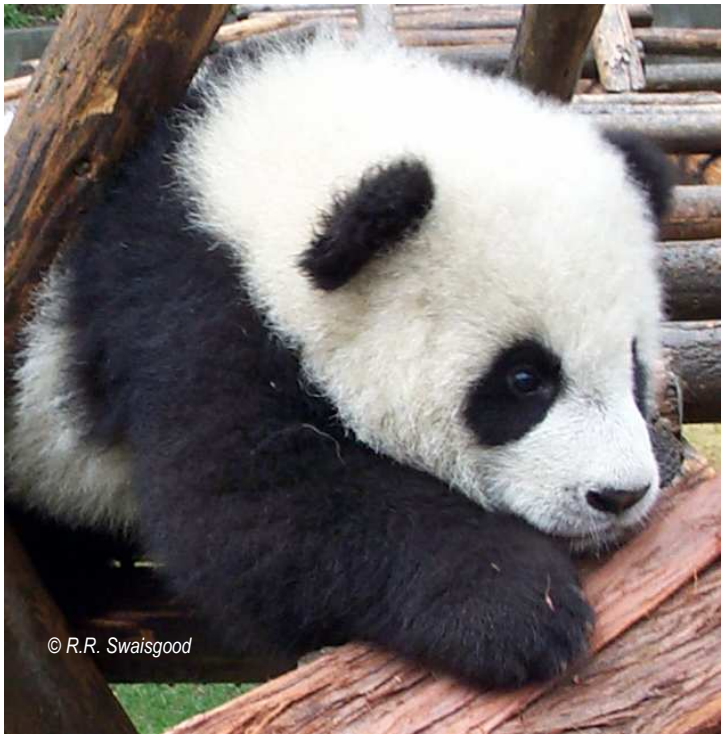
The Conservation Behaviorist

Captive breeding, conservation and behavioral research



"How can we justify confining animals in small enclosures, often far removed from many salient features of the animal's natural environment? …How can we justify the expenditure of money to maintain a few representatives of endangered species in captivity when the same funds could significantly enhance in situ conservation efforts? …These questions are interrelated because minimal well-being is a prerequisite for reproduction for conservation breeding…" says Ronald R. Swaisgood in our Feature Article: *"What Can Captive Breeding Do for Conservation and What Can Behavior Research Do for Captive Breeding?"* (page 3)

Animal Behavior Society ABS Conservation Committee

The Conservation Behaviorist, an electronic biannual news-update, informs ABS members about the Conservation Committee's activities, research trends in behavior and conservation, and relevant scientific news in conservation research where behavior plays an important role.

The Conservation Behaviorist **Vol. 2, No. 2, November 2004**

In this issue

Conservation Tips By Daniel T. Blumstein

Is there anything a behaviorist can do to help conservation?

Apply *"Tinbergen's Four Questions"* to a conservation question: the physiological and sensory mechanisms that control behavior, the development or ontogeny of behavior, its function and evolution. Applying our major conceptual framework can provide novel management questions and can help structure the scientific study of an endangered species. Share this conceptual framework with others! It works well for behaviorists and it can surely work well for mainstream conservation biologists.

The ABS Conservation Committee

Created in 1997, the Conservation Committee aims to encourage ABS members to participate in research programs addressing the interface between animal behavior and conservation science. By identifying and evaluating the areas in which behavioral research has contributed to conservation, as well as the fields that need development, the Committee seeks to generate discussion and promote studies in behavior and conservation.

ABS Conservation Committee Members

Interact with the Conservation Committee

Send letters, announcements, comments and contributions to
The Conservation Behaviorist
gpazymino@worcester.edu
Deadlines for articles are the 15th of the month preceding the next news update. The next deadline is **April 15th**. Contributions submitted by members of the Animal Behavior Society and determined by the Conservation Committee to be appropriate will be published in The Conservation Behaviorist. The publication of such material does not imply ABS or Conservation Committee endorsement of the opinions expressed by contributors.

