

Endangered Species UPDATE

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

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THE UNIVERSITY OF MICHIGAN
School of Natural Resources



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Biosphere Reserves: Myth and Reality

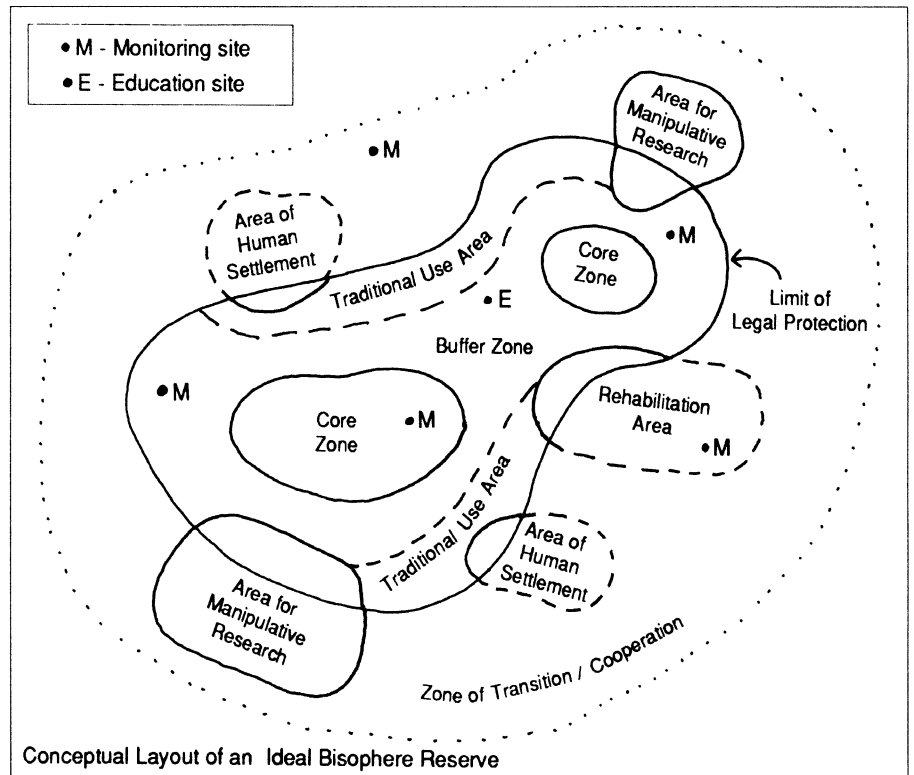
by
John Hough

Opinions of the biosphere reserve concept range from questioning the need for yet another category of protected area to hailing it as a symbol of the dawning of a new age in the relationship of humankind with nature. This article examines the evolution and purpose of biosphere reserves with the aim of dispelling some of the myths and illusions surrounding them and clarifying their role in conservation.

The Biosphere Reserve Concept

The Biosphere Reserve concept was initially formulated in 1969 as a part of UNESCO's Man and the Biosphere (MAB) programme. The intention was to create a global network of protected areas where the scientific research and monitoring called for under the MAB programme could be conducted. In addition, biosphere reserves were seen as an appropriate mechanism for fulfilling the objectives of theme number 8 of the MAB programme - "Conservation of natural areas and the genetic material they contain" (Batisse 1982, 1986, 1987). The convergence of these interests also led to the development of a biogeographical classification system, that of Udvardy (1975), so that reserves could be selected to include representative examples of all of the world's major biological regions or biomes (UNESCO 1974).

Though the initial emphasis of the biosphere reserve concept was on conservation and research, including "manipulative research", as the concept evolved, there was an increasing emphasis on addressing the dynamic relationship of humans with their environment, the central theme of the entire MAB programme (Batisse 1986). In addition to natural ecosystems "stable landscapes resulting from long-established



patterns of land use" and "severely modified or degraded landscapes" were to be included in biosphere reserves. Education and training were also designated as functions of biosphere reserves (UNESCO 1974).

A natural result of these multiple functions was a zoning system, now considered a key element of the biosphere reserve concept (UNESCO 1987a). Ideally a strictly protected core zone would be surrounded by a buffer zone where education and manipulative research might take place. The buffer zone might also include human settlements, areas of traditional use, and degraded areas to be rehabilitated. However, human activity would be carefully controlled by a managing agency and both the core and the buffer zone would be legally protected (UNESCO 1974).

