationship between arousal and vocal output in captive Asian elephants.

Pregnancy diagnosis through urine hormone analysis in giraffe.

Janine Brown, Nichole Abbondanza, National Zoological Park Conservation and Research Center; Gerald Aquilina, Vicky Hodge Buffalo Zoological Gardens. The purpose of this pilot study is to determine if pregnancy in giraffe can be accurately diagnosed through urine hormone levels.

Distribution of Artifacts, Samples and Data in 2006

In the course of normal operation of the Zoo, certain animal artifacts and animal management data may become available for use by legitimate researchers. For the most part the artifacts consist of post mortem tissues but can also encompass serum samples, fecal samples or even x-ray films. Management data consists of diet, veterinary, inventory, and husbandry records. The Zoological Society encourages the constructive use of such artifacts and data derived from the collection. Obtaining animal related artifacts and data is subject to Committee approval. In 2006, artifacts and/or data were supplied or cooperation was committed/continued to the following researchers:

Baizer, Joan, Ph.D. Associate Professor of Physiology and Biophysics, SUNY at Buffalo. Brain and central nervous system samples from animals at necropsy for the study of comparative organization of mammalian brains and understanding of brain evolution.

Brown, Janine, Ph.D., Conservation and Research Center, Front Royal, VA., AZA Elephant SSP Reproductive Advisor. Blood samples from Asian elephants provided to monitor hormones to determine cyclicity.

Chabot, Adrien, Ph.D., University of Chicago. Agreement to provide liver and kidney samples at necropsy from great apes to aid in a study to compare gene expression profiles in livers and kidneys between humans

Dubach, Jean DVM, Brookfield Zoo, Chicago, Illinois. Blood samples provided for DNA analysis of ring-tailed lemurs to determine population relatedness for the SSP.

Elephant TAG, AZA. A hoof survey was completed to help study current trends in Elephant hoof care in AZA Zoos.

Erwin, Joseph, Ph.D., Division of Neurobiology and Behavior, Bioqual, Inc. Continued commitment to The Great Ape Aging Project by agreeing to provide brain tissues upon necropsy.

Fuller, Grace, Graduate Research Associate, Cleveland Metroparks Zoo. A fecal marker survey was completed. The survey will be used to identify the various methods used to identify individual animal fecal samples in AZA zoos.

Goodman, M. Scott, Ph.D., Department of Chemistry, SUNY College at Buffalo. Hair samples from various mammals were provided. The samples will become part of a hair library for forensic science students to examine during the course of their studies. The hair will be examined microscopically, physically characterized, cross-sectioned and casts made. Additionally, permanent microscope slides will be prepared in some cases to quickly illustrate different features of hair morphology.

International Elephant Foundation, AZA Elephant SSP, AZA Conservation Endowment Fund. Study to reduce elephant deaths caused by Endotheliotropic Elephant Herpes Virus (EEHV). Historic data and blood samples provided to determine prevalence of EEHV in collection animals.

Maned Wolf SSP, AZA. Extensive diet and fecal observation survey completed. The results will provide a specific nutritional analysis for each diet, possible correlations between diet, health, and stool consistency, and help to determine the next steps needed to establish a diet that is palatable and meets maned wolf nutritional needs.

McMillan, Amy, Ph.D., SUNY College at Buffalo. Fecal samples provided for DNA extraction and genotyping of mandrill and ring-tailed lemur.

Munson, Linda, Ph.D., University of California at Davis for the AZA Contraception Advisory Group. Agreement to provide pathology samples for any animals involved in chemical contraception.

Noonan, Michael Ph.D., Canisius College Psychology Department: Anatomy of cerebral commissures in brains. Cerebral commissures are the bundles of neuronal fibers which interconnect the two sides of the brain and are responsible for coordination between the right and left side. Post mortem harvest of mammal and bird brains for anatomical comparison.

Polar Bear SSP, Bear TAG Nutrition Advisory group. Polar bear blood samples were provided to help establish normal values to assess health and nutritional status.

Riniolo, Carol, Niagara County Community College. Blood samples provided to aid in the instruction of Animal Management students in the area of cellular transport mechanisms.

