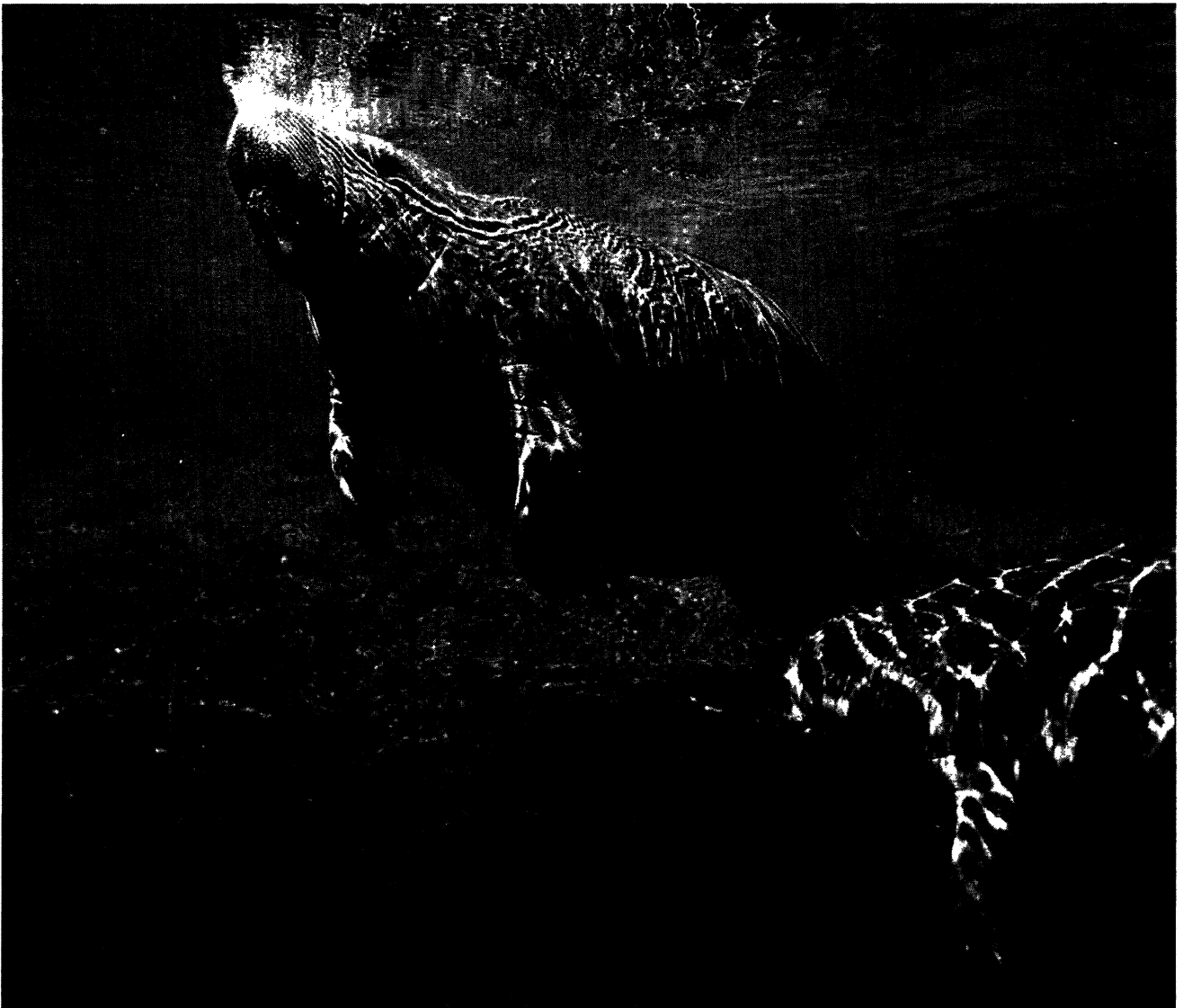


Endangered Species UPDATE

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

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**School of Natural Resources
THE UNIVERSITY OF MICHIGAN**



