The Conservation Behaviorist

Jason South, student at the University of Maryland, College Park, receives the "E. O. Wilson Conservation Award"

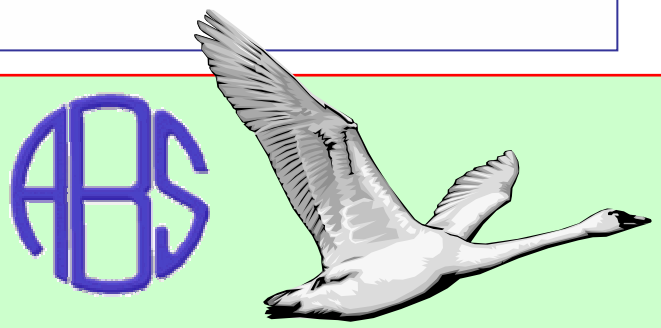
"…Behavioral ecology has been my main intellectual interest since my early

undergraduate days. However, I am morally compelled to work in an area [Bornean rainforest] with some relevance to nature conservation. I was persistent -and lucky- enough to develop a project that represents a 'best of both worlds' scenario…" said South when learning his proposal *"Behavioral responses of treeshrews to selective logging on Borneo"* will be funded by the ABS Student Research Grant Program and he will receive the E. O. Wilson Student Research Grant for Conservation.

South's study will examine territoriality, mating system evolution, dispersal patterns, and genetic diversity of the Large Treeshrew, *Tupaia tana*, in relation to logging of lowland rainforest habitat in Borneo. The study will integrate basic animal behavior research with practical implications for conservation.

The acceleration of timber production in Southeast Asia, particularly in Borneo, makes research in production forests an urgent necessity. In South's opinion, ceasing timber harvesting is not politically or economically viable, so research efforts should focus on the behavior, demography, and evolutionary processes of wildlife in logged forests with the ultimate goal of estimating and managing long-term persistence in these habitats.

(see Award page 6).



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. 1, May 2004

In this issue

Conservation Tips By Daniel T. Blumstein

Is there anything a behaviorist can do to help conservation?

Develop and test predictive models of animal behavior that apply to endangered and non-endangered species. Predictive models will be useful when managers are faced with managing an endangered species for which little information is known. While not a substitute for detailed study of the endangered species, predictive models may help highlight behaviors that influence demographic parameters, such as infanticide or reproductive suppression.

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.

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Zoological Society of San Diego
Ilonka von Lippke
University of California Los Angeles

Interact with the Conservation Committee

Send letters, announcements, comments and contributions to The Conservation Behaviorist
pazymino@unlserve.unl.edu
Deadlines for articles are the 15th of the month preceding the next news update. The next deadline is **October 15th**. Contributions submitted by members of the Animal Behavior Society and judged 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

Mentors in Conservation Behavior

Do you conduct research at the interface animal behavior-conservation science?

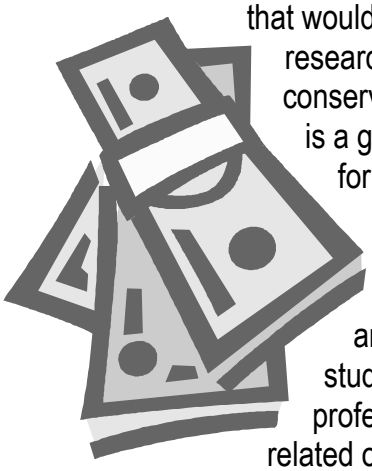
The Animal Behavior Society Conservation Committee is creating a data base of individuals (professors or scientists affiliated with academic institutions) who conduct research in animal behavior and conservation. The data base will be available to the public (particularly to graduate and undergraduate students looking for academic programs, research assistantships, internships, or summer programs) at the ABS-CC website.

If you think that your name should be included in this data base, contact pazymino@unlserve.unl.edu

Looking for funding?