Though this was the dominant model for biosphere reserves during the

1970s by the early 1980s their role in promoting sustainable development, though implicit from the start, was being made explicit and the participation of local people in management was being encouraged (Batisse 1982, UNESCO 1984). In order to accommodate this a second buffer zone, normally called a zone of "transition" or "cooperation", where conservation is pursued through cooperation with the local people, was added outside the legally protected core and buffer zones (Batisse 1982).

One result of the early emphasis on conservation of representative ecosystems, rather than on a combination of conservation and development, was that many biosphere reserves were established as overlapping, and often contiguous with, other protected areas such as national parks. Consequently, transition zones are often lacking, local people are not involved in management,

and there is little difference between the management of biosphere reserves and the underlying protected areas (Batisse 1986). This contributes to the frequent confusion and lack of understanding surrounding the role of the biosphere reserve as distinct from other categories of protected area (Kellert 1987).

Myths and Realities of Biosphere Reserves

Myth - Biosphere Reserves form a Network of New Protected Areas

As of mid 1987 there were 266 designated biosphere reserves in 70 different countries of the world (Robertson-Vernhes 1987). However, most of these reserves were superimposed directly on existing protected areas such as national parks and nature reserves and Miller (1984) calculates that in 1983 only 1.6% of the total area under biosphere reserve designation represented an addition to the worldwide protected area system. Though some new areas have been protected under specific biosphere reserve legislation (Halffter 1981), these are few and the notion that biosphere reserves represent a new network of protected areas is a myth.

Reality - Biosphere Reserves Conserve *In Situ* Biological Diversity

Conserving biological diversity is one of the three major functions of biosphere reserves. This role is enhanced by the requirement that they contain examples of natural ecosystems, are of sufficient size to function as "viable" conservation units, and have adequate long term legal protection (UNESCO 1980). However, in practice there is great variability in both the nature and management of biosphere reserves (Cagri & Loope 1977), and their size (UNESCO 1986b).

Biosphere reserves could make an additional contribution to the conservation of *in situ* biological diversity by protecting the genomes of domesticated species, cultivation and the husbandry of domestic animals normally being excluded from other protected areas.

However, since the majority of biosphere reserves have simply been superimposed on existing protected areas this capability is not well developed.

That biosphere reserves conserve *in situ* biological diversity is a reality, however, they could play an even greater role if human-modified landscapes and agricultural ecosystems were more effectively included.

Myth - Biosphere Reserves Protect Representative Examples of all the Worlds Major Biogeographical Provinces

The biosphere reserve concept emphasizes the designation of biosphere reserves to include representative examples of all of the world's major ecosystems (UNESCO 1984). However, more than half the existing reserves are situated either in Europe or the United States of America and as of January 1987 there were none at all in India, southern Africa and Madagascar (UNESCO 1987a). In 1983 Batisse (1984) noted that many biosphere reserves were located in "mixed mountain and highland systems" and there were significant gaps in the coverage of marine and coastal areas and certain other biomes. In 1986 only 101 of the 193 biogeographical provinces identified by Udvardy (1975) were represented in biosphere reserves (UNESCO 1986b).

That biosphere reserves protect representative examples of all the worlds major biogeographical provinces is at present a myth.

Myth - Biosphere Reserves form an International Network for Research and Monitoring

Though stated as a function of biosphere reserves there is at yet no mechanism in place for facilitating the exchange of information or the generation of a true "network". Robertson-Vernhes (1987) suggests that as of mid-1987 biosphere reserves could be considered to "essentially correspond to 266 separate dots on a map". Consequently the concept of an "international network" must be considered a myth.

Endangered Species UPDATE

A forum for information exchange on endangered species issues
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Dr. Michael Soulé.....Faculty Advisor
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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 Rob Blair at the number listed below.

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Cover:

Few Biosphere Reserves actually include human settlements such as this village in the buffer zone of the Pendjari Biosphere Reserve in Bénin, West Africa.