Ryder, Oliver A, Ph.D., San Diego Zoo Center for the Reproduction of Endangered Species: Skin biopsy samples from specific individuals of SSP© mammals were provided opportunistically. The DNA of these animals will be preserved in the Frozen Zoo.

Ryder, Oliver, Ph.D. Zoological Society of San Diego Center for Reproduction of Endangered Species. Biopsy and blood samples from selected primates were provided and authorization given for inclusion in the Integrated Primate Biomaterials and Information Resource to allow progeny cells and derived DNA to be broadly available to qualified investigators.

Savarese, Joseph, DVM Medaille College Veterinary Technician Program. Blood and fecal samples provided to aid in the instruction of veterinary technology students in the areas of clinical pathology and parasitology.

Songasasen, Nucharin, DVM, Ph.D., National Zoological Park Conservation and Research Center, AZA Maned Wolf SSP. "*Stress and Reproduction in Maned Wolves (Chrysocyon brachyurus)*" Fecal samples and behavioral observations provided in order to monitor fecal corticoids in relation to reproductive success.

Tiger SSP, AZA. A training survey was completed to help assess the type and degree of training employed with tiger species in AZA zoos.

Voin, Doina, Forensic Scientist QAQC Standards, USFWS National Forensics Laboratory, Ashland Oregon. Samples provided from various exotic animals for the Standards Collection to aid in the identification of materials involved in possible violations of wildlife and conservation laws and regulations.

Walsh, Daniet, LVT, MPS, Purdue University School of Veterinary Medicine, West Lafayette, Indiana. Stained blood and cytology films provided for the education of veterinary technology students at Purdue.

Zschokke, Samuel, Ph.D., University of Basel, International Rhino Foundation. The Buffalo Zoo continues to act as the U.S. Coordinator for the shipping of blood samples to the University of Basel to facilitate a study to analyze the genetic relationship between the two populations of Indian rhinos in Assam (India) and Nepal.

A new method to secure funding for conservation projects was implemented in 2006. The “Cars for Conservation” program received \$0.25 from each parking fee collected. The funds generated are distributed to national and international conservation programs. A total of \$8392.23 was distributed in 2006. Projects below receiving “Cars for Conservation” funding are notated **CFC**.

Financial support was provided to the following conservation organizations in 2006

Abbe-Freeland Wildlife Rehabilitation Center- Major NYS wildlife conservation and rehabilitation center in Angelica, New York. Support provided through donation of materials and expertise in husbandry, shipping, management, etc

Addax SSP, Antelope TAG, AZA- Funding provided to aid in the re-introductory program for Addax antelope through the Sahara Conservation Fund. **CFC**

AZA Conservation Endowment Fund- Regular donations are made to the Conservation fund through proceeds from on site “wishing wells” and through the Research/Conservation Fund. Informational graphics about the Conservation Endowment Fund are provided at the site of the donation. **CFC**

Association of Zoological Horticulture (AZH) Conservation Fund- Yearly contributions through the Zoo Horticulturalist to the AZH auction and a cash donation to the Conservation fund. Proceeds fund grants from the AZH Conservation Fund for worldwide plant conservation. **CFC**

Elephant Managers Association (EMA) Financial support provided for the 27th annual Elephant Managers Association Conference.

El Valle Amphibian Conservation Center (EVACC) In-situ and ex-situ Panamanian amphibian conservation was supported in 2006 by sending zoo staff members to Panama to help fulfill the El Valle Amphibian Conservation Center (EVACC) goals when a chytrid fungus infection broke out the area. Staff helped with field collection of targeted endemic frogs, set-up of the water filtration system for the Center, and helped develop quarantine style husbandry. The Goals of EVACC are to save 12 species of Panamanian endemic frogs for education, display, and the future maintenance of the species. The Buffalo Zoo also supplied funding for the salary of one local Panamanian as an EVACC keeper for a year. Panamanian frogs were exhibited in the reptile house with an educational graphics package. **CFC**

Grizzly & Wolf Discovery Center- Financial support of brown bear conservation and rescue and Yellowstone National Park education efforts.

