

A Tribute to Devra Kleiman, a Pioneer in Conservation Biology

Devra G. Kleiman died unexpectedly of cancer on 29 April 2010 in Washington, D.C. The news of her death at age 67 generated a spontaneous outpouring of tributes from hundreds of people around the world whom Devra had mobilized on a multitude of paths in conservation and science.

Throughout her 40-year career, Devra Kleiman used innovative scientific approaches to address conservation issues and consistently modeled the collaborative processes that are critical for effective actions. In her own words, her interests and expertise were in “mammalian reproduction and behavior, zoo biology, conservation biology, organization development and institutional strategic planning, and program evaluation.” She authored over 150 scientific and popular publications, lectured widely, and was editor or coeditor of eight books and symposia, including the much referenced *Wild Mammals in Captivity* and *Lion Tamarins: Biology and Conservation*. Over her career, she served as a mentor and advisor for hundreds of students throughout the world.

Devra is perhaps best known for her work with the golden lion tamarin, a small primate endemic to the Atlantic Forest of Brazil. In 1972, when she first became involved with this tamarin, there were at most several hundred animals in the wild and fewer than 75 in captivity. In 1974 Devra assumed responsibility for the tamarin studbook and began a collaborative, international effort to alter this species' trajectory toward extinction. By 1980 the captive population was expanding rapidly, and zoos that owned golden lion tamarins agreed not to sell their stock so the animal no longer would be traded. Zoos that owned golden lion tamarins and those that had the animals on loan formed a consortium to cooperate in research and management. This agreement would become a model for future collaborations among zoos to manage captive populations of species and is seen today in the efforts of the World Association of Zoos and Aquariums and the Conservation Breeding Specialist Group of the International Union for Conservation of Nature (IUCN) to establish standard management concepts for species conservation.

Devra was a founding member of the International Committee for the Conservation and Management of Lion



Photo by Jessie Cohen of the Smithsonian's National Zoo.

Tamarins, which officially advised the Brazilian government on the management of the four species of lion tamarins in captivity and in the wild. She was an active participant in that body until a few days before her death. Devra negotiated the 1990 transfer of ownership to the Brazilian government of all but five golden lion tamarins in captivity. Recently the Brazilian authorities have used the golden lion tamarin model as a template for creation of other international management committees and for regional conservation planning.

In 1972 the Wild Animal Propagation Trust Conference on the Golden Marmoset took place at the National Zoo in Washington, D.C. Devra presented the final paper in the conference, in which she identified the importance of applying reproductive and behavioral science to the issue of captive breeding and laid out the roadmap that was to guide golden lion tamarin research. Devra was one of the early advocates and practitioners of applying science to captive breeding and conservation.

Devra's early research led to increased breeding success in the captive population of tamarins. As the captive population grew, plans began for reintroducing golden lion tamarins to Brazil's first biological reserve, Poço das Antas, which had been gazetted in 1974. Devra's insight was to ensure that ownership of the tamarins and the capacity to manage the wild population remained firmly in Brazilian hands. She was adamant that training and mentoring of Brazilian professionals be central to the effort. The reintroduction process, which began in 1984, eventually involved many Brazilian and international institutions that were informed by research on wild and reintroduced populations, the species' habitat, and the social and economic contexts of their reintroduction.

A critical component of the golden lion tamarin reintroduction program was education. Through teacher training, local community outreach, and partnerships with municipalities, the plight of the golden lion tamarin became a popular preoccupation, and the conservation success evinced national pride. Landowners engaged in the process of preserving the animal, committing tracts of private land for groups of reintroduced tamarins. Translocations of tamarins among these private lands began in 1993. A second federal biological reserve, União, was established in 1997, and in 2002 the process of creating corridors to link reserves and private lands began.

In all, approximately 150 zoo-born tamarins were reintroduced in these reserves and private lands, with the population resulting from these reintroductions now standing at over 600 individuals. Ninety-seven percent of the animals in the latter population were born in the wild. As a result of efforts led by Devra and supported by the work of numerous collaborators, by 2007 the total number of golden lion tamarins in the wild, including the descendants of reintroduced animals, had risen to between 1000 and 2000. Moreover, there were over 480 golden lion tamarins in 140 zoos around the world. In 2003 the IUCN changed the status of the golden lion tamarin from critically endangered to endangered, a clear measure of program success. Devra continued her active involvement in the Associação Mico-Leão-Dourado, the Brazilian nongovernmental organization she helped to create for conservation of the golden lion tamarin, until her death.

Although probably most widely known for her work with the golden lion tamarins, Devra also was a major contributor to our understanding of the evolution of mating

systems, reproductive and social behavior, and communication systems in mammals. Her research contributed substantially to the scientific knowledge about pandas, carnivores, rodents, and sloths. Devra's involvement in research on captive animals, including her emphasis on scientifically based conservation planning, professional education, and international collaboration, became integral components of the conservation strategy for the giant panda.