Photo by John Hough



Local ranchers work closely with the park superintendent at the Waterton Lakes Biosphere Reserve in Canada. Despite the Biosphere Reserve goals of involving local people in management, this sort of cooperation is rarely found. Photo by John Hough

Reality - Biosphere Reserves Serve as Sites for Research and Monitoring

The early emphasis on biosphere reserves as sites for scientific research and long-term environmental monitoring, in addition to their origin in the scientific MAB programme, has led to a heavy research emphasis, even though much of this may have already existed before the site was designated as a biosphere reserve (UNESCO 1984). That biosphere reserves serve as sites for research and monitoring is hence a reality. However, much of the research is basic rather than applied and integrated ecological research, and research on rehabilitation and sustainable development is lacking (Robertson-Vernes 1987, UNESCO 1986).

Reality - Biosphere Reserves Provide Sites for Education and Training

Originally the third major function of biosphere reserves, after conservation and research and monitoring, was education and training. Undoubtedly education takes place in many biosphere reserves, as it would take place in the underlying protected areas, and

this is a reality. The replacement of education and training with the "association of environment with development" as the third major function of biosphere reserves (UNESCO 1986a, Batisse 1987) redirects this education and training role to local people as well as educational institutions and specialists.

Myth - Biosphere Reserves Integrate Conservation & Development

Though there is a major emphasis in the recent biosphere reserve literature on their role in integrating conservation and development this function is little developed in reality (Maldague 1984, Batisse 1987, UNESCO 1987). This can be attributed to the early emphasis of the biosphere reserve programme on conservation, research and monitoring, and education and training, in addition to their tendency to be superimposed on existing protected areas. Though there are a few notable exceptions, such as La Mapimi Biosphere Reserve in Mexico (Halffter 1981), so far the assertion that biosphere reserves actually integrate conservation and development is a myth.

Myth - Biosphere Reserves Include Landscapes Representing Various Levels and Types of Human Intervention

Though an integral part of the biosphere reserve concept this objective is in direct conflict with the requirement that the core and buffer zones of biosphere reserves have long term legal protection. As Collin (1987) points out

In France, the rural society does not accept to be stuffed as in a museum and insists on keeping an independent economic status

Human settlement is normally absent from the underlying protected areas, and is required to be absent from the core zone of biosphere reserves. Consequently, significantly human-modified landscapes are generally relegated to the peripheral zone of transition or co-operation, which often does not exist at all (Batisse 1982).

Though there are notable exceptions, such as the protected landscape of Les Cevennes, in general biosphere reserves do not include landscapes representing various levels and types of human intervention.

Reality - Biosphere Reserves Represent a Flexible Approach to Conservation

Flexibility is stressed throughout the biosphere reserve program. This includes flexibility with respect to specific goals and objectives, legal and administrative structures, and management activities (Batisse 1986). One interesting feature of biosphere reserves which reflects this flexibility is the concept of "cluster reserves" whereby a reserve can consist of a non contiguous group of sites which in combination perform all of the functions of a biosphere reserve, though each site may not perform all of the functions itself (Batisse 1982). However, this emphasis on flexibility can lead to the loss of the very "originality & specificity of the concept" (Batisse 1986, Castri & Loope 1977).

Flexibility is a major reality of the biosphere reserves program.

(Continued on UPDATE page 4)

Reality - The Biosphere Reserve Concept is a Symbol of a New Moral Ideal

According to Engel (1987), the biosphere reserve concept can be viewed as a symbolic model of an ideal relationship between people and nature. It represents a departure from the concept of setting humans apart from nature, embodied in other types of protected area, and an approach to a cooperative relationship with both nature and fellow humans. In its ideal form one biosphere reserve, with multiple core and buffer zones, could encompass the whole earth.

Though biosphere reserves could represent such a normative statement of societal development, Engel (1987) points out that the biosphere reserve language currently reflects a tension between this ethical perspective of "cooperation or partnership" and that of "use and management". This duality is incorporated through the "flexibility" of biosphere reserves with respect to transition zones and local cooperation and participation. The older "use and management" ethic is reflected in the protectionist approach where transition zones are absent and local people are viewed simply as agents to be consulted. The newer "cooperative" ethic is reflected in the current emphasis on zones of cooperation and participation by local people in biosphere reserve management.