Animal Behavior-Conservation Related Funding Institutions

Debra M. Shier and the ABS-Conservation Committee have compiled a list of more than 60 institutions (with their corresponding www links) that would consider funding research proposals from conservation behaviorists. This is a great source of information for a broad audience, including professors in academia and teaching institutions, graduate and undergraduate students, as well as professionals in conservation-related organizations. To access this data base, visit the CC website http://www.animalbehavior.org/ABS/Conservation/ccfunding.html



Behavior & Conservation at the 2004 ABS Meetings

ANIMAL BEHAVIOR SOCIETY
XLI MEETING
OAXACA, MÉXICO 2004

Environmental Impacts and Behavior

Symposium Organized By
Gil Rosenthal (Boston University) &
Salvador Contreras-Balderas (Universidad Autónoma de Nuevo León)

Behavior is a bellwether of the viability of animal populations. The most immediate and visible responses to a disturbance are usually behavioral. Environmental changes can also severely impair critical behaviors even if they have no detectable physiological or toxicological effect. Conversely, human-induced disturbances can serve as powerful, if unfortunate, experimental models in behavioral ecology. The symposium will address the impact of species introductions and habitat alteration on social structure, foraging behavior, mate choice, and communication. The symposium will be particularly topical in light of the meeting's location in Oaxaca. Developing countries host a disproportionate share of the world's threatened biodiversity. A major goal of this symposium will be to increase awareness of the centrality of behavior to conservation. Behavioral methods can also provide an economically feasible research tool to scientists from the developing world. Finally, animal behavior has historically been underrepresented in Mexican biology. By linking behavior to the better-populated field of conservation biology, we hope to stimulate behavioral research in the Mexican scientific community.

Speakers & Topics for Discussion

Salvador Contreras-Balderas, Universidad Autónoma de Nuevo León, Species introductions and behavior: a perspective from Mexican ichthyology
Sharon Downes, Australian National University, Cascading behavioral responses to habitat degradation
John Eadie, University of California Davis, From landscapes to loci: disturbance, demography, behavior and the link to local population genetic structure
Francisco Garcia de León, Technological Institute of Ciudad Victoria, Environmental degradation and behavioral evolution: insights from a hybrid zone
Astrid Kodric-Brown, University of New Mexico, Mate choice, hybridization, and species introductions
Gil Rosenthal, Boston University, Coral reef extinction and behavior: a very long-term view of reef fish evolution
Michael Singer, University of Texas, Ecological and evolutionary consequences of human-induced maladaptation of food choice in butterflies
Hans Slabbekoorn, Leiden University, Communication strategies in altered environments
Andy Suarez, University of Illinois, Behavioral mechanisms of success in biological invasions
Pamela Yeh, University of California San Diego, Behavioral adaptations to urbanization

For additional information contact gil@bu.edu or saconbal@axtel.net

Perspectives

Developing a Career in Conservation Behavior

By Daniel T. Blumstein

"Many of the inquiries I receive from prospective graduate students are from people who have interest in conservation behavior. However, most have vague notions of what conservation behavior is. This is -in itself- an important reason to embrace new disciples and mentor them", says Blumstein

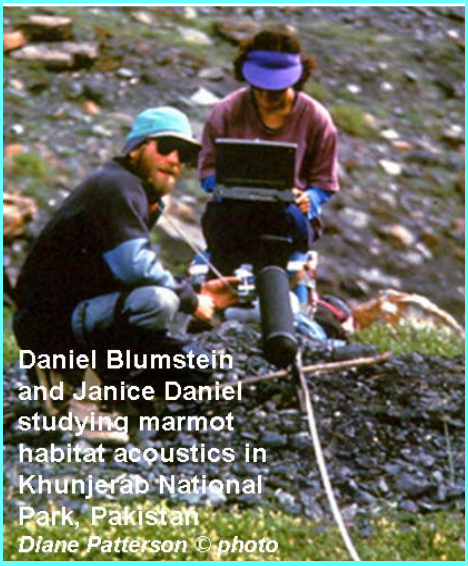
I define conservation behavior as the application of general principles of behavior to help conserve or manage wildlife populations. Others have different definitions. Such is the excitement associated with working in a growing field.