International Elephant Foundation- Financial support for Saving Elephants by Helping People project in Sri Lanka involving the erection of a solar powered electric fence to resolve human-elephant conflict. Financial support was provided for the IEF Elephant Symposium. **CFC**

International Rhino Foundation- Financial support provided for North American Save the Rhino Campaign which helps to conserve rhinos in the wild.

International Snow Leopard Trust- Financial support of Natural Partnerships Program.
CFC

Polar Bears International- Contributions to this non-profit organization dedicated to the worldwide protection of the polar bear.

Turtle Survival Alliance- Contribution made to advance and support the conservation goals of the Alliance.

BUFFALO ZOOLOGICAL GARDENS CONSERVATION INVOLVEMENT

Conservation through captive animal management is of paramount importance to global wildlife preservation. On an international basis, zoos are cooperating to insure the long term genetic and demographic preservation of targeted endangered and threatened species. In the United States under the auspices of the American Zoo and Aquarium Association, the Species Survival Plan © (SSP ©), Population Management Plan (PMP), Studbooks, Taxon Advisory Groups (TAG) and Conservation Action Partnerships (CAP) have been implemented.

The Species Survival Plan © is a cooperative effort to maintain a viable captive population of a species through close genetic and demographic management. In situ conservation and education programs are also a part of an SSP ©. The Buffalo Zoo works with 22 SSPs. The Buffalo Zoo also participates in 36 Population Management Plan (PMP) programs. These programs manage the captive population utilizing the studbook as the primary tool. (*Appendix 1*)

An important component in captive population management for any single species is the maintenance of a good database or record keeping system. Studbooks are the database that represents the history of a captive population: genealogies, captive locations, sex and birth information. The Buffalo Zoo provides information on an annual basis to 56 regional and international studbooks. (*Appendix 1*)

The viability and sustainability of wildlife populations is monitored on international, national and regional bases. Various designations of endangered, threatened, vulnerable or special concern status are applied and legal protection granted accordingly. *Appendix 1* lists those species in collection at the Buffalo Zoo that are regulated under either CITES, USDI or New York State. In large part, collection composition at Buffalo is influenced by these conservation concerns and the long-term need to maintain a viable and healthy gene pool in support of captive conservation efforts.

A Taxon Advisory Group (TAG) takes a systematic approach to the management of an entire Taxon through regional collection planning, SSP and studbook recommendations and overall issues of management and husbandry. The Buffalo Zoo actively participates in 40 TAG's. (*Appendix 2*)

Conservation Action Partnerships (CAP) serve to promote and coordinate cooperative scientific and conservation programs within a specific geographic region. The Buffalo Zoo participates in seven CAPs. (*Appendix 3*)

Buffalo Zoo Conservation Programs Involvement

	CITES	USDI	SSP/PMP	Studbook	NY
Mammals					
tamar/scrub wallaby			PMP	X	
wallaroo			PMP	X	
Straw-colored fruit bat (Education)			PMP	X	
ring-tail lemur	I	E	SSP	X	
douroucouli/grey- legged owl monkey	II		PMP	X	
cotton-top tamarin	I	E	SSP	X	
DeBrazza's guenon (loan out)	II		SSP	X	
Japanese macaque	II	T	SSP	X	
black ape	II		SSP	X	
mandrill	I	E		X	
w. lowland gorilla	I	E	SSP	X	
two-toed sloth			PMP	X	
giant anteater	II		PMP	X	
Brazilian agouti			PMP	X	
prehensile-tail porcupine			PMP	X	
maned wolf	II	E	SSP	X	
spectacled bear	I		SSP	X	
polar bear	II		SSP	X	
grizzly bear	II	T			
Kodiak bear	II	T			
red (lesser) panda	I		SSP	X	
slender-tailed meerkat			PMP	X	
river otter	II		PMP	X	
spotted hyena			PMP	X	
fennec fox (Education)	II		SSP	X	
serval	II		PMP	X	
African lion			SSP		
Siberian tiger	I	E	SSP	X	
snow leopard	I	E	SSP	X	
California sea lion			PMP	X	
Indian elephant	I	E	SSP	X	
rock hyrax			PMP	X	
common zebra			PMP	X	
South American tapir (loan out)	II	E	PMP		
great Indian rhinoceros	I	E	SSP	X	
collared peccary			PMP	X	