Editor Guillermo Paz-y-Miño C.
Associate Editor Allison C. Alberts

Announcements

Funding opportunities

Debra M. Shier and the ABS-Conservation Committee have compiled a list of institutions that would consider funding research proposals from conservation behaviorists. To access this data base, visit
http://www.animalbehavior.org/ABS/Conservation/ccfunding.html

Publications: Conservation Behavior

J. Cully Nordby and the ABS-Conservation Committee have compiled a list of review and conceptually based publications on the interface of conservation and behavioral biology. For an electronic version of this list, visit
http://www.animalbehavior.org/ABS/Conservation/index.html

E. O. Wilson Conservation Award: Deadline for registered ABS students: 28 January 2005

The Edward O. Wilson ABS Student Research Grant for Conservation seeks to encourage graduate students of animal behavior to participate in meaningful conservation-related research. The award is part of the **ABS Student Research Grant Program** and it supports a ***proposal*** considered meritorious for its integration of behavior and conservation.

E. O. Wilson, professor at Harvard University, who in 2002 received the ABS Distinguished Animal Behaviorist Award, is one of the world's most eminent scientists and pioneers in biodiversity conservation.

For additional information on this award visit the **Student Research Grant Committee's** website http://www.animalbehavior.org/ABS/Grants/ or contact hugh@servidor.unam.mx

Feature Article

What can captive breeding do for conservation and what can behavior research do for captive breeding?

How can we justify confining animals in small enclosures, often far removed from many salient features of the animal's natural environment? This question speaks to concerns of animal welfare, and I see it as a challenge to behaviorists and managers to understand the behavioral needs of animals and develop captive environments that meet these needs. How can we justify the expenditure of money to maintain a few representatives of endangered species in captivity when the same funds could significantly enhance in situ conservation efforts? A reasonable answer must show that these expenses actually do not take away funds that otherwise could go to conservation of animals in their natural environments and that captive breeding programs contribute to in situ conservation. These questions are interrelated because minimal well-being is a prerequisite for reproduction (18) for conservation breeding.

By Ronald R. Swaisgood*

Zoos are the preeminent domain of captive breeding programs, but not the only players. Governmental agencies and many Non-Governmental Organizations (NGO's) are increasingly involved in species recovery efforts that involve a stint in captivity. This underscores the sad truth that we are too often confronted with conservation triage, where we have to rescue populations that are no longer able to sustain themselves in the human-altered landscape in which they live (witness the plight of the California condor). But these last-ditch efforts are not the preferred method of rescuing disappearing populations. The International Union for the Conservation of Nature (IUCN) recommends that captive breeding programs for vulnerable populations be established before their existence becomes so precarious that further removals for captive breeding will exacerbate their decline in situ. In this view, viable captive populations are established as an insurance policy, providing a genetic reservoir for reintroduction should in situ efforts fail.

As habitat for wild populations becomes increasingly altered by human activities, conservationists are relying more on meta-population management, where many populations in small reserves (and breeding centers) are managed as a whole to preserve genetic diversity. As zoos and breeding centers move more to large, naturalistic enclosures and many wild populations are managed in smaller, fenced areas (e.g., rhino reserves in Africa), the captive-wild distinction becomes blurred. It is not the preferred model for conservation, but often the reality.

Studies of white rhino social organization, reproductive behavior, and endocrinology are underway in the Hluhluwe-Umfolozi Park in South Africa. One goal of this research is to use these data to evaluate reproductive problems that plague the captive population. Ronald R. Swaisgood © photo.

What about the role of captive breeding in the conservation community? As a previous outsider to the zoo community—now nearly a 10-year veteran of zoo-based conservation—I can speak to issues that initially weighed heavily on my mind, but I have learned to appreciate from a new perspective. First, the money. I think it's fair to say that the typical zoogoer is not necessarily an avid conservationist. Money spent at the gate is likely not money taken out of the environmental charity tithes. This money is used to feed and house the zoo animals. And today zoos often skim off a few dollars earned from ticket, T-shirt and hamburger sales to support their own in situ conservation programs. Second, zoos have the unique opportunity to educate people that might not otherwise embrace conservation. Typically busy urbanite families that need a break and enjoy seeing animals easily (e.g., without the heat and the mosquitoes), the zoogoer may not be up to speed on the latest conservation issues. A zoo devoted to a conservation message can capitalize on this opportunity to educate the zoo-going citizen. A close-up experience with a wild animal can foster a bond that—with the proper educational experience—can grow into a conservation ethic. Some may just throw an extra buck in the conservation donation box, but some may develop into true conservationists, support environmentally sound policy, and make significant monetary contributions. This is a best-case scenario, and it is incumbent upon zoos to do everything in their power to ensure that this goal is realized, or risk becoming an obsolete holdover from the circus mentality of previous generations.