In 1972, when Ling-Ling and Hsing-Hsing arrived at the National Zoo from China, little was known about panda behavior. The animals were assumed to be solitary and therefore were kept apart in small, plain enclosures. Ling-Ling's four pregnancies between 1983 and 1989 resulted in a stillborn cub and three cubs that died shortly after birth. During this time Devra and her colleagues tracked the pandas' behaviors, concluding that the animals in fact were social. When the National Zoo's second pair of pandas arrived in 2001, the animals were housed together in a large enclosure with diverse features such as trees and pools. In 2005 these pandas produced Tai Shan, the first cub born at the National Zoo that survived beyond birth.

Devra Gail Kleiman was born on 15 November 1942 in the Bronx, New York. She obtained a B.S. in biopsychology from the University of Chicago in 1964 and a Ph.D. in zoology from the University of London in 1969. From 1969 to 1971 she was a National Institute of Mental Health postdoctoral fellow at the Institute of Animal Behavior at Rutgers University, where she also served as assistant professor in the Department of Psychology.

After experiencing hiring biases against women, Devra became one of the Smithsonian National Zoological Park's first female scientists in 1972. She held the position of Reproduction Zoologist until 1979, when she became head of the Department of Zoological Research. She became the National Zoo's Assistant Director for Research in 1984, continuing in that position until 1996, when she became Senior Research Scientist, a position she held until her retirement in 2001.

After retiring Devra turned her focus to facilitation, team building, negotiation, and conflict management, earning a Certificate in Organization Development from the NTL Institute and starting her own consulting business, Zoo-Logic. Devra was one of the earliest advocates for evaluation of conservation efforts and continued her work in this area through 2009. She served as North American Section Chair for the IUCN Species Survival Commission Reintroduction Specialist Group and was a member of IUCN's Primate Specialist Group and the Conservation Breeding Specialist Group. Devra was an elected member of the board of governors of the Society for Conservation Biology from 2003 to 2006. She served as a handling editor for the journal *Conservation Biology* since publication of the journal's first volume in 1987. While still involved with the golden lion tamarin

conservation program, she was an active participant in several other collaborations, including conservation of beach mice in Florida and recovery of Channel Island foxes in California. She also retained her position as adjunct professor of biology at the University of Maryland, a position she held since 1979.

Throughout her illustrious career Devra was always ahead of her peers in the application of science to animal management and captive breeding, the development of cooperative-breeding programs, and the concept of global captive management. She facilitated broad collaborations that included zoos, national governments, and local communities; advanced the science of reintroduction; incorporated education and capacity building into reintroduction and field conservation efforts; and promoted the integration of critical evaluation into conservation initiatives. She consistently embodied creativity, innovation, and collaboration.

We will miss Devra's energetic, fearless, systematic marching into new territory, both geographic and scientific, leading collaborators in pursuit of a conservation goal. We will miss her not-so-gentle prodding to get things done, her outspoken manner, her boisterous laugh, her energy, her interest in our personal lives, and her e-mails.

Romulo Mello, President of the Brazilian Chico Mendes Institute for Conservation of Biodiversity, said, "Devra was highly respected by managers and employees alike throughout our institute, by local communities in Brazil, also by scientists, educators, and conservationists around the world. She was regarded as a visionary leader by anyone who ever worked with her. Devra's contributions to the conservation of the lion tamarins and their habitats since the 1970s, with dedicated and selfless service, were many and varied. She was certainly a key part to the initial movement to raise the lion tamarins' conservation flag. Her contributions to environmental conservation in Brazil will never be forgotten. Devra was a remarkable leader, and knowing her personally... made us well aware of the difference she made in the

lives of so many people, from conservation scientists to the local communities she worked with. Many will miss her."

In March 2010 the Municipal Council of Silva Jardim, Rio de Janeiro, Brazil, voted to award to Devra the Medal of Honor "for her valuable contribution of service to environmental conservation and to the education of the youth of Silva Jardim." The award was presented posthumously to the Associação Mico-Leão-Dourado on 8 May 2010.

Jeremy Mallison said, "It is now the responsibility of all those who have had the privilege to know Devra, and to have worked with her, to keep the flame of her highly motivated conservation spirit alight, as well as to ensure that all those programs that she was involved in continue to flourish and go from strength to strength."

As one of those whose careers in conservation biology were launched through Devra's offer of an opportunity to collaborate, I offer this tribute on behalf of all those conservation biologists whose work and lives she influenced. We will keep her enthusiastic spirit alive by continuing and expanding her legacy of collaborative science-based conservation.

Monetary contributions, in Devra Kleiman's honor, to conservation of golden lion tamarins may be made to Save the Golden Lion Tamarin (online, www.SavetheLionTamarin.org; check, made out to Save the Golden Lion Tamarin in U.S. dollars and mailed to Save the Golden Lion Tamarin, 9604 Garwood Street, Silver Spring, MD 20901, U.S.A.). Please indicate that the contribution is for the Devra Kleiman Fund to Save Golden Lion Tamarins. Also indicate the name to include in the fund's donor registry and the email or mailing address to which an acknowledgment and receipt should be sent.

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