

Endangered Species UPDATE

*Including a Reprint of the latest USFWS
Endangered Species Technical Bulletin*

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School of Natural Resources



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Saving Birds While They Are Still Common

An Historical Perspective

By Stanley E. Senner

More than 90 percent of the 832 species of North American birds that are protected under the federal Migratory Bird Treaty Act are not regularly hunted, nor are they listed as Threatened or Endangered throughout their range (Senner 1986). Although federal efforts directed at hunted or endangered species including the North American Waterfowl Plan and the California condor recovery project get a great deal of attention and resources, current efforts to maintain populations of still common, non-hunted birds are limited, and are not part of an identifiable, well-known program (Senner 1986, 1987).

Although there is increasing awareness that conservation strategies should not focus only on single species or on rare and endangered species (e.g., Myer et al. 1987, Hutto et al. 1987, Scott et al. 1987, Conner 1988), we are a long way from realizing any fundamental changes in the orientation of wildlife conservation programs. The purpose of this article is to provide an historical perspective on federal bird conservation efforts and to suggest some avenues for enhancing and re-orienting those efforts.

People interested in bird conservation in North America are lucky, because most bird species are still common and widespread. Relatively few North American birds are endangered, and many species have populations numbering in the millions or many millions. Abundance, however, does not mean immunity from extinction (e.g., Myers et al. 1987); nor should the mere prevention of extinction be our only goal. The concept of minimum viable populations is useful in defining a "bottom line" below which populations should not drop, but where



Fledgling Flycatcher

S. Johnson

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ever possible, our primary goal should be to maintain populations that approximate historical and ecologically functional (Conner 1988) levels over as much of historical ranges as possible.

Protection From "Taking"

Overall, the prevailing philosophy toward the conservation of migratory nongame birds is that they will prosper if protected from "harvesting" (Jantzen 1984). The roots of this policy of "benign neglect" date back to the turn of the century when the greatest threat to bird populations was the unregulated harvest by market, plume, sport, and subsistence hunters, and egg collectors. Their excesses ultimately led to passage of the Lacey Act in 1900, negotiation of a migratory bird treaty between the United States and Great Britain on behalf of Canada in 1916, and passage of the Migratory Bird Treaty Act (MBTA) in 1918 to implement the treaty (Bean 1983, Senner 1986). These steps firmly established that the protection of migratory birds was a federal responsibility, which is today carried out by the U.S. Fish and Wildlife Service (USFWS) on behalf of the Secretary of the Interior. The crucial point here is that the MBTA gave the government the authority to prohibit the "taking" (shooting, eggging, etc.) of migratory birds. Yet, particularly for non-game birds, no broader role was required or envisioned.

An Expanding Role

In the late 1920's and the 1930's, in response to the devastating effects of drought on waterfowl populations (Mattienssen 1959), the federal government became directly involved in the business of protecting migratory bird habitats. A Migratory Bird Conservation Commission was established to approve the acquisition of habitat areas recommended by the Secretary; waterfowl hunters were required to purchase a stamp to generate funds for habitat ac-

quisition; and a migratory bird treaty was negotiated with Mexico. Not incidentally, the Secretary was also authorized to conduct investigations and publish documents related to North American birds.

On paper at least, the federal role was extended still further in 1940 when President Roosevelt signed the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere. This agreement was designed to protect birds that crossed American boundaries. However, it was not until 1982 that the Secretary was given specific direction and funds to implement the convention with respect to migratory birds (Mason and Raffaele 1986).

Through the first half of the century and into the 1960's, it is fair to say that active federal migratory bird conservation efforts concerned primarily game species, especially waterfowl. Many of these efforts benefitted (and continue to benefit) non-game species through operation of the bird banding and law enforcement programs, and the establishment of refuges. Yet such benefits were largely incidental. It was not until the 1960's that conservation efforts began to broaden.

An important conservation milestone from the standpoint of bird populations grew out of the increasing concern over the effects of pesticides on wildlife. This concern led the Fish and Wildlife Service to initiate the first attempt at a broad-scale monitoring program for breeding songbirds in 1965. The Breeding Bird Survey, as it was named, continues today, and in many respects it is a model program, combining the leadership and expertise of USFWS biologists with the cooperation of volunteer birdwatchers and ornithologists across the continent (results from the first 15 years are presented by Robbins et al. 1987).