Enthusiasts usually seek the hands-on opportunity to prevent the extinction of endangered species. This is an admirable goal. Others gravitate toward studying theoretical questions that may not turn into immediate conservation outcomes, but that will influence future decisions. From my perspective, there are several ways to contribute to conservation behavior. I do believe, however, that obtaining a broad and strong education is not only crucial for good conservation-decision making but also a smart career move. Here is my advice:

First, obtain an integrative education in Tinbergian behavior while also studying ecology (particularly population biology) and conservation science. Broadly studying behavior at multiple levels of analysis (i.e. mechanisms, ontogeny, function, evolution) should help with integration later on in your career. A working "vocabulary" of population biology is essential because it is the *lingua franca* for many wildlife biologists. After all, to save species, we have to know the status of their populations, predict how many individuals we'll have in the future, and plan strategies to conserve and manage them. Population biology principles have proven to be essential in conservation plans.

Daniel Blumstein trapping marmots as they emerge from hibernation
Claire Zugmeyer © photo

Second, study some topic of behavioral interest and simultaneously work on a conservation problem. When I was a graduate student interested in studying marmots in a high-alpine national park in Pakistan, I was told by a wildlife conservation biologist that working with marmots would contribute nothing to conservation! I believed then, as I do now, that I could contribute to conservation with my research. While addressing questions about marmot communication and anti-predator behavior (nowadays essential topics in reintroduction and management plans), I also worked with the local community who sought help protecting the land and managing the park. I documented the biodiversity of this spectacular alpine ecosystem. I interacted with managers, non-governmental organizations, and government officials lobbying on the park's behalf. Now, I realize in retrospect that my theoretically-interesting behavioral studies did, in fact, have conservation relevance, and that they prepared me intellectually for future work.



Daniel Blumstein and Janice Daniel studying marmot habitat acoustics in Khunjerab National Park, Pakistan
Diane Patterson © photo

Third, study some facet of behavior in an endangered species. But remember that everyone working with endangered species loses some aspect of control over the research. Sample sizes with endangered species are often distressingly small, and some research techniques might in fact harm animals. I believe it's often preferable to first gain experience working with non-endangered species and then apply this knowledge to extinction-risk prone taxa. Moreover, working with endangered species usually involves interacting with other professionals, including veterinarians, managers, government officials, and other scientists whose decisions could influence your work, delaying it or even jeopardizing the completion of the research. I have learned through my own work that studying endangered species should be left for those that already have a degree under the belt. But of course there must be exceptions.

We live at an exciting time. Conservation behavior, as a new area of common work, is just emerging, and students today will be who make fundamental contributions tomorrow.

*Department of Organismic Biology, Ecology and Evolution, University of California Los Angeles, marmots@ucla.edu

Feature Article

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.

By M. Elsbeth McPhee* & Emily Silverman#

As wildlife populations continue to decline, the number of captive breeding and reintroduction programs aimed at conserving endangered species increases. The efficacy of these programs, however, still generates debate. In a number of recent reintroductions –e.g. golden lion tamarins, black- and white-ruffed lemurs, thick-billed parrots, and African wild dogs– behavioral deficiencies (e.g. absence of anti-predator behavior, difficulty in recognizing and finding food, and inadequate social interactions) have caused numerous fatalities.

Selective pressures in a captive environment differ from those in the wild. Over time, captivity causes the variability and average expression of population traits to change. Some animals do not survive reintroductions because their behaviors, and the morphological traits directly associated with the performance of behaviors, are functional in captivity but not in the wild. Unless individuals with behavioral traits similar to wild animals can be released, an increased number of captive-bred animals will need to be reintroduced to compensate for the mortalities caused by behavioral deficiencies, and thus meet the targeted wild-population size (the minimum number of survivors required for the population to persist).