Take the case of the giant panda, global conservation icon (11). Probably no other animal can claim so much conservation fund-raising in its name—for itself and for the ecosystem in which it resides. Sure, some monies have been misappropriated, but increasingly panda-generated funds are finding their way into valid conservation channels. The visionary U.S. Fish & Wildlife policy dictates that no zoo turns a profit from panda importation, that any money generated is put back into panda conservation in China, and that at least 80% of these funds go to in situ conservation. Long lines of T-shirt-

buying zoogoers often wait for a brief view of a sleeping panda. This means that each of the four U.S institutions holding pandas sends a million dollars per year back to China, supporting reserve protection staff, capacity building, reforestation, conservation science, the establishment of new reserves, and the creation of corridors. Not just pandas, but an incredible diversity of life is protected in the more than 40 reserves that have been established in the panda's name. The panda has also generated a surreal level of public interest. Panda PR dominates the media with regularity, and—in addition to the warm fuzzy stories—often conveys a conservation message. One more step toward an educated citizenry. Surely, conservationists had the panda in mind when they came up with terms like "flagship species" and "umbrella species." The endearing character of the panda has made it a good will ambassador of almost unparalleled success. The coming decades will see what comes of this—will scientists and policy-makers make the most of this opportunity to conserve the panda and its co-inhabitants? And how can this form of self-promotion—perhaps on a smaller scale—be maximized for less charismatic species?

Studies of reproductive behavior and communication are helping researchers tease out the components governing sexual motivation in giant pandas. New scientific understandings of panda behavior have played a crucial role in recent successes at the Wolong breeding center, where the numbers have increased from 25 to nearly 80 in recent years. Ronald R. Swaisgood © photo.

In principle—and often in practice—zoos can contribute to in situ conservation through education and fund-raising. But how can captive breeding programs contribute to conservation more directly and what role can behavior research play? (i) Perhaps most importantly, many aspects of biology and behavior can be studied in the captive environment that would be impossible to study in the wild. Lack of such scientific knowledge often hinders management of endangered populations both ex situ and in situ. (ii) Behavior research can help captive populations reach self-sustaining growth, reducing demand for removals of individuals from the wild and creating a genetic reservoir as a safeguard against extinction. Health, nutrition, and basic husbandry play crucial roles in captive breeding programs, but good behavioral management often means the difference between stagnant breeding and viable captive populations (10, 12, 19, 24). (iii) Behavior research programs are essential for both generating surplus animals for reintroduction into the wild and for preparing candidates for a drastically different set of challenges in nature (7, 9, 14). For example, captive-bred black-footed ferrets faired better when released in the wild if they were raised in enriched environments that afforded behavioral opportunities that mimic those found in nature (14). To put things in perspective, however, I need to point out that many reintroduction attempts fail (2) and some conservationists do not consider captive breeding and reintroductions to be worthwhile pursuits (15).

This brings us to what—specifically—animal behaviorists can do to promote these conservation-related activities. Below are a few research activities that conservation behaviorists can pursue to promote captive breeding.

Mimicking nature. Behaviorists can use the literature and/or conduct their own studies to learn about the species' behavioral ecology in nature. Two key pieces of information include its foraging strategy and social organization. This is a starting point for creating a biologically relevant captive environment for improved well-being and reproduction. However, it is not that simple a matter, for we can never mimic all the complexities inherent in the natural environment, so further evaluation is necessary to determine just what the animal requires for psychological health and sexual motivation.

Stress. Understanding animal stress-response systems has long played a role in captive breeding programs, but recent years have seen a surge of interest in understanding anthropogenic stressors that affect wild populations in shrinking habitat, now subjected to increasing levels of human disturbance. "Stress"—used here as a loose descriptive concept pertaining to a variety of physiological and behavioral responses that animals use to cope with environmental challenges to homeostasis—can frustrate captive breeding efforts through its suppressive effects on reproduction and immunocompetence. In my favorite example of how stress can affect captive breeding, Nadja Wielebnowski and colleagues used a controlled experiment to show how social stress can impair ovarian function in captive cheetahs (26). Many other aspects of the captive environment, such as chronic proximity to predators, small or barren enclosures, and noise, can be related to stress (3), and only well-designed behavioral research will tease out potential stressors. Captive animals also present a valuable opportunity to develop stress-monitoring tools that can be used with wild populations.