Though existing reserves reflect two contrasting moral ideals, the most recent conceptualizations of biosphere reserves symbolize a new moral ideal with respect to human relationships with nature.

Conclusions

According to UNESCO (1987b) the features which set biosphere reserves apart from other protected areas are:

- conservation of biological diversity through a scientific and rational approach to protecting "representative" examples of major biomes and ecosystems on a worldwide basis, including the conservation of domesticated species and human-modified ecosystems;

- a logistic role as part of an international communicating and coordinated network of sites for long term ecological research and monitoring; and

- a conservation and development role through inclusion of human-modified landscapes, the development of new sustainable land and resource management strategies, and full cooperation with local people in a zone of transition.

However, in light of the foregoing it would appear that biosphere reserves can encompass virtually any type of protected area, though this is now changing due to an increasing emphasis on achieving the "originality and specificity" (Batisse 1986) of the model. This requires that in addition to conserving biological diversity, undertaking research and monitoring, and performing education and training, biosphere reserves also integrate conservation with development. To do the latter they must incorporate human-modified ecosystems, develop transition zones, and pursue cooperation with local people through involving them in management. In addition they must develop a real network for functional interchange of information and ideas and extend their coverage to all biogeographical provinces. Only then will the myths be transformed to reality.

Biosphere reserves offer an exciting challenge. Founded on scientific principles and recognizing the need to integrate human and natural systems, they have the potential to redefine our relationship with nature. If biosphere reserves can achieve all they aspire to then they will indeed represent an original, distinctive and significant approach to both protected areas and the integration of conservation with human society.

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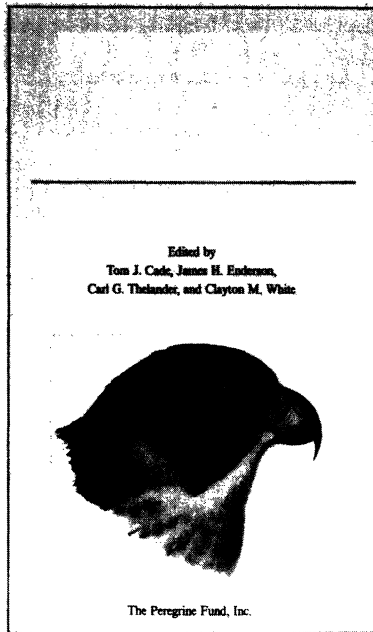
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John Hough is a wildland management specialist focusing on the role of protected areas in development and the management of national park-local people conflicts. He has worked extensively in Africa and currently teaches at the University of Michigan, while completing his PhD degree.

Book Review

Peregrine Falcon Populations: Their Management and Recovery

Edited by Tom J. Cade, James H. Enderson,
Carl G. Thelander, and Clayton M. White



A special conference on the Peregrine Falcon (*Falco peregrinus*) was convened in 1965 to document knowledge of the recently discovered population crash. Since then, the Peregrine Falcon has recovered substantially from the widespread use of certain pesticides. A second conference, convened on the 20th anniversary of the first conference, highlighted much of the current knowledge about the Peregrine; the proceedings of this conference have now been published. The book, *Peregrine Falcon Populations: Their Management and Recovery*, consists of 81 papers arranged in thematic sections.

Three sections of the book deal with the status of Peregrine populations in North America, Europe, and other parts of the world. These 29 papers, however, are too repetitive, usually reporting either stable or increasing populations (at least the news is good). While the format of individual paper may be necessary, the section overviews could have better summarized the data, perhaps in tabular form, to facilitate between region comparisons.

Perhaps the most interesting section of this book deals with chemical pollutants and their effects on the Peregrine. The disagreement between British and American scientists concerning direct adult mortality (due to aldrin and dieldrin) as a cause of the Peregrine's decline is well presented, but the dispute, which first surfaced at the 1965 conference, is not resolved here. Results from a model, in support of the American opinion that reproductive failure due to DDT contamination was the sole cause of the population decline, are presented, but are not convincing because many of the details of the model are omitted.