Endangered Species

The late 1960's brought passage of the first version of the Endangered Species Act as well as the National Environmental Policy Act, thus launching a decade of activism in which many major environmental protection laws

were established. The Endangered Species Act of 1973 was a landmark in wildlife conservation history. It was an attempt to address the problem of endangered wildlife in a comprehensive way (Bean 1983), and it made the conservation and management of wildlife other than hunted species a major feature of the USFWS agenda. With respect to non-game species, implementation of the Endangered Species Act remains the centerpiece of the USFWS wildlife conservation program.

Hutto et al. (1987:2) were probably correct in pointing out that most people would "find efforts to preserve 200 Kirtland's Warblers more valuable than efforts to maintain a million American redstarts." In fact, this value judgement is fundamental to the Endangered Species Act. The Act's implementing regulations assign the highest listing priority to those species facing the greatest, most immediate threats (Anonymous 1983). Unfortunately, the "imminent danger" approach may be counterproductive, by assuring that no species gets direct conservation attention until the population in question is reduced to a critical level. Arguably, this is exactly what will happen in the case of the Northern Spotted Owl, given the recent USFWS decision to not list this species as either Threatened or Endangered.

Treaties With Japan and the Soviet Union

Migratory bird treaties with Japan and the Soviet Union were ratified in 1972 and 1976, respectively. Both treaties contain important and progressive measures aimed at protecting migratory bird habitats and thus potentially extend the authorities of the USFWS a great deal beyond the earlier treaties with Canada and Mexico (Bean 1983). For example, the Soviet treaty requires that each party identify "areas of breeding, wintering, feeding, and molting which are of special importance" and, to the maximum extent possible, undertake measures to protect these ecosystems." Unfortunately, Congress has never explicitly implemented the habitat-related provisions of either treaty (this would require amendments to the MBTA), and

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endangered species issues*

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*Kathryn Kohm..... Editor
Dr. Michael Soule..... Faculty Advisor*

Instructions for Authors:

The Endangered Species UPDATE welcomes articles related to species protection in a wide range of areas including but not limited to: research and management activities for endangered species, theoretical approaches to species conservation, and habitat protection and preserve design. Book reviews, editorial comments, and announcements of current events and publications are also welcome.

Readers include a broad range of professionals in both scientific and policy fields. Articles should be written in an easily understandable style for a knowledgeable audience. Manuscripts should be 7-10 double spaced typed pages. For further information please contact Kathryn Kohm at the number listed below.

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Short-billed Dowitcher
(*Limnodromus griseus*)

Line Islands, S. Oyster Bay, N.Y.
Photo by Frank Schleicher
(contributed by VIREO)

hence the USFWS is unable to take advantage of these tools for bird conservation.

The Nongame Act

The last and most recent wildlife legislation (and the only act that focuses on non-hunted, non-endangered species) is the Fish and Wildlife Conservation Act of 1980. The so-called Nongame Act sets up a mechanism for allocation of federal grants to states with approved nongame conservation programs. The authors intended that the Act would be to nongame species what the Pittman-Robertson Act is to game species and the Dingell-Johnson Act is to sport fish species. Unfortunately, however, the Nongame Act has never been implemented. The Administration has never requested, nor has Congress ever appropriated, a penny toward its implementation. Congress and the Administration have also never agreed

on an ongoing mechanism to generate a pool of funds for a state grants program.

Even if funds were available to allocate to the states, they would not necessarily be used to support broader approaches to biological conservation. For example, when LeFranc and Millsap (1984) summarized 267 state raptor projects underway in Fiscal Year 1982, only 8 % dealt with habitat management; 18 % involved reintroduction, captive breeding, and rehabilitation projects. This was true even though their survey indicated habitat loss was probably the principal threat to raptor populations. Cerulean and Fosburgh (1987) pointed out that a common pitfall into which many state nongame programs fall is placing too much emphasis on "glamor" species; although they also point out that these programs are usually dependent on public donations and that attention to such species attracts public interest and support.

What's Next?

Declines in many species of nongame, migratory birds suggest that benign neglect is not adequate as a federal policy toward the conservation of migratory birds. Deforestation and forest fragmentation, conversion of wetlands, urbanization, pollution, modern agricultural practices (including the use of pesticides and herbicides), and depletion of surface and ground water supplies dramatically influence the distribution and abundance of still common migratory birds (e.g., Powell and Rappole 1986).