In this Issue

The Biological Diversity
Treaty of UNCED

New Legislation Aids
Fish and Wetlands in
Nevada

More from the State Series:
Florida's Nongame and
Endangered Species
Programs

The Biological Diversity Treaty of the United Nations Conference on Environment and Development

by

John M. Fitzgerald

The largest gathering of heads of state in the history of the world took place in Rio de Janeiro for UNCED (United Nations Conference on Environment and Development), also called the Earth Summit, in June, 1992. The greatest controversy at that conference was the decision of President George Bush not to sign the treaty on the conservation of biodiversity despite the decision to do so by 153 other heads of state, and the representative of the European Community.

The fact that most of these nations are likely to ratify the treaty means that this treaty will set common requirements, terms and procedures for wildlife conservation and the use of living natural resources for the vast majority of the world from now on. Therefore it is vital that all engaged in the policy and science of conservation and use of living natural resources be familiar with it. There is, of course, the whole range of existing treaties and national arrangements affecting the use of living resources, usually on a more specific or segmented basis. The Biodiversity Treaty is intended, at the very least, to fill gaps between those existing laws and systems and to be the foundation and template for future national policies and international undertakings.

The President might have repudiated the conservation requirements of the treaty, but he did not. He said that he was refusing to sign it for other reasons, including questions of biotechnology patent rights and the financing of aid to developing countries through the treaty. He said that the U.S. would do more for conservation under its existing laws than the treaty required. Furthermore, the U.S. may sign the treaty in the future and may want to ensure that our actions will be based on full knowledge of the development of international conservation practices.

It may also be that the tables will be turned and that access to natural re-

sources and even biotechnologies in other countries will depend on whether the nation seeking them is a signatory or party to the treaty or at least has practices and policies that conform to those of the treaty parties.

This article will summarize the treaty, with emphasis on the conservation requirements. It will also briefly cover the events leading up to the signing of the treaty in Rio, including the final negotiating session in Nairobi, Kenya in May 1992, and some of the potential steps on "the road from Rio".

The Need for a Treaty: Towers of Babel Built on Sand

As with many treaties, the biodiversity treaty was preceded by numerous calls for a greater and more comprehensive effort based on a number of concerns. In natural resources management as in other areas, without common commitments and limits, nations and their corporate and individual citizens run the risk of expending resources in dangerously unsustainable ways in order to compete with each other in economic or military pursuits. Furthermore, without common terms of reference, even shared goals become more difficult to pursue together as we speak different scientific and legal languages.

The treaty, being a global contract that is difficult to agree on but also somewhat difficult to change, is intended to provide a firm foundation that will not be eroded by rapid shifts in expectations or performance. On that foundation those involved (including many in nations that have not yet signed the treaty) expect to work together to build scientific and legal systems and institutional arrangements to ensure that we not only understand the effect of our actions on our own and each other's living resources, but that those effects will not undermine the ability of those resources

to sustain themselves.

In wildlife conservation there are numerous treaties that have been ratified over nearly the last century. These are between different nations concerning different groups of animals and plants. The Endangered Species Preservation Act of 1969 called for a treaty on conserving endangered species and this resulted in what the world calls the "Washington Convention", formally entitled "The Convention on International Trade in Endangered Species of Flora and Fauna" (CITES). That treaty on which the nations could agree in 1972 can cover any part of biodiversity, or subspecies, even species already subject to other international agreements, as long as that subspecies is in international trade or likely to be threatened by trade in it or in species similar in appearance to it.

It was clear by the mid-1980's that regulating the trade in species, even if successful, would not be sufficient to stem the loss of biodiversity, or genetic diversity within or among species and of ecosystems, as defined in the convention. Other factors such as habitat loss, pollution, introduction of exotic species, and domestic overconsumption had to be comprehensively addressed to ensure that life on earth could be sustained.