Another section of this book deals with banding and migration studies. Increases in the numbers of Peregrines migrating southward in the eastern United States are documented, as are migration routes along the Pacific coast that were considered to be nonexistent as recently as 1975.

The part of the book devoted to captive propagation and the reintroduction of Peregrines through the use of falconry techniques is very encouraging. Details of the problems encountered during these efforts in the United States and Europe are provided. The results are remarkable considering that these techniques were hardly even considered at the first Peregrine conference in 1965. Although the tremendously high expenses of this program are mostly ignored, this section should be required reading before efforts of this type are considered for any other endangered species.

Another interesting section deals with geographic variation in Peregrine populations. Differences between the 18 or 19 recognized subspecies are described quantitatively and related to presumed natural selection forces. Two papers describe how genetics are being

used to identify the geographic region (for example a particular river drainage) where a Peregrine was born.

Other sections deal with the population dynamics of Peregrine populations and the Peregrine's relationship to people. This latter portion contains mostly opinion papers rather than scientific papers. Some of the topics are not relevant to the rest of the book, especially those on falconry (although nobody should deny the importance of falconers in the Peregrine's recovery) and a stinging attack on the undercover law enforcement tactics of the U.S. Fish and Wildlife Service (particularly "Operation Falcon").

A final critique of this volume is the incompleteness of the index. For example, Massachusetts is listed only once in the index, yet the historical population of 14 pairs is discussed in at least five different papers. And the current status of Massachusetts Peregrines is mentioned in at least one of the articles; that page should be cited in the index. Similar problems occur for other states, provinces and even countries, and this detracts from the usefulness of this volume as a reference.

Despite the criticisms, however, this volume does a remarkably thorough job of presenting current issues and knowledge about the recovery of the Peregrine Falcon. This is not a book that very many people will read from cover to cover, but it is a useful reference for anyone interested in the Peregrine Falcon.

Book review by Robert Culbert.

Peregrine Falcon Populations: Their Management and Recovery is published by The Peregrine Fund, World Center For Birds of Prey, 5666 West Flying Hawk Lane, Boise, Idaho 83709. \$45.00 plus \$3.75 postage in the U.S.A.

The Next Step: Part One

by Kevin Bixby

Conservationists like to tout the Endangered Species Act (ESA) of 1973 as a landmark piece of legislation, exceptional in its farsightedness, one that marked the beginning of a change in society's relationship to other living things. The actual track record of the Act has not been impressive. Only a handful of species have recovered sufficiently to be delisted. Several protected species have gone extinct, and the roll of candidates for listing continues to grow. Still, 16 years is not much time to achieve results, especially when the Act has been only grudgingly implemented for more than half its lifetime by an administration that never grasped its importance.

In at least one important way, however, the Act has been very successful. "Endangered species" is now a household term, one that I am amused to see even appears in advertising slogans. It seems to me that this addition to the popular vernacular signifies an elevation of public awareness that is at least as momentous as the hatching of a condor egg in a zoo. It is an essential first step towards creating a climate in which conservation can succeed, since it is much easier to perceive moral obligations towards named entities than nameless ones. The fact that people recognize and use the term "endangered species" more frequently doesn't imply that they *care* more about what happens to endangered species, but it does mean that a developing wildlife ethic is beginning to find articulation in popular culture.

That is good, because it makes possible the next step towards full restoration of America's wildlife. Over the past several hundred years most native species of wildlife have undergone range reductions, some drastic like the gray wolf, others less dramatic. While some species, notably game animals,

have been restored to near pre-European settlement numbers, many other remain absent from significant portions of their original ranges. To cite just one measure of this loss, I surveyed U.S. Forest Service biologists as part of my graduate work to determine the extent of wildlife losses from lands now included within the National Forest System. Only one national forest out of the 93 which responded (representing ap-

As a nation, we have already determined that species should be saved from avoidable extinction. But why should we commit ourselves to protecting wildlife *only* at minimally viable levels?

proximately 75% of the lands managed by the USFS in the lower 48) reported an intact native fauna. To give a few examples, lynx were reported extirpated from 12 forests, martens from five, elk from 20, and ospreys from three. The mean number of species reported as extirpated per forest was 4.7. For the most part the Forest Service did not have a hand in these extirpations. They are historical artifacts, the legacy of activities unrestrained by today's conservation sensibilities and laws. In the post-NFMA world, further reductions in the diversity of wildlife found on national forests are unlikely. But at present no law requires that historical losses be redressed on federal lands or anywhere else.