In spite of weaknesses among its legal tools and mandates, the USFWS does not lack the authority it needs to mount a comprehensive conservation program aimed at still common bird species. Given the brief history presented above, however, it is no surprise that the USFWS lacks the commitment and the resources to carry out the job. In



In 1932, Richard H. Pough (left) and His colleague Henry H. Collins, Jr. survey a grisly scene of freshly shot raptors, mostly sharp-shinned hawks, at a site in the Appalachian Mountains. Today this site is part of Hawk Mountain Sanctuary in southeastern Pennsylvania. The investigation and photographs by Pough and Collins came to the attention of Mrs. Rosalie Edge, who believed that "the time to save a species is while it is still common." In 1934, she established the Sanctuary at the site where tens of thousands of migrating raptors had been shot, beginning at about the turn of the century.

(Continued on UPDATE page 4)

Saving Common Bird Species (cont.)

a critique of the USFWS migratory nongame bird program, Senner (1986:416) outlined seven elements that should be included in a comprehensive USFWS program:

- A higher profile and a greater commitment, within the agency and publicly.
- Clearly defined objectives and a comprehensive plan for research, management, and conservation.
- Continuous population monitoring of major groups of birds, as well as individual rare, unstable, and declining species.
- Continuous field, statistical, and museum-based research on monitoring techniques, life history and habitat requirement, and reasons for population declines.
- Periodic national assessments of the status of all species and population trends and the factors that influence them.
- Liaison with cooperating agencies (international, state, and private) through placement of regional nongame coordinators in each USFWS region, supported in Washington with adequate staff to provide national and international leadership.
- Training, technical assistance, and research in sister nations in the Western Hemisphere in fulfillment of treaty obligations.

There has been some progress since these elements were outlined in 1986. First, in 1987 the USFWS released a review and list of bird species of national management concern (Office of Migratory Bird Management 1987). This synthesis of information on the status of nonhunted and nonendangered birds is intended for internal use only and has numerous deficiencies. Nevertheless, it is a step in the right direction.

Second, in Fiscal Year 1988, Congress appropriated an extra \$1 million for migratory nongame bird research and management activities, effectively doubling the amount that had been spent in recent years. Lastly, Congress also required the USFWS to proceed with development and implementation of a comprehensive nongame bird management plan. That process is underway, and the USFWS Office of Migratory Bird Management has now released a draft "Nongame Bird Strategies" for public comment. Readers are encouraged to participate in that process.

Many of the elements proposed above still fall in the vein of species-oriented conservation efforts. In my opinion, however, these elements are fundamental to any conservation strategy for migratory birds, and they can easily be linked to programs that more broadly address needs in biological conservation. For example, improved monitoring of migratory nongame bird populations and their relationships with different habitat types and biogeographic zones would mesh neatly with the geographic systems approach to protecting biological diversity envisioned by Scott et al. (1987). Revisions to the Nongame Act, possible legislation to establish a national policy on biological diversity, and the revival of a national biological survey are potential vehicles to achieve some of these goals.

It should be clear that for a whole host of political and institutional reasons changes in wildlife conservation strategies have not and will not come easily. If our national strategy is to be redirected, it is crucial that those people who have theoretical skills in conservation biology couple their efforts with those who have the political skills to persuade decision makers in the Administration and Congress.

About the Author:

Stan Senner is executive director of the Hawk Mountain Sanctuary Association and Chairman of the U.S. Section of the International Council for Bird Preservation. His own studies on nongame species have concentrated on the ecology and conservation of shorebirds.

Literature Cited:

- Anonymous. 1983. Final listing and recovery priority guidelines approved. *Endangered Species Technical Bull.* 8:6-7.
- Bean, M.J. 1983. The evolution of national wildlife law. Praeger, New York.
- Cerulean, S. and W. Fosburgh. 1986. State nongame wildlife programs. pp. 631-656, in *Audubon Wildlife Report 1986* (R.L. Di Silvestro, ed.). National Audubon Society, New York.
- Conner, R.N. 1988. Wildlife populations: minimally viable or ecologically functional? *Wildl. Soc. Bull.* 16:80-84.
- Hutto, R.L., S. Reel, and P.B. Landres. 1987. A critical evaluation of the species approach to biological conservation. *Endangered Species Update* 4: 1-4.
- Jantzen, R.A. 1984. Fish and Wildlife Service directions in migratory nongame bird management. Fish and Wildlife Service, U.S. Dept. of the Interior. Speech to the Northeast Fish and Wildlife Conference, 15 May 1984, Ocean City, Maryland (unpubl. photocopy).
- Le Franc, M.N., Jr. and B.A. Millsap. 1984. A summary of state and federal raptor management programs. *Wildl. Soc. Bull.* 12: 274-282.
- Mason, L. and H. Raffaele. 1986. The Western Hemisphere Program. *Fish and Wildlife News*. June-July-August 1986, pp. 14-15. U.S. Fish and Wildlife Service, Washington, D.C.
- Matthiessen, P. 1959. *Wildlife in America*. The Viking Press.
- Myers, J.P., M. Docherty, K. Heinzel, R. Jung, and M. Stein. 1987. Scarce resources and common species. *Endangered Species Technical Bull.* Reprint 4:1-4.
- Office of Migratory Bird Management. 1987. *Migratory nongame birds of management concern in the United States: The 1987 list*. U.S. Fish and Wildlife Service, Washington, D.C.
- Powell, G.V.N. and J.H. Rappole. 1986. The hooded warbler. pp. 827-853, in *Audubon Wildlife Report 1986* (R.L. Di Silvestro, ed.). National Audubon Society, New York.
- Robbins, C.S., D. Bystrak, and P.H. Geissler. 1986. The breeding bird survey: its first fifteen years, 1965-79. U.S. Fish and Wildlife Service Resource Publ. 157.
- Scott, J.M., B. Csuti, J.D. Jacobi, and J.E. Estes. 1987. Species richness: a geographic approach to protecting future biological diversity. *Bio Science* 37: 782-788.
- Senner, S.E. 1986. Federal research on migratory nongame birds: is the United States Fish and Wildlife Service doing its job? *American Birds* 40: 413-417.
- Senner, S.E. 1987. Statement of Stanley E. Senner, Chairman, United States Section of the International Council for Bird Preservation. Testimony presented to the Subcommittee on Interior and Related Agencies, Committee on Appropriations, U.S. House of Representatives, 26, February 1987.

Book Review

A Crowded Ark: The Role of Zoos in Wildlife Conservation

by Jon R. Luoma

With tropical rain forests disappearing at the rate of 50 acres every minute and Africa's population rapidly eroding the remaining wildlife habitat, people everywhere should be concerned about the future of the world's wildlife. As this issue gathers public attention, zoos claim they are actively taking up the conservation challenge and frequently refer to themselves as "arks."

Jon Luoma's book, *A Crowded Ark*, is timely and important in exploring the role of today's zoos as players in wildlife conservation efforts. The author explores the subjects of artificial insemination, embryo transfer, the "frozen" zoo, computer assisted population management, euthanasia, species reintroduction, and zoo visitor education. The author's original negative impressions as a youth balance his new impressions in examining the complex nature of these institutions as they relate to conservation.

Luoma provides a fascinating and detailed look at some of the people involved in making conservation an integral part of the zoos' objectives and operation. From Dr. Betsy Dresser's work in reproductive physiology at the Cincinnati Zoo to Dr. Ulysses Seal's contribution to genetic management, the author has selected some prime examples of conservation activities in the zoo community. Nevertheless, Luoma's case studies are limited. There are numerous examples from other zoos of all shapes and sizes that could illustrate active involvement in research and captive propagation. It is also important to note that the author has not dealt with conservation activities at aquariums, a group of institutions that are professionally and culturally tied to zoos.

The greatest value of Luoma's book, besides the colorful illustrations of reintroducing golden lion tamarins to the coastal tropical forests of Brazil, build-

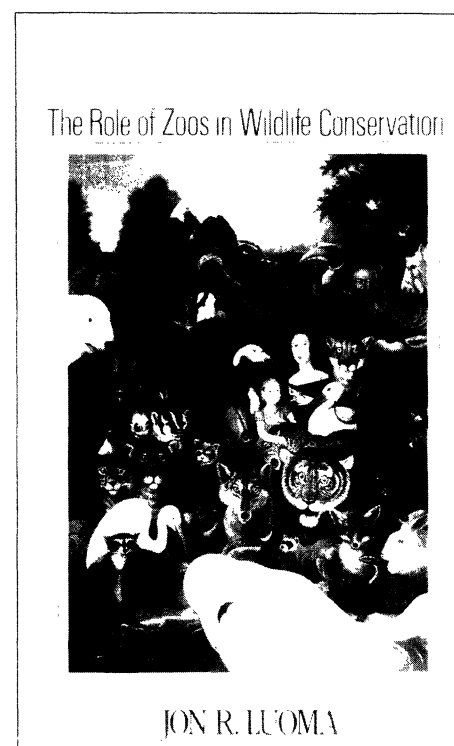
ing a better understanding of Siberian tiger biology, or saving the Speke's gazelle from almost certain extinction, is the questions he raises concerning how great a role zoos can realistically play in conserving wildlife. Luoma discusses the pro's and con's of zoos as "arks," and readily identifies the problems relating to space, questions about which species to save, and conflicts between attracting zoo visitors and developing an active conservation program.