Abnormal behavior, enrichment and ethological needs. "Enrichment" is any modification of the captive environment to promote psychological well-being, and runs the gamut from appropriate conspecific companions, to adding environmental complexity such as climbing structures and novel objects, to encouraging animals to work for food rather than quickly consuming a bowl of processed food. "Ethological needs" refers to one model of motivation that posits that animals are motivated not just to obtain important biological resources (e.g., food), but also to perform the appetitive behaviors typically used to locate, capture, extract or process the resource (8). If the captive environment does not provide opportunities to perform these behaviors, animal well-being will suffer, as often manifest in the performance of abnormal behaviors. Other motivational theories that may explain poor well-being in captivity include the need for control over the environment, behavioral contingency, and information gathering needs (17). A major class of abnormal behavior seen in captive animals is stereotypies, which are highly repetitive behaviors, invariant in form, that have no obvious goal or function, such as pacing (13). Behaviorists can design studies that test these motivational theories and help develop more effective enrichment programs to reduce stereotypies, enhance a more natural diversity of behavior, and promote well-being (22). Enrichment studies not only contribute to animal well-being, but promote reproduction by reducing stress and improving behavioral competence (4).

Social environment. Another critical link in the chain leading to successful reproduction is the social environment. In general, the rule of thumb is to mimic the group composition prevalent in the wild, but recent studies have shown the social system of many species to be highly flexible, depending on the distribution of resources, population density, and so forth. By capitalizing on this flexibility, some experimentation in captivity may yield the best composition for captive environments.

Reproductive behavior. A "bread-and-butter" research activity in captive breeding programs is to study the female estrous cycle to illuminate the temporal pattern of behavior leading up to ovulation (25). This is essential information in relatively asocial species where male and female are held separately: without it, managers will not know when to allow pairs access for mating. In addition, by establishing species' norms, deviations in individuals can help pinpoint the cause of reproductive failure. It also provides important clues regarding the overall reproductive strategy of the species.

Communication. A subset of reproductive behavior, but also used in competitive and other social contexts, communication plays an important role in bringing the sexes together for reproduction. For example, my own work with giant pandas has shown that sexual motivation is enhanced by providing appropriate opportunities for olfactory communication, and olfactory management has figured prominently in recent growth of the captive population (20, 21). Behavioral research targeting judicious use of animal signaling behavior stands to increase successes in captive breeding programs.

Manipulating reproductive skew. When a few individuals—typically males—attain higher reproductive success than others, they obtain greater genetic representation in the population at the expense of others. As a result, the effective population size decreases and the population may suffer from the effects of reduced genetic diversity. In a previous issue of The Conservation Behaviorist (Vol. 1, No. 2) Allison Alberts described how her research team dealt with this problem in a small wild population of Cuban rock iguanas (1). They captured and temporarily removed the dominant males that out-competed the other males for mates, allowing the subordinate males a chance to make a genetic contribution to the population. If many females prefer to mate with a few males, mate choice can also lead to reproductive skew. Recent studies have shown that it is possible to manipulate female choice by "faking" olfactory cues related to competitive ability, capitalizing on female preference for the most competitive males (5, 6, 16). Such management tools need to be used with caution, since free female choice may produce more viable offspring, but when populations are very small, intervention to preserve remaining genetic diversity is warranted (23).

Parental care and development. Good management for captive breeding does not end with the birth of offspring, but also includes fostering good parental skills so that the offspring survive and reproduce. Some species or individuals can be very sensitive to the environment during the period of offspring dependency, and may abandon or kill offspring if disturbed. Behavioral research can identify the proper environmental variables to encourage parental behavior. Studies of caregiving systems can elucidate species norms for comparison with individuals that show abnormal responses to newborns, and suggest ways of encouraging reluctant mothers. For example, we used such studies to develop techniques to train female pandas to accept and rear cubs that were initially abandoned (27). And finally, normal behavioral development requires that we pay attention to all of the behavioral concepts discussed above throughout the animal's lifetime.