Full restoration is impossible, but many wildlife species can be returned to

unoccupied portions of their range without too much trouble. Many readers probably share my belief that there are good reasons for doing so. As a nation, we have already determined that species should be saved from avoidable extinction. But why should we commit ourselves to protecting wildlife *only* at minimally viable levels? In its statement of findings contained in the ESA, Congress asserts that various depleted species of plants and wildlife are of "esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people." Surely Congress did not intend to suggest that only endangered species possess these values. Wildlife is not good because it is endangered, but because of these and other values that Congress didn't list. These values can be maximized not by protecting abstract "species" no matter how small the numbers, but by putting real animals in places where they can function ecologically and where people have a hope of detecting their presence. This means reestablishing extirpated local populations wherever possible.

The ESA is not the vehicle for achieving this goal because there is a vast gulf between recovery as defined under the Act and full restoration. The Act's approach is crisis-oriented and reactive. It was never intended to do more than remove the immediate threat of extinction. Recovery under the Act can be accomplished by restoring a species to population levels which, although secure in the short-term, are vestigial nonetheless.

In the next issue, Kevin Bixby, who is an environmental writer based in Las Cruces, New Mexico, will explore the limitations of the Endangered Species Act in preserving biological diversity and in restoring native fauna. If you would like to contribute an opinion piece, write the editor of the UPDATE.

Bulletin Board

New Feature: Opinion

The Center for Conservation Biology at Stanford has finished its year long commitment to producing the Technical Notes for the Endangered Species UPDATE. The column will be sorely missed and I thank the Center for devoting so much time and effort to the series.

This issue inaugurates the use of that page of the UPDATE as an opinion column for discussion of issues in endangered species protection and conservation. If you have a topic on which you want to pontificate, write it up and send it in. The opinions should be three, typed, double-spaced pages covering such concerns as research and management activities of endangered species, theoretical approaches to species conservation, or habitat protection and design.

I am eager to hear the concerns of UPDATE readers.

Rob Blair
Editor

CITES Monograph Series

The Pacific Center For International Studies, a California-based international law research group announces the

publication of a series of monographs on the Convention on International Trade in Endangered Species of Wild Fauna and Flora. The first three publications of the series are:

•Asian Compliance With CITES: Problems and Prospects, P.C.I.S. CITES Monograph No. 1.

•The Convention on International Trade in Endangered Species of Wild Fauna and Flora: Toward A More Viable Framework For Protecting Wildlife Resources, P.C.I.S. CITES Monograph No. 2.

•CITES and International Trade in Flora: Problems and Prospects, P.C.I.S. Cites Monograph No. 3.

These are now available for \$5 per monograph from the Center's headquarters at 1008 Tenth St. Suite 263, Sacramento CA 95814, attention Eric McFadden.

U.S. Endangered National Parks

According to a report by The Wilderness Society, the 10 most endangered national parks in the United States are the most popular ones. Threats range from logging, oil drilling and development on the fringes to low-flying aircraft, imported wildlife, and too many backcountry users in the inte-

riors. Mismanagement of federal lands surrounding the parks poses the most serious risk. The 10 most endangered parks are:

1. Glacier National Park
2. Everglades National Park
3. Yellowstone National Park
4. Grand Canyon National Park
5. Santa Monica Mountain National Recreation Area
6. Yosemite National Park
7. Manassas National Battlefield Park
8. Rocky Mountain National Park
9. Olympic National Park
10. Great Smoky Mountains National Park

Endangered Species Technical Bulletin Index

The Endangered Species UPDATE now has the index to Volume XI Nos. 1-12(1986) of the USFWS Endangered Species Technical Bulletin, which is the center portion of the UPDATE. If you would like to receive a copy of this index, send an SASE with your request and mail it to: The Endangered Species UPDATE, The School of Natural Resources, University of Michigan, Ann Arbor, MI 48109-1115

Bulletin Board information provided in part by Jane Villa-Lobos, Smithsonian Institution.

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