Preparing the Treaty: Out of Africa

First proposed in several quarters in 1987, negotiating sessions proceeded slowly with many feeling that success would be unlikely. At the opening session of the Conference of the Parties to CITES in Kyoto, Japan in March, Dr. Mustafa Tolba, the Executive Director of the United Nations Environment Programme (UNEP), informed the representatives of the Parties and the Non-governmental Organizations present that based on substantial progress in recent weeks, he expected shortly to conclude

negotiations on a biodiversity treaty that nations would sign at the United Nations Conference on Environment and Development in Rio de Janeiro in June.

Some conservationists and government officials alike who had followed the laborious development of the treaty from afar began to focus on the biodiversity convention. It had been overshadowed by changes in the climate convention. There the U.S. government had insisted on eliminating timetables and targets for the reduction of greenhouse gases blamed for global warming as the price for U.S. participation in the treaty and President Bush's personal participation in the summit at Rio.

At this point, the Biodiversity Treaty was still full of brackets, indicating



The UNCED logo and motto.

phrases or whole articles that at least one nation's negotiators had found objectionable. One major reason for this was that the negotiating process used by the United Nations for such treaties is to require in almost all cases complete consensus. That means not that all parties agree but that they do not disagree enough for any one party to object and veto the consensus agreement.

In mid-April a memo on the Biodiversity Treaty from the staff of Vice President Dan Quayle's Council on Competitiveness found its way not only around the White House but not long thereafter to conservation groups and the news media. The Council had been reviewing proposed regulations of

the E.P.A. and other agencies to ensure that any approved would not unduly burden business. Regulations delayed or rejected had included rules implementing the Clean Air Act and listing species as endangered under the Endangered Species Act, actions environmentalists had challenged in court. The memo, based on the most extreme reading of the most extreme option for each section, slammed the treaty as a threat to the economic health of the U.S. and its biotechnology industry in particular.

Just days before the Nairobi session, the leading Fish and Wildlife Service representative was removed from the delegation.

The seventh and final session of the Intergovernmental Negotiating Committee (INC) was held at UNEP headquarters in Nairobi, Kenya in May. It was scheduled to go from May 11 to May 19 but ran three days over schedule with participants having to fly out and sessions extending into the early morning hours.

When the U.S. delegation arrived on a Sunday night in Nairobi, they began distributing draft amendments that rewrote whole articles, or chapters, in the treaty despite the fact that the U.S. had already agreed to many of these provisions, and in spite of the intention of the Committee, reaffirmed in an initial ruling from the chairman, to address only the sections remaining in brackets.

In order to achieve the consensus required by the U.N. process, the representatives of over one hundred nations represented in Nairobi spent the next two weeks trying to accommodate the U.S., and on many of the same and several different points, India and Malaysia. Australia, backed up by the Netherlands and other European countries with help from Kenya, Tanzania and sometimes Brazil attempted to head off changes that would weaken the conservation provisions of the treaty. Britain played the unofficial role of senior parliamentarian.

A few examples of changes the U.S. sought in Nairobi will have to suffice in light of limited space. The U.S. supported the successful effort to remove an article establishing global lists of species and biogeographic areas to help prioritize conservation efforts. In

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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. For further information, contact the editors at the number listed below.

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its proposed revision of the article concerning *In Situ* Conservation, the U.S. removed the duty to regulate and manage biological resources with a view to ensuring their conservation, and the duty to regulate and manage processes and activities which have or are likely to have a significant adverse effect on biological diversity. Together these two paragraphs comprised the two most important conservation requirements of the treaty.