Reintroduction. Once the combination of these behavioral and other management strategies lead to a self-sustaining viable population it is possible to consider reintroducing captive-born animals to the wild, if the other criteria for reintroduction as a conservation tool are met (9). Much of the behavioral research required to obtain reproduction will also be critical for reintroduction, which depends on the development of behaviorally competent individuals. More behavioral research to select the best candidates and prepare them for the very different challenges that await them in nature will be essential also. Behaviorists will again play a crucial role in post-release monitoring to determine the behavioral deficiencies that limit the success of reintroductions. There may be no other conservation action where the skills of behavioral researchers are more essential than reintroduction.

These behavioral research strategies are just a few starters important for behavioral management in captive breeding programs. In actual practice, the ways that behavior research can contribute to conservation breeding are as diverse as the imaginations of researchers tackling the challenge of managing animals outside the natural context in which they evolved.

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Are you looking for advisers, academic programs, research assistantships, internships, or summer programs in conservation behavior?

Here is a preliminary list of scientists affiliated with academic institutions who conduct research in animal behavior and conservation. If you think that your name should be included in this data base, please contact gpazymino@worcester.edu This list will also be posted in the Animal Behavior Society Conservation Committee's website.

Dr. Raphaël Arlettaz
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raphael.arlettaz@nat.unibe.ch www.conservation.unibe.ch

Conservation biology of emblematic species of agro-ecosystems and alpine ecosystems, mostly vertebrates (birds and mammals). We are sometimes looking for good graduate students as PhD recruits.

Dr. Allison C. Alberts
Head of Applied Conservation, Conservation and Research for Endangered Species, 15600 San Pasqual Valley Road, Escondido, CA 92027-7000, USA, (760) 291-5480 aalberts@sandiegozoo.org

Much of my career has been spent studying iguanas, and I currently serve as co-chair of the IUCN-World Conservation Union Iguana Specialist Group. Because they facilitate germination, promote seedling growth, and disperse the seeds of the native plants they consume, iguanas play an important role in maintaining healthy ecosystems. Although my early work concentrated on social communication in desert and green iguanas, since 1993, I have been carrying out applied research on the critically endangered rock iguanas of the Caribbean. My work includes studies on the behavior and reproductive ecology of wild iguana populations, experiments to determine optimal egg incubation parameters, population surveys, translocation programs, and educational outreach efforts. Most recently, my colleagues and I have been exploring the utility of in-country "headstarting" programs, in which juvenile rock iguanas are reared in a safe environment until they are no longer vulnerable to introduced predators, as a conservation strategy for augmenting wild populations. In addition to my work in the Caribbean, I have a long-standing interest in the conservation of biodiversity in Southern California. My research group is currently involved in recovery programs for a number of threatened species, as well as outreach in local communities to increase public understanding and appreciation. One of our primary focus areas continues to be the restoration of endangered Southern California ecosystems to a more natural, healthy, and productive state. We are actively exploring a variety of restoration approaches, including reintroduction of keystone vertebrate species to their native range, seed banking for revegetation of disturbed areas, and invasive plant removal.

Dr. Jeffrey M. Black
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My research involves quantification of how individuals cope with the constraints imposed by their environment while striving to survive and reproduce. In animal systems where human activity adds to the set of natural constraints studies of behavioral repertoires can be classified under the realm conservation and management. I work with a set of MSc candidates that enroll in our Wildlife Program to address these kind of studies primarily in the Waterfowl Ecology Research Group as outlined on my website.

Dr. Daniel T. Blumstein
Assistant Professor of Biology, Department of Organismic Biology, Ecology & Evolution, 621 Charles E. Young, Drive South, University of California Los Angeles, Los Angeles, CA 90095-1606, USA, (310) 267-4746 marmots@ucla.edu
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I am a behavioral ecologist broadly interested in the evolution of social and antipredator behavior. My research has several themes: it is broadly interdisciplinary; it combines *in situ, ex situ*, and comparative studies; it uses the process of research to educate students and members of the community about science; and it integrates theory with applied biology. Current work focuses on three questions: 1) developing predictive models of the persistence of antipredator behavior under relaxed-selection; 2) understanding the evolution of complex communication and sociality; 3) developing an empirically-derived evolutionary ecology of fear. Additionally, I am the principle investigator on a project that develops JWatcher--a freely distributed program to quantify and analyze behavior. My conservation behavior experience includes both theoretical reviews which highlight and identify the relevance of behavioral knowledge for conservation questions, as well as theoretical and empirical work focusing on ways to increase reintroduction success. I am a member of the IUCN Reintroduction Specialist Group. I work with marmots, kangaroos, wallabies, and birds.