Consider the following case study. Captivity affects the natural behavior of old-field mice (*Peromyscus polionotus*). When exposed to an owl silhouette in the laboratory (a simulated predator), captive-bred animals take more time than their wild-born counterparts to seek protection inside a burrow. We have documented that the time it takes a mouse to enter a burrow after seeing the owl silhouette and the variability associated with response time is greater for mice from populations that have been in captivity for several generations. If we want to release captive-bred mice to successfully restore a population in the wild, we must assume that some of the released animals will probably die due to lack of appropriate anti-predator responses. How many animals should we release to compensate for the expected increase in mortality? For years, the answer to this question has remained elusive. We have recently developed a mathematical method to estimate a "release ratio," a value that tells us the number of individuals we should release after taking into consideration potential mortality caused by behavioral deficiencies. Our calculations indicate that the release of 120 captive-bred mice is equivalent to releasing 100 wild-like animals (see supplement).

Each case imposes unique challenges. More data are needed to develop a quantitative approach to reintroduction planning. Our release ratio is an important step toward ensuring that the optimal number of animals is released, thus increasing the probability of success of reintroduction programs.

Supplement: Release Ratios

To calculate the release ratio, R, we need to define the traits of interest and specify their distributions. Then, we must determine the range of trait values associated with high survival rates in a wild environment; this is the target-trait range. The release ratio is calculated as $R = P_w / P_r$*, where* P_w *is the proportion of the wild population that falls within the target-trait range, and* P_r *is the proportion of the captive-bred released population that falls within that same range.*

In the case of the old-field mouse, there is a significant increase in the mean and variance of time that it takes a mouse to enter a burrow after seeing a simulated predator as generations in captivity increase. These data appear to be exponentially distributed: the sample mean and standard deviation are close in value (wild mean = 9.6 sec, wild standard deviation = 8.4 sec, release mean = 15.1 sec, release standard deviation = 14.6 sec), and the null hypothesis of an exponential distribution cannot be rejected for either. In this case, we calculate R to ensure a sufficient number of individuals at the lower tail (i.e. the "fast" end) of the trait distribution. Thus, we define the target-trait range as zero to one standard deviation above the wild mean. In other words, the target-trait range includes all animals that take between 0 and 18.1 sec to get into the burrow. Using calculations developed for exponentially distributed data, we found that, for time to burrow, the release ratio for one standard deviation above the mean is 1.2 (for 0 and 2 standard deviations, R = 1.3 and 1.1, respectively). Therefore, if we plan a reintroduction of old-field mice and our goal is to have the same number of released animals in the target-trait range as expected from the release of 100 wild individuals, we should release 120 captive-bred mice to compensate for morality caused by behavioral deficiencies.

* Department of Biology, University of Missouri St. Louis
mcpheeme@umsl.edu
School of Natural Resources and Environment, University of Michigan
esilver@umich.edu

Award

continued from page 1

"Jason is highly motivated to pursue a career that applies behavioral ecological principles to international conservation efforts" says advisor **Jerry Wilkinson**, professor at the University of Maryland. Wilkinson is confident that Jason is poised to complete an excellent project and will take full advantage of the funds and recognition the award will provide. **Devra Kleiman**, co-advisor and researcher at the Smithsonian Zoological Park, agrees: "Jason is incredibly diverse in his research interests and melds theory and practice brilliantly."

The Conservation Behaviorist talked with Jason South about the E. O. Wilson Conservation Award; here is what he said:

What was your immediate reaction when learning you got the E.O. Wilson award?

"I was extremely delighted to be associated with an award named after one of the most significant figures of the field of biodiversity conservation."

What do you think about the award? Will it encourage students to present more proposals with conservation content?