The U.S. later returned to this article again and attempted to change the duty to actually "rehabilitate and restore degraded ecosystems..." to educational or public relations-oriented wording "promote the rehabilitation and restoration of degraded ecosystems..." . The last of these changes was rejected but the U.S. did persuade the others to add after "resources" in the first item (now Article 8(c)) the phrase "important for the conservation of biological diversity". This could be read either to mean indicator or keystone species or species-rich areas, or it could be read to mean that some resources are so unimportant for the conservation of biological diversity that they need not be managed or regulated, a potential loophole.

The U.S. also insisted on the removal of both the article on general obligations which contained conservation duties, and any reference to the duty to conserve from what remained in the article called "Principle". In light of the objective of the treaty to conserve biodiversity, the overall duty to conserve at least the viability of natural populations and ecosystems has survived in any case.

This background helps explain the very bad press the U.S. received in Rio when President Bush refused to sign the treaty that his team had insisted on watering down repeatedly. It also helps, in understanding the treaty, to know that most of the nations that have signed the treaty were willing to accept even clearer and more direct conservation mandates than the text now contains.

The Treaty as Initialed in Nairobi and Signed in Rio

As head of the U.S. delegation, William Reilly, Administrator of the

Environmental Protection Agency, made a final attempt to secure a few key changes to reduce the perceived threats to patent rights of biotechnology firms and the perceived threat that other nations might be able to require the U.S. to pay excessive amounts for projects under too little donor country control. Reilly's memo was leaked along with the news that he had been informed that he could not suggest these changes and that even if he secured them they would not be sufficient to persuade the President to sign the treaty. Therefore, the treaty as initialed in Nairobi was not changed before signature in Rio. It will take effect as soon as 30 nations ratify it, which usually involves legislative approval of the executive's signing of the treaty.

The treaty is a document of twenty pages with two annexes comprising about four more. It is, unlike many United States statutes, relatively direct and self-contained and therefore, quite worth reading, although an attempt to summarize its highlights follows.

The Preamble

The Preamble is not an operative part of the treaty but provides background information concerning why the operative parts were included. It begins by recognizing the intrinsic value of biological diversity and reaffirms the sovereign rights of states over their own biological diversity and their responsibility for conserving it. It notes the need to develop scientific capabilities but that the lack of scientific certainty should not be used as a reason for postponing measures to avoid or minimize threats of significant reductions in biodiversity now occurring.

It recognizes the traditional knowledge of indigenous communities, the need for full participation of women at all levels of policy making for biological diversity conservation and the need for cooperation among governmental and non-governmental organizations. Desiring to enhance and complement existing international arrangements for the conservation and sustainable use of biological diversity (rather than supplant or preempt them) and determined to conserve and sustainably use biological di-

versity for the benefit of present and future generations, contracting parties concluded that they have agreed on the treaty.

Objectives

Article 1 reads as follows: The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

Definitions

The drafting of definitions was so time-consuming and important that they were the subject of separate working groups in Nairobi and earlier, while most of the treaty was dealt with by two main committees of several hundred persons each.

Biological diversity is defined as "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and, of ecosystems." (This technically includes people. Although most delegates were probably not thinking generally of that, it was recognized that people, and particularly traditional communities of indigenous peoples, play a wide range of roles in the natural ecosystem. For that, among other reasons, the treaty does not infer a preference for consumptive use of resources or other uses deemed unethical and hence outlawed by a given nation or group of nations.)

"*In situ* conservation" includes "the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they

have developed their distinctive properties.”

“Sustainable use” is defined as “the use of components of biodiversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.”

Principle

The third article is called “Principle”. It includes a restatement in this international treaty of a basic rule of international common law recognized in the Trail Smelter arbitration in 1947 that is basically that nations must ensure that actions within their jurisdictions or under their control not harm the environments of others. The rule was repeated in Article 21 of the Stockholm Declaration of the first U.N. Conference on the Environment in 1972. It was originally opposed by the U.S. in Nairobi but later accepted as part of a deal that dropped considerable material from the draft articles on objectives and fundamental principles. As simple and obvious as it may seem, its ramifications are great. It is:

“States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.”