Dr. Justin Brashares
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Ecology and conservation; behavioral correlates of population persistence in mammals; behavioral ecology and conservation of large mammals and birds in East and West Africa; impact of over-exploitation on ecology and behavior of mammal and bird species and species interactions. Graduate students will be considered for work on behavior and conservation in Africa and California, and possibly elsewhere.

Dr. Richard Buchholz
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http://home.olemiss.edu/~byrb/

I study the adaptive function of multiple sexual signaling structures primarily in birds. I am also exploring how variation in animal behavior impacts the conservation of isolated and fragmented populations.

Dr. Tim Caro
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Edited a book entitled Behavioral Ecology and Conservation Biology, Oxford University Press, 1998. I am interested in innovative and specific projects that link behavioral ecology and conservation biology.

Dr. Colleen Cassady St. Clair
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I work at the interface between Behavioural Ecology and Conservation Biology by studying the movement behaviour of animals living in human-altered landscapes. Recent work with my students concerns the way animals assess and respond to habitat barriers and corridors. My group is also studying the relative importance of landscape configuration to species distribution and population parameters by comparing these landscape effects to small-scale habitat selection and large-scale weather phenomena. A final aspect of this research assesses the potential to use behavioural manipulation, such as aversive conditioning, to solve management problems that stem from changes to the movement and distribution of animals in fragmented landscapes.

Dr. Stephen B. Hager
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I am interested in understanding population dynamics in anurans using breeding chorus indices at a biological field station in North central Illinois, Green Wing Environmental Laboratory. I would be interested in collaborative projects with graduates and undergraduates, but mostly I want to plug Green Wing Environmental Laboratory, a member of the Organization for Biological Field Stations (OBFS), as a potential site for anuran conservation research for anyone interested. Visit this for more info:
http://www.obfs.org/Members/Stations/IL_Green_Wing_.html

Dr. Kay E. Holekamp
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Research in my laboratory focuses on mammalian behavioral development and its physiological substrates. My students and I are currently investigating how social, ecological, and endocrine variables interact during an individual's early development to influence its subsequent behavior and its reproductive success as an adult. We have been working lately on study of mammalian dispersal movements, interspecific competition among large African carnivores, and effects of anthropogenic activity of various sorts on the behavior, development and reproduction of large carnivores.

Dr. Devra Kleiman
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Social behavior of mammals and interface of animal behavior and conservation science. I take grad students.

Dr. Tom A. Langen
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www.clarkson.edu/~tlangen

Current research focuses on the impact of roads on turtles, frogs, and other organisms associated with wetlands. This research includes detailed demography, analysis of dispersal movements, and landscape ecology. I welcome applications for graduate work - we have a new program in interdisciplinary environmental science at Clarkson University.

Dr. Don Moore
Wildlife Conservation Society, Prospect Park Zoo, 450 Flatbush Ave, Brooklyn, NY 11225, USA, (718) 399-7310 dmoore@wcs.org http://wcs.org/

Reproductive synchrony in endangered deer and other species, and other reproductive/life history behavioral characteristics, and how these relate to conservation in nature; natural history of a species and how this can inform daily husbandry of zoo animals, especially those in cooperative restoration programs; and behavioral pathologies and how to address these in captive animals that are part of cooperative endangered species restoration programs. I am interested in recruiting undergraduate or graduate interns to collaborate on research in situ or ex situ. Adjunct Professor at Hunter College (New York City), Dept Psychology, graduate focus in Animal Behavior and Conservation.