"The award is an excellent and overdue idea. Graduate students may also be encouraged to present their conservation-related research at ABS meetings, and submit their papers to Animal Behaviour rather than other journals."

Why do you work in the interface of animal behavior-conservation biology?

"Behavioral ecology has been my main intellectual interest since my early undergraduate days. However, I am morally compelled to work in an area [Bornean rainforest] with some relevance to nature conservation. I was persistent -and lucky- enough to develop a project that represents a 'best of both worlds' scenario: 'Behavioral responses of treeshrews to selective logging on Borneo.'"

How did you become interested in working overseas? Why with treeshrews?

"I grew up with a strong awareness of tropical rainforests and wildlife through books and popular media, and always had the intention of pursuing studies in the behavioral ecology of tropical species. By a twist of fate I ended up conducting studies on an introduced population of subtropical parrots on the south side of Chicago. However, I never lost my desire to study rainforest species, and applied to graduate school with this goal in mind."

Treeshrew
Jo Annah Jensen © photo

"During college I also took several classes related to the history, politics, and sociology of East and South Asia. I realized that these societies are truly at a turning point in terms of economic and societal development, perhaps more than anywhere else at the current time and in the near future, and decided that I wanted to be involved in the conservation of this region's globally-important and extremely-threatened biological resources. My search for appropriate graduate programs and advisors turned up few opportunities for Americans to study in the Indomalayan tropics, so I enrolled in a department [Biology at the University of Maryland, College Park] that would allow me to develop my own contacts and research program in Asia."

"After enrolling in graduate school, I started developing a series of ideas related to variation of mating behavior along gradients of ecological disturbance. The first significant field study of Bornean treeshrews ('Tupai: A Field Study of Bornean Treeshrews'*) happened to be published at a serendipitous time by a well known scientist. After reading the entire book in two days and talking to the author, Louise Emmons, I realized I had found an excellent group of species and habitats for my dissertation. I am now testing hypotheses related to the evolution of social monogamy by examining variation in territoriality and mating systems of treeshrews in primary rainforest and recently logged forests in Borneo."*

How do you see yourself in the future? Academic work? Conservation-oriented work?

"Ideally, I would like to be employed as an academic conservation biologist. Such a position would allow me the flexibility and freedom to develop an international collaborative research program in behavior and conservation research with Asian colleagues. If the right opportunity to work in a scientific capacity with a non-governmental organization devoted to conservation presents itself (or if academia doesn't work out!), then I will be happy to devote my energies outside of the 'academy.'"

The E. O. Wilson Award

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 science and conservation component.

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 contact the **Conservation Committee** pazymino@unlserve.unl.edu or the **Student Research Grant Committee** plsch@ou.edu

Publications in Conservation Behavior

J. Cully Nordby and the ABS-Conservation Committee have compiled this list of review and conceptually based publications on the interface of conservation and behavioral biology. These references provide an overview on how conservation efforts have been aided through a better understanding of behavior. These references are not an exhaustive list nor are they intended to present empirical papers or case studies. For an electronic version of this list, visit http://www.animalbehavior.org/ABS/Conservation/index.html

Books and Edited Volumes

Caro, T. (ed.). 1998. Behavioral Ecology and Conservation Biology. Oxford University Press, New York, New York.

Clemmons, J.R., and R. Buchholz (eds.). 1997. Behavioral Approaches to Conservation in the Wild. Cambridge University Press, New York, New York.

Festa-Bianchet, M. and M. Apollonio (eds.) 2003. Animal Behavior and Wildlife Conservation. Island Press, Washington, D.C.

Gosling, L.M., and W.J. Sutherland (eds.). 2000. Behaviour and Conservation. Cambridge University Press, New York, New York.

Sutherland, W.J. 1996. From Individual Behaviour to Population Ecology. Oxford Series in Ecology and Evolution. Oxford University Press, New York, New York.