The responsibility to ensure that you do no harm to the environment of others includes no loopholes or modifiers such as “substantial” or “significant”. In 1991, when Iraq caused the oil spills that fouled the waters and fisheries of Kuwait and its neighbors, the reader may recall that the U.N. approved of tariffs to be levied on Iraqi oil for restoration costs once the embargo on its sale is lifted. U.S. and international law have similar provisions for some but not all types of damage to living natural resources. The U.S. pressed for the elimination of the more direct statements in favor of restoration and compensation

in the treaty. But the general duty to avoid harm remains and under Article 14(2) the Conference of the Parties will examine the issue of liability and redress, including restoration and compensation, for damage to biological diversity.

Key Themes

At this point it should be noted that certain themes run through the treaty and were insisted upon by many third world countries. One is that conservation will require new and additional contributions of funds from the developed world to the developing world as well as the sharing of technologies for conservation and those based on the (new) uses of biological resources. These themes and the assertion of sovereignty over resources are reactions against the experience to date of powerful nations or their corporate or individual citizens helping themselves to genetic resources of developing countries without paying for them, even when they become the basis for highly profitable agricultural hybrids or drugs that are sold back at high prices to the countries of origin. The countries of origin assert that these specimens often result from hundreds of years of careful selection and breeding by the human communities or at the very

The responsibility to ensure that you do no harm to the environment of others includes no loopholes

least, from their conservation of the resource rather than the wasting of it.

Some developing countries such as Malaysia resented any intimation that the treaty would require them to lock up vast amounts of their forests. Others such as India seemed to fear that the requirements of conservation or safety regulations would stifle their young industries. It was also evident in Nairobi that some nations had unresolved tensions between their own agencies and the balancing of language in the treaty reflects that in some cases.

Therefore, it is recognized, for ex-

ample, that conservation allows in most cases the sustainable use of resources, although special protected areas are to be established and existing treaties banning the consumptive use or commercial harvesting of certain species such as the International Whaling Convention and CITES are not overridden.

In fact, Article 22 provides that the provisions of the convention shall not affect the rights and obligations of any Contracting Party deriving from any existing international agreement, except where the exercise of those rights and obligations would cause serious damage or a threat to biological diversity. So, if a nation felt it had a right to harvest a certain allocation of a resource under a previous agreement and that resource or species were found to be in danger of extinction, there is an argument that such dangerous harvests would conflict with its duty under this treaty to conserve its resources (Articles 1 and 8) and/or its duty not to harm the environment of others or areas beyond the limits of national jurisdiction (Article 3), depending on where the resources and the activities were taking place.

Article 4. Jurisdictional Scope

In an exercise of considerable obfuscation and legal contortions, which required many days of reclusive sessions with a small group of lawyers, the U.S. insisted on and eventually obtained a new Article 4 on “Jurisdictional Scope”, the main purpose of which seems to be to avoid the direct duty to affirmatively act to conserve resources outside one’s own jurisdiction, or to assess the impact of one’s own actions or proposed actions in the jurisdictions of other nations.

The U.S. is being sued to require various impact assessments for actions overseas. The U.S. is also embroiled in a lawsuit requiring the embargo of tuna from Mexico and Venezuela whose fleets so far cannot show that their rate of killing dolphins, including certain species that are biologically depleted, is comparable to or better than that rate at which the few U.S. tuna boats setting on dolphins actually kill them. Similar lawsuits and petitions to ban the importation of shrimp and crab caught at the

expense of protected species with methods of fishing that are not allowed or used by U.S. fleets are pending. And in the debate over the North American Free Trade Agreement, environmental protection is a contentious issue.

The more *laissez faire* interpretations of the impact of the jurisdictional article on the treaty are held in check somewhat by the duty not to damage the environments of other states or the global commons in Article 3. Although it was characterized as an attempt to clarify jurisdictional questions after U.S. proposals to more directly limit the application of the more substantive articles were rejected, the Article may raise more questions than it answers.