There is a constant conflict between bringing in visitors and dollars vs. the expenditure of dollars and zoo resources for conservation activities which may not be well publicized or may not provide enough public interest to generate increased attendance or support. Furthermore, the reality of space must be squarely faced. As the book's title implies, there is very limited space in zoos, and if they are to play a role in wildlife conservation, there will be only a handful of species that can be practically maintained in captivity. This, of course, brings us back to Luoma's question, which species do we save?

Luoma also clearly identifies the importance of conservation education in zoos as a primary justification for the existence of zoos today. Unfortunately, he did not look into this dimension as thoroughly as he did the physiological and technological issues. Some of the better zoos have developed extensive conservation education programs that include public lectures and formal courses addressing various age groups.

Luoma's interviews with leading zoo researchers and administrators illustrate that these institutions have a long way to go; but his background research makes it very clear that they have made some tremendous progress in the past decade. Although Luoma's

book focuses on a few of the better zoos in this country, he has captured the essence of a renaissance that is now in progress. *A Crowded Ark* is a thoughtful work that should provoke discussions about zoos and conservation among all who share a common concern for the future of the world's wild crea-



tures. Zoos do have a role to play, and only time will tell if they evolve to provide financial and institutional resources on a level that makes them significant players in this important endeavor.

Book review by Rich Block, Director of Public Programs at World Wildlife U.S.

A Crowded Ark: The Role of Zoos in Wildlife Conservation is published by Houghton Mifflin Company, Boston, 1987. The hardbound version costs \$17.95.

"Habitat-Based" Conservation Plans: The Case of the Amargosa Vole

by Dennis D. Murphy and Kathy E. Freas

The Amargosa River drainage in southeastern California is a remnant of the Death Valley system of interconnected rivers and lakes extant during the late stage of the Pleistocene epoch. During the final pluvial stages of the Pleistocene, these connections allowed the dispersal of plants and animals from an extensive geographic region to the North and West into the Amargosa drainage. The end of the pluvial stage was marked by much warmer, drier climatic conditions which interrupted continuous geographic distributions, and isolated many populations. Today, populations in the Amargosa drainage remain as isolated endemic species and subspecies with distributions restricted to a few permanent water sources and surrounding habitat.

The endangered Amargosa vole (*Microtus californicus scirpensis*) is one such subspecies. Recent surveys conducted by the U.S. Fish and Wildlife Service found the vole only in "tule marsh," which is dominated by bulrush (*Scirpus olneyi*) and saltgrass (*Distichlis spicata*). These surveys, however, have yielded insufficient information to determine the distribution of the vole through available habitat, or to determine the relative importance of particular patches of habitat to the persistence of the species.

The Nature Conservancy and the Center for Conservation Biology at Stanford University began cooperative research in June 1987 to determine the distribution of the vole, acquire an understanding of its natural history, and evaluate the relative importance of specific habitat patches to populations persistence. Results from this research indicate that the extent of the Amargosa vole habitat in the best of times, is less than a square kilometer. But habitat conditions are rarely optimal. Vole habitat occurs at three elevations. At

the lowest, the Amargosa River floodplain and the slough created by dissected river flow support habitat that is subject to unpredictable and violent flooding during the winter season, particularly following severe thunderstorms across the western desert regions of Nevada. These floods flatten or uproot herbaceous vegetation, leaving the river channel and slough inundated for days or even weeks. At a slightly higher elevation, vole habitat is somewhat more protected from flooding by an old railroad grading. However, extended periods of rainfall can produce spectacular ("30 year") floods that submerge this higher ground. During these floods, only the ribbons of marsh that grow at the highest elevations in the Amargosa drainage, along hot spring outflows on the surrounding hillsides, provide refuge for the vole subspecies.