Symposia Proceedings

Helfman, G. S. (ed.) 1999. Behavior and fish conservation. *Environmental Biology of Fishes*. 55, 7-201. [15 contributed papers]

Ulfstrand, S. (ed.) 1996, Behavioural ecology as a tool in conservation biology. *Oikos*. 77, 183-237. [7 contributed papers]

Reviews and Opinion

Anthony, L. L. and Blumstein, D. T. 2000. Integrating behaviour into wildlife conservation: the multiple ways that behaviour can reduce N_e. *Biological Conservation*, 95, 303-315.

Blumstein, D.T. 2002. Moving to suburbia: ontogenetic and evolutionary consequences of life on predator-free islands. *Journal of Biogeography*, 29, 685-692.

Blumstein, D.T. 1998. Female preferences and effective population size. *Animal Conservation* 1:173-177.

Caro, T. M. 1999. The behaviour-conservation interface. *Trends in Ecology and Evolution*, 14, 366-369.

Curio, E. 1996. Conservation needs ethology. *Trends in Ecology and Evolution*, 11, 260-263.

Fisher, B. L. 1998. Insect behavior and ecology in conservation: preserving functional species interactions. *Annals of the Entomological Society of America* 91: 155-158.

Fenton, M.B. 1997. Science and the conservation of bats. *Journal of Mammology*, 78, 1-14 .

Goss-Custard, J.D. and Sutherland, W.J. 1997. Individual behaviour, populations and conservation. In J.R. Krebs and N.B. Davies (eds.) Behavioural Ecology: an Evolutionary Approach 4th ed. pp. 373-395 Blackwell Science: Malden, Massachusetts.

Griffin, A. S., Blumstein, D. T. & Evans, C. S. 2000. Training captive-bred or translocated animals to avoid predators. *Conservation Biology*, 14, 1317-1326.

Harcourt, A. H. 1999. The behaviour-conservation interface. *Trends in Ecology and Evolution* 14, 490.

Hofer, H. and East, M.L. 1998. Biological conservation and stress. *Advances in the Study of Behavior*, 27, 405-525

Holway, D. A. and Suarez, A. V. 1999. Animal behavior: an essential component of invasion biology. *Trends in Ecology and Evolution*, 14, 328-330.

Kokko, H. and Sutherland, W. J. 2001. Ecological traps in changing environments: ecological and evolutionary consequences of a behaviorally mediated Allee effect. *Evolutionary Ecology Research*, 3, 537-551.

Lindburg, D. G. and Fitch-Snyder, H. 1994. Use of behavior to evaluate reproductive problems in captive mammals. *Zoo Biology*, 13, 433-445.

Lima, S. L., and Zollner, P. A. 1996. Towards a behavioral ecology of ecological landscapes. *Trends in Ecology and Evolution*, 11, 131-135.

Reed, J. M. 1999. The role of behavior in recent avian extinctions and endangerments. *Conservation Biology* 13, 232-241.

Reed, J. M. and Dobson, A. P. 1993. Behavioural constraints and conservation biology: conspecific attraction and recruitment. *Trends in Ecology and Evolution,* 8, 253-256

Rice, K. J. and Emery, N. C. 2003. Managing microevolution: restoration in the face of global change. *Frontiers in Ecology and the Environment*, 1, 469-478.

Rubenstein, D. I. 2001. Social behavior. *Encyclopedia of Biodiversity*, 5, 295-303.

Schlaepfer, M. A., Runge, M. C. and Sherman, P. W. 2002. Ecological and evolutionary traps. *Trends in Ecology and Evolution*, 17, 474-480.

Shepherdson, D. J. 1994. The role of environmental enrichment in the captive breeding and reintroduction of endangered species. In: *Creative Conservation: Interactive Management of Wild and Captive Animals*. Mace, G., Olney, P. J. S. & Feistner, A. (eds.), pp. 167-177. Chapman & Hall: London.

Shumway, C. A. 1999. A neglected science: applying behavior to aquatic conservation. *Environmental Biology of Fishes*. 55: 183-201.