Conservation Steps

Article 5 calls for international cooperation in respect to areas beyond national jurisdiction. Article 6 requires that each party develop or adapt strategies, plans, and programs to reflect the measures set out in the Convention and integrate conservation and sustainable use into relevant sectoral or cross-sectoral plans, programs, and policies. Prior to the Nairobi meeting, Article 6 was more explicit about the requirement that nations adopt measures for the recovery and reintroduction of endangered species and for preventing harm to the biodiversity of others and the global commons.

Identification and Monitoring

Article 7 requires each contracting party to "identify components of biological diversity important for its conservation and sustainable use having regard to the indicative list of categories set down in Annex I". Annex I describes attributes that might make ecosystems, habitats, species, communities and genomes or genes particularly important for the conservation and sustainable use of biodiversity. These include areas: of high diversity, high numbers of endemic or threatened species, or wilderness; required by migratory species; of social, economic, cultural or scientific importance; or which are representative, unique or associated with key evolutionary or other biological processes. Species at-

tributes of note include agricultural and medicinal values as well as indicator species. Finally the appendix includes described genes or genomes of social, scientific or economic importance.

In situ and *Ex situ* Conservation

The heart of the treaty is Article 8, with its conservation duties ranging from establishing systems of protected areas or areas of special conservation measures, to cooperating in providing financial support to *in situ* conservation. Other duties require: regulation and management of living resources "with a view to" ensuring conservation and sustainable use; promoting the protection of ecosystems and viable populations in natural surroundings and buffer zones around protected areas; and restoring degraded ecosystems and promoting the recovery of threatened species (a general term not excluding endangered spe-

[One] very controversial article calls for the sharing of biotechnology with developing countries

cies) through recovery plans.

In response to the concerns that the United States expressed on behalf of its biotechnology industry, a paragraph of the draft treaty was softened in Nairobi even though it had been provisionally accepted. Rather than require any regulation of the development, use and release of genetically modified organisms, in the final treaty, the parties commit to "establish or maintain means to regulate, manage or control the risks associated with ... the use and release of living modified organisms...".

What was once extensive treatment of exotic species is now one clause requiring the control or eradication of those that threaten ecosystems, habitats, or species.

Also called for is the preservation of traditional knowledge and lifestyles relevant for conservation and the promotion of wider application of them, with the approval and involvement of the holders of traditional knowledge,

and the equitable sharing of the benefits arising from such knowledge.

One paragraph (k) is unequivocal in the requirement to maintain necessary regulatory provisions for the protection of threatened species and populations. (Some in the U.S. Congress are calling for the elimination, from our current law, the Endangered Species Act, of the power to list and protect separate threatened populations when the entire species may not yet be threatened. Such a move would end U.S. protection for grizzly bears, gray wolves, bald eagles, and many others.)

There is also a clear requirement in Article 8(1) for the regulation of processes that are determined, through the party's application of Article 7, to adversely affect biological diversity.

As a complement to *in situ* conservation, *ex situ* studies and captive breeding are encouraged, with preference for locations in the countries of origin (Art. 9).

Incentives, Research, Training, and Education

Article 10 requires that nations include conservation and sustainable use in national decision-making and work with the private sector, local and traditional populations in that regard. Article 11 calls on parties to adopt economically and socially sound measures as incentives, but was reduced from a longer list of measures that specifically mentioned rights of use, international trade and pricing policies as items to consider.

Articles 12 and 13 require programs in scientific and technical education and training in identification, conservation and sustainable use in individual and public education.

Impact Assessment and Minimizing Adverse Impacts

One of the most important contributions of the treaty to the international effort is to require that each party "introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects, and where ap-

appropriate, allow for public participation in such procedures."