Dr. Mike Mooring
Associate Professor, Point Loma Nazarene University, 3900 Lomaland Drive, San Diego, CA 92106, USA, (619) 849-2719 mikemooring@ptloma.edu

Ungulate behavioral ecology. Long-time interest in behavioral adaptations to parasites (e.g., tick defense, grooming and fly-repelling behavior). More recent work on predation risk, sexual segregation, and behavioral endocrinology. Current research is exploring sexual selection and communication, specifically, sexually-selected signal assessment in bison. This work involves acoustical and fecal steroid analyses to explore acoustical, chemical, and visual signals during the rut. Most of this work is done on national or state wildlife refuges in collaboration with management agencies, such as the US Fish and Wildlife Service. Applied aspects of my research aim at assisting conservation efforts. In the past few years, my work with bighorn sheep and bison has investigated habitat use, predation risk, sexual segregation, population parasitology, forage selection and nutritional analysis, and reproductive endocrinology to assist management goals and policy. My current research on a national wildlife refuge is collecting data on reproductive success of the bison herd in order to calculate effective population size, needed to estimate the minimum population size required to avoid future genetic loss and risk of extinction. I work with undergraduates at my institution (which has no graduate program in the sciences) through a well-established summer research program, in which students work with me for 10 weeks of the summer. I am willing to co-mentor graduate students who are interested in this work.

Dr. Stephen Mullin
Assistant Professor, Department of Biological Sciences, Eastern Illinois University, Charlston, IL 61920, USA, (217) 581-6234 cfsjm@eiu.edu
http://www.ux1.eiu.edu/~cfsjm/

On-going research includes projects concerning (a) predator-prey interactions where one or both species are introduced; and, (b) foraging ecology of threatened or rare species. I would welcome inquiries from prospective Master's of Science (thesis only) students.

Dr. Raleigh J. Robertson
Professor of Biology, Baillie Family Chair in Conservation Biology and Director, Queen's University Biological Station, Department of Biology, Queen's University, Kingston, Ontario, Canada K7L 3N6, (613) 533-6140
robertsr@biology.queensu.ca http://biology.queensu.ca/~robertsr/

Behavioural ecology, mating systems and conservation biology of birds.

Dr. Bruce A. Schulte
Associate Professor of Biology, Georgia Southern University, Box 8042, Georgia Avenue, Statesboro, GA 30460-8042, USA, (912) 681-5807
bschulte@georgiasouthern.edu http://www.bio.gasou.edu/bio-home/Schulte/Schulte-home.html

I study communication and signal theory, reproductive behavior and sexual selection, the interaction of forage selection and social dynamics, and related aspects of conservation biology. My primary species of study are beavers, elephants and manatees.

Dr. Rebecca Snyder
Curator of Giant Panda Research and Management, Zoo Atlanta, 800 Cherokee Ave SE, Atlanta, GA 30315, USA, (404) 624-5623 rsnyder@zooatlanta.org
www.zooatlanta.org

My research focuses on proximate mechanisms underlying three types of complex social behavior in giant pandas, courtship and mating, maternal behavior, and social play. Currently, I am investigating hormonal and developmental variables that contribute to the expression of these behaviors.

Dr. Judy Stamps
Professor, Evolution and Ecology, University of California Davis, Davis, California 95616, USA jastamps@ucdavis.edu

My students and I are interested in general principles of habitat selection that are relevant to problems in conservation and population biology. For instance, we are studying situations and species in which experience in a natal habitat increases the chances that a disperser will select that same type of habitat after dispersal, a phenomenon called habitat preference induction.

Dr. John P. Swaddle
Assistant Professor, Biology Department College of William and Mary, Williamsburg, VA 23187-8795, USA, (757) 221-2231 jpswad@wm.edu
http://fsweb.wm.edu/jpswad/

Our lab researches how developmental conditions influence the behavior and fitness of individuals. In terms of conservation work, we are studying how land management practices affect the development, behavior, fitness and life history of bird populations. We have a very active lab of undergraduate and graduate students and are always looking for student collaborators and Master students to join our program at the interface of animal behavior and conservation.

Dr. Ronald R. Swaisgood
Center for Reproduction of Endangered Species, Zoological Society of San Diego, P. O. Box 120551
San Diego, CA 92112, USA, (619) 744-3372 rswaisgood@sandiegozoo.org