Stockwell, C. A., Hendry, A. P. and Kinnison, M. T. 2003. Contemporary evolution meets conservation biology. *Trends in Ecology and Evolution*, 18, 94-101.

Strier, K.B. 1997. Behavioral ecology and conservation biology of primates and other animals. *Advances in the Study of Behavior* 26:101-158.

Sutherland, W. J. 1998. The importance of behavioral studies in conservation biology. *Animal Behaviour*, 56, 801-809.

Wedekind, C. 2002. Sexual selection and life-history decisions: Implications for supportive breeding and the management of captive populations. *Conservation Biology*, 16, 1204-1211.

Yahner, R. H. and Mahan, C. G. 1997. Behavioral considerations in fragmented landscapes. *Conservation Biology* 11, 569-570.

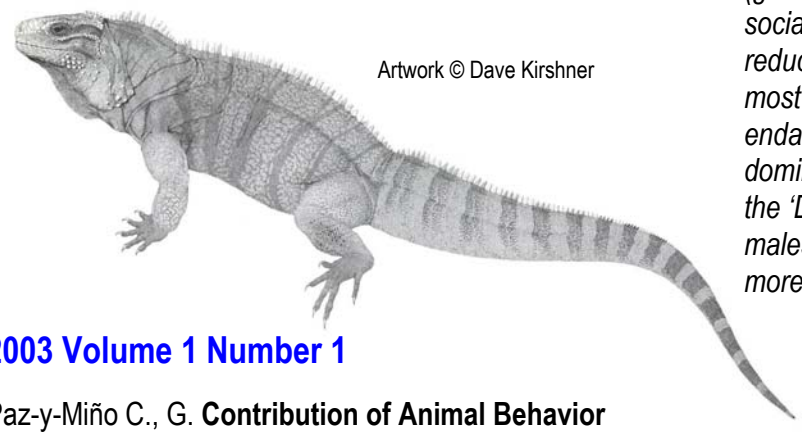
Articles

Knight, J. 2001. If they could talk to the animals. *Nature*, 414, 246-247.

Fox, D. 2003. Behavior and conservation: More than meets the eye. *Conservation in Practice*, 4, 20-29.

Excerpts from back issues

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



Artwork © Dave Kirshner

2003 Volume 1 Number 1

Paz-y-Miño C., G. **Contribution of Animal Behavior Research to Conservation Biology**

"…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**

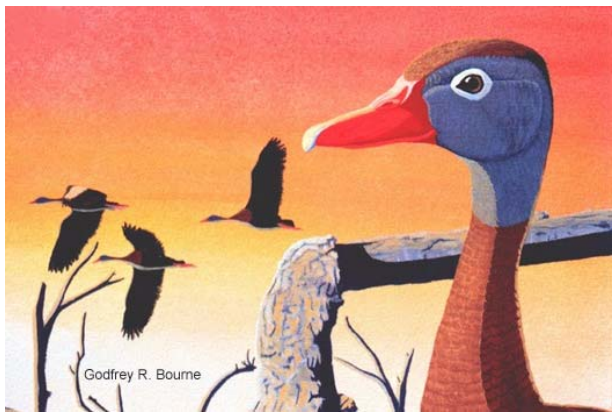
"In 1995, Norman Myers defined 'Environmental Unknowns' as those problems we had not even identified as yet but for which we were all accountable. Examples included climate change, mass extinctions, and ozone layer depletion… As data become available and environmental public awareness grows, new 'unknowns' 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."

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…"*

Art Gallery

Godfrey R. Bourne, behavioral ecologist and conservation biologist at the University of Missouri St. Louis, is also an artist. Learn more about professor Bourne and his artwork© at:
http://www.umsl.edu/%7Ebiology/faculty/bourne.html
http://www.umsl.edu/%7Ebiology/paintsale.html



Black-bellied Whistling Duck

Tricolored Heron