The U.S. alone among the world insisted on inserting "its" before "proposed projects" so that the U.S. could interpret that to limit the Environmental Impact Statement duty to federal government projects. The other nations' representatives who spoke on this point in Nairobi said that they would interpret the paragraph nonetheless to cover private, corporate and provincial projects. The article contains the duty to ensure that the likely consequences are taken into account, and to warn and take action to prevent or minimize damage or danger of damage to the biodiversity of other "states" (as treaties refer to nations). Finally, as noted above, the official meeting ("Conference") of the Parties shall examine, on the basis of studies to be carried out, the issues of liability, redress, restoration and compensation for damage to biodiversity, except where such liability is a purely internal matter.

Access

The treaty recognizes again, in Article 15, the sovereign rights of states to control access to their genetic resources but encourages the facilitation of such access to resources and the sharing of the benefits derived from them on the basis of prior informed consent and mutually agreed terms.

Transfer of Technology

This very controversial article calls for the sharing of biotechnology with developing countries but recognizes in paragraph two that "in the case of technology subject to patents and other intellectual property rights, such access and transfer shall be provided on terms which recognize and are consistent with the adequate and effective protection of" those rights.

Nevertheless, President Bush accepted the assessment of a number of U.S. biotech firms that felt that the treaty did not go far enough in establishing or recognizing patent rights over life forms or products derived therefrom.

Technical cooperation and information exchange at all levels of tradi-

tional and developed studies are encouraged in Articles 18 and 17.

Handling of Biotechnology

Contrary to claims still made by some, the treaty seems to bend over backward to avoid regulating biotechnology and requires only that parties consider the need for a protocol setting out appropriate procedures concerning safe transfer and use of living modified organisms and that they provide any available information about any regulations that may be in place and on the potential adverse impact of specific organisms to the party into which those organisms are to be introduced. Article 19 also provides for effective participation in research by the parties providing resources.

Financial Resources and Mechanism

In the last of the big three controversial provisions which the U.S. noted as objections, the treaty sets out the beginnings of a mechanism for providing new and additional funds for conservation, primarily for developing countries. The second paragraph of Article 20 provides that developed parties shall fund the full costs of implementing the convention as agreed between the developing country and what we might call the "bio-bank" which will hold funds and make grants. Article 21 calls for the Conference of the Parties at its first meeting to establish such an institution. Until the parties decide, Article 39 provides that it will be the Global Environment Facility (GEF) of the World Bank (International Bank for Reconstruction and Development), the UNEP and the UN Development Programme.

Some developed countries feared that the majority of the parties would vote to demand too much money of them under Article 20. They wanted Article 21 to specify that the World Bank which they control, or at least the GEF housed there, would be the "bio-bank" and arbiter of amounts. The developing world charged that the World Bank has been and still is quite insensitive to both the environment and open, democratic government.

Conference of the Parties: Procedures Protect Minorities

Most developed countries, and the United Kingdom cited this specifically, were persuaded to join despite their misgivings by rereading paragraph 3 of Article 23. It requires consensus agreement on rules of procedure for the Conference of the Parties, (COP's), for any subsidiary body, such as the bio-bank, and financial rules governing the funding of the Secretariat which will administer the treaty day to day.

Article 23 also gives non-government observers, qualified in the fields of conservation and sustainable use, the right to be admitted to meetings of the COP's unless one third of the parties object. This parallels the provision in CITES which has been so important in its successful development.

The treaty also calls for regular reports from parties and a subsidiary advisory body of experts open to all parties.

Reservations

Unlike some treaties, such as CITES, that allow parties to ratify with reservations declaring that they will not be subject to certain provisions, this treaty states that there may be no reservations. Although reservations can encourage more parties to accept a convention, Japanese trade in sea turtle shell (finally ending now), South African trade in ivory, and trade in many other species have perforated the protection that CITES provided for these endangered species. Parties may choose not to ratify later amendments however, and thus avoid their application.