guanaco	II				
reticulated giraffe			PMP	X	
gaur (loan out)	I	E	SSP	X	
addax	I		SSP	X	
roan antelope			PMP	X	
gemsbok			PMP	X	
bighorn sheep		E			
	CITES	USDI	SSP	Studbook	NY
Birds					
red-breasted goose	II				
black-necked swan	II				
cinereous vulture	II		SSP	X	
American kestrel (Educ)	II				
Harris hawk (Education)	II				
nanday conure (Education)	II				
blue and gold macaw (Educ)	II				
Senegal parrot (Education)	II				
red-rumped parrot	II				
princess parrot	II				
Cloncurry parrot	II				
eastern rosella	II				
Bourke's parrot	II				
Edward's lorikeet	II				
green-naped lorikeet	II				
black lory	II				
blue-streaked lory	II				
rainbow lorikeet	II				
ornate lory	II				
red lory	II				
dusky lory	II				
yellow-streaked lory	II				
Forsten's lorikeet	II				
Lady Ross' plantain eater			PMP	X	
great horned owl (Educ)	II				
snowy owl	II		PMP	X	
trumpeter hornbill			PMP	X	
Pekin robin	II		PMP	X	

speckled mousebird			PMP	X	
	CITES	USDI	SSP	Studbook	NY
Reptiles					
three-striped box turtle	II		PMP	X	
Annam leaf turtle					
giant So Am river turtle	II				
S American red-footed tortoise	II				
pancake tortoise	II		PMP	X	
desert tortoise	II	T			
gopher tortoise	II	T			
eastern box turtle (Educ)	II				
American alligator	II	T			
Mexican beaded lizard	II		PMP	X	
gila monster	II				
Egyptian spiny-tail lizard	II				
fence lizard					T
belted chameleon	II				
Parson's chameleon	II				
Modest day gecko (modesta)	II				
yellow-throated day gecko	II				
prehensile-tailed skink	II		PMP	X	
black tree monitor	II		PMP	X	
Virgin Islands boa	I	E	SSP	X	
emerald tree boa	II				
sand boa	II				
reticulated python	II				
olive python	II				
ball python (Education)	II				
eastern indigo snake		T	PMP	X	
king cobra	II				
Arizona ridgenose rattlesnake			PMP	X	
Mexican lance-headed rattlesnake			PMP	X	
e massasauga rattlesnake			SSP	X	E
Amphibians					
	CITES	USDI	SSP	Studbook	NY
Japanese giant	I	E			

salamander					
Puerto Rican crested toad		T	SSP	X	
green/black poison dart frog	II				
blue poison dart frog	II		PMP	X	
yellow/blue poison dart frog	II				
bicolored poison dart frog	II				
golden poison dart frog	II				
tomato frog	I				
Panamanian golden frog	I	E	PMP	X	
golden mantella	II		PMP		
TOTALS	85	23	22 SSPs 36 PMPs	56	2

Reviewed 9 Jan 2007

Appendix #2

Antelope and Giraffe TAG
Ape TAG
Bat TAG
Bear TAG
Bison, Buffalo, Cattle TAG
Canid/Hyena TAG
Caprid TAG
Deer TAG
Elephant TAG
Equid TAG
Felid TAG
Marine Mammal TAG
Marsupial/Monotreme TAG
New World Primate TAG
Old World Primate TAG
Pangolin, Aardvark, Xenarthra TAG
Prosimian TAG
Pig and Peccary TAG
Rhino TAG
Rodent TAG
Small Carnivore TAG
Tapir TAG

Anseriiforme TAG
Ciconiiforme TAG
Charradriiformes TAG
Coraciiforme TAG
Galliforme TAG
Parrot TAG
Passeriforme TAG
Piciforme TAG
Pigeon and Dove TAG
Raptor TAG
Turaco TAG

Amphibian TAG
Chelonian TAG
Crocodilian TAG
Lizard TAG
Snake TAG

Freshwater fish TAG

Terrestrial Invertebrate TAG

Appendix 3

Brazilian CAP

East African CAP

Mesoamerican CAP

North American CAP

Paraguay CAP

Southeast Asian CAP

Venezuela CAP