Understanding the ecology and natural history of the Amargosa vole and identifying the environmental events that affect its population dynamics have been key in the development of a conservation plan. Since during the worst floods the vole survives only along hot spring outflows, protection of that "permanent" habitat is the conservation priority. Only slightly less important to the vole's survival is protection of the habitat below the hot springs, but above levels of annual flooding. Identifying the roles of these habitat areas in the persistence of the Amargosa vole led to some conclusions that were neither intuitively obvious, nor apparent from previous studies. Protection of just several acres of peripheral habitat will be more crucial to the conservation of the vole than protection of extensive portions of centrally-located, high quality, but more ephemeral habitat. Areas of suitable habitat at the higher elevations show evidence of substantial vole activity (burrows and runways

with fresh piles of clipped green vegetation and fresh fecal pellets) indicating relatively high population densities. At lower elevations, in the river floodplain, extensive areas of suitable habitat showed no indications of vole habitation during this past winter season. While a Fish and Wildlife Service Endangered Species Recovery Plan acknowledges that floodplain habitat is subject to environmental unpredictability, that plan largely focuses on habitat-wide population densities as key to recovery efforts.

Recent advances in "population viability analysis" provide conservation biologists with important tools for assisting land managers and decision-makers in minimizing losses of biological diversity. Considerations so important to the conservation of what have been called our "macrocharismatic megavertebrates" (grizzly bear, spotted owl, red cockaded woodpecker) however, are not equally applicable in conservation efforts aimed at lower trophic level species (small mammals, many cold-blooded vertebrates, and nearly all invertebrates, and most plants). For such species, high local population densities often are the rule, and extinctions of populations are rarely due to the deleterious effects of genetic inbreeding or demographic stochasticity. For myriad species, like the Amargosa vole, the determination demographic targets based on theory may misdirect typically limited conservation efforts and monies. The simple Amargosa vole story should remind conservation biologists that for the unsung 99.9% of species preservation plans focusing on habitat structure, topographic diversity, availability of successional stages, and special landscape features will most often be the key to reserve design and endangered species management.

Bulletin Board

Conference on Breeding Endangered Species In Captivity

The 5th World Conference on Breeding Endangered Species in Captivity will be held in Cincinnati, Ohio October 9-12, 1988. The conference will be co-sponsored by the Cincinnati Zoo and Botanical Garden, Kings Island Wild Animal Habitat, and the Fauna and Flora Preservation Society. The IUCN Captive Breeding Specialist Group meeting will be held prior to the conference on October 8, 1988. Persons interested in attending or submitting an abstract should contact Dr. Betsy L. Dresser, Conference Chairperson, Cincinnati Zoo and Botanical Garden, 3400 Vine Street, Cincinnati, OH 45220, (513)872-4371.

CITES Annotated Bibliography

An annotated bibliography for the Convention on International Trade in Endangered Species compiled by Mark Trexler and Laura Kosloff is now available from TRAFFIC (U.S.A.) This 346-page publication contains 2,300 citations, 1,500 of which are annotated. The publication is available for \$25 by writing, World Wildlife Fund, 1250 24th Street N.W., Washington D.C. 20037.

A bilingual update to the second (1985) edition of "Latin America Wildlife Trade laws" by Kathryn Fuller & Byron Swift is also available. The update covers changes in wildlife trade laws in Argentina, Belize, Brazil, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Paraguay, Peru, and Venezuela. Purchasers of the 1985 edition will receive free supplements.

Symposium on Urban Wetlands

On June 16-19, The Association of State Wetland Managers is sponsoring a symposium on urban wetlands in Oakland California. Topics will include: values of urban wetlands, wetland assessment and riparian habitat protection needs, and restoration of altered systems. For more information, contact Jon Kusler, Symposium Chairperson, Box 2463, Berne, New York 12023.

Research in California's National Parks

The Third Biennial Conference on Research in California's National Parks will be held on September 13-15 at the University of California at Davis. The conference will include the presentation

and discussion of research related to the biological, physical, and sociological resources of California's National Parks. For more information, contact CPSU/Institute of Ecology, University of California at Davis, Davis CA 95616 752-6086.

New WWF Newsletter

The World Wildlife Fund -U.S. has initiated the publication the World Wildlife Fund Letter, a new bulletin designed to provide a critical look at global conservation issues and World Wildlife Fund's efforts to address them. Each issue will feature an in depth article on problems, progress, and new techniques in conservation and sustainable economic development. The inaugural issue of The Letter reviews debt-for-nature swapping and examines its potential as a link between conservation and development. For more information about receiving this and other copies of the Letter, contact Todd Buchta, managing editor, World Wildlife Fund U.S., The Communications Department, 1250 24th Street N.W., Washington D.C. 20037.

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