I am a broadly trained behavioral ecologist seeking avenues to apply my expertise in support of conservation efforts. I have been employed at the Center for Reproduction of Endangered Species (CRES), Zoological Society of San Diego since 1995. I maintain several active projects, primarily with the giant panda and rhinoceros species. For the past few years I have spent several months each year at the panda breeding center in the Wolong Nature Reserve (China) conducting studies aimed at improving captive breeding and building base knowledge for potential use in conservation of wild populations. Research areas include chemical communication, mate choice, reproductive behavior, stress, well-being, enrichment, and maternal care. I also have conducted studies of reproductive behavior and physiology and chemical communication in the southern and northern white rhino and Indian rhino in captive settings, seeking to determine the cause of reproductive failure in the F2 generation. For the past three years I have conducted a similar study with white rhino in Umfolozi Game Reserve, South Africa. More recently, I have been involved in a research program examining the use of scent communication to reduce aggression and fight-related mortalities in translocated black rhino in Namibia and South Africa. I also maintain an active program with the pygmy loris, studying chemical communication, mate choice and reproductive behavior.

Dr. Liang Wei
Associate Professor, Department of Biology, Hainan Normal University, Haikou 571158, Hainan Province, P. R. China, +86-898-65890520 liangw@hainan.net
http://www.hainnu.edu.cn/yuanxisz/teacher/liangwei.htm

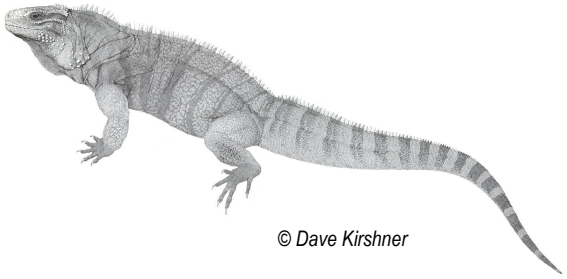
Foraging and flocking behavior and conservation of Golden pheasant Chrysolophus pictus, and Hainan hill partridge Arborophila ardens.

Excerpts from back issues

To access back issues of The Conservation Behaviorist, visit http://www.animalbehavior.org/ABS/Conservation/ccConsBeh.html

2003 Volume 1 Number 1

Paz-y-Miño C., G. **Contribution of Animal Behavior Research to Conservation Biology**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"…To assess the contribution of behavioral paradigms in conservation studies, I identified and evaluated 277 articles (N=1631) published in Conservation Biology between 1987 and 2002 that were directly related to animal behavior and conservation. Four main areas of behavioral research were commonly addressed in these studies: dispersal and settlement, reproductive behavior and social organization, species interactions, and foraging/feeding and pollination. These areas have helped biologists to understand and alleviate conservation problems such as extinction of endangered species and biodiversity loss, habitat destruction and ecosystem management and restoration..."

2003 Volume 1 Number 2

Paz-y-Miño C., G. **Behavioral Unknowns: An Emerging Challenge for Conservation**

"In 1995, Norman Myers defined 'Environmental Unknowns' as those problems we had not even identified as yet but for which we were all accountable. Examples included climate change, mass extinctions, and ozone layer depletion… As data become available and environmental public awareness grows, new 'unknowns' are emerging. One such 'surprise' is the impact of global disruptions on the behavior of animals… 'Behavioral unknowns' are emerging at a time when ethological data are most needed for captive breeding of endangered species, reintroduction programs, and habitat restoration. Yet, despite Myers' previous warnings, we have been taken by surprise. For too long, we have omitted behavior from the list of 'things to be done' to keep our Planet running. Behaviorists have much to contribute to conservation."


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Alberts, A. **Kidnapping the Don Juans of Guantánamo**

"Temporary removal of dominant male rock iguanas (genus Cyclura*) and careful manipulation of a population's social structure could help conservation behaviorists reduce the effects of inbreeding. The technique may be most effective for small genetically-compromised endangered species that show strong polygyny, with a few dominant males monopolizing territories and females. After the 'Don Juans' are removed from their home ranges, new males take over their roles and females have access to a more diverse set of mates…"*

2004 Volume 2 Number 1

McPhee, M. E. & Silverman, M. **Behavioral deficiencies and the reintroduction of animals into the wild**

"When captive-bred animals are released to re-establish or supplement a wild stock, reintroduced populations show behavioral deficiencies. Absence of anti-predator behavior, difficulty recognizing and finding food, and inadequate social skills, compromise the success of reintroductions. How many animals should be released to compensate for mortality caused by behavioral deficiencies? In this article, the authors discuss a method to estimate a "release ratio," a figure that considers the effects of behavioral deficiencies and can help us estimate the number of animals needed for successful reintroductions."