Disputes

There are several means provided in Article 30 for dispute settlement, recognizing the many countries have accepted the jurisdiction of the International Court of Justice for many or all disputes, but that others, including the U.S., have not done so across the board.

Withdrawal

The final defense against the terms

Continued on UPDATE page 7

of the treaty, should a party feel wronged or disadvantaged, is to withdraw. Parties may withdraw after two years of membership plus one year of notice to other parties.

In addition to seeking amendments, protocols, or resolutions at the first meeting of the Conference of the Parties clarifying the provisions that the Administration found troubling, the author also suggested to the U.S. delegation in

laws of individual nations, under the standard international law of treaties leaves each nation free to adopt stricter measures, but requires conservation standards and procedures not up to the treaty's standards to be strengthened.

Entry Into Force, the Interim, and the First Meeting

The treaty enters into force on the

convene a meeting in 1993 of an Intergovernmental Committee on the Convention on Biological Diversity. The committee would begin to implement as much of the Convention as possible. Such steps would include developing guidance for countries' conservation strategies and plans and arranging technical cooperation between countries' institutions. They suggested hosting a meeting in late 1992 on biological surveys, and the UK will support a conference in 1993 on technology and another global forum for Non-government Organizations (NGOs) to follow up on their work drafting agreements among NGOs at the Global Forum in Rio.

The Wealth of Nations: "Rio-oriented"

With the exception of Mr. Bush, who vowed in his address to the world not to risk any American jobs by signing the treaty, the more than one hundred heads of state in Rio and the 153 nations that signed the treaty seemed in their statements throughout the Conference to acknowledge that economic and job security depend on our ability to sustain the environment and its components.

In classical economics, a nation's use of natural resources at rates that cannot be sustained has not been counted against it. Recent international finance in fact often seems to drive developing countries and their citizens to destroy native ecosystems and species in order to raise crops that can be exported for hard currency that buys more in today's financial system. The treaty asks that conservation and sustainable use be part of each nation's decision-making. Although it does not directly address multilateral organizations, they are agents of their constituent governments, and through them should be subject to the same controls. Therefore, it may be that the treaty will help reform the multilateral banks, even those not holding its money.

One Road from Rio or Rio deja vu?

The U.S. can participate in meet-

Signatories of the UNCED Biological Diversity Treaty

Afghanistan	Dem. People's Rep. of Korea	Lebanon	Qatar
Algeria	Denmark	Lesotho	Republic of Korea
Angola	Djibouti	Liberia	Romania
Antigua & Barbuda	Dominican Republic	Liechtenstein	Russian Fed.
Armenia	Ecuador	Lithuania	Rwanda
Australia	European Commun.	Luxembourg	St. Kitts/Nevis
Austria	Egypt	Madagascar	Samoa
Azerbaijan	El Salvador	Malawi	San Marino
Bahamas	Estonia	Malaysia	Sao Tome
Bahrain	Ethiopia	Maldives	Senegal
Bangladesh	Finland	Maldova	Seychelles
Barbados	France	Malta	Slovenia
Belarus	Gabon	Marshall Islands	Solomon Islands
Belgium	Gambia	Mauritania	Spain
Belize	Germany	Mauritius	Sri Lanka
Benin	Ghana	Mexico	Sudan
Bhutan	Greece	Micronesia	Suriname
Bolivia	Guatemala	Monaco	Swaziland
Botswana	Guinea	Mozambique	Sweden
Brazil	Guinea Bissau	Myanmar	Switzerland
Bulgaria	Guyana	Namibia	Tanzania
Burkina Faso	Haiti	Nauru	Thailand
Burundi	Honduras	Nepal	Togo
Canada	Hungary	Netherlands	Trinidad & Tobago
Cape Verde	Iceland	New Zealand	Tunisia
Central African Rep.	India	Nicaragua	Turkey
Chad	Indonesia	Niger	Tuvalu
Chile	Ireland	Nigeria	Uganda
China	Israel	Norway	Ukraine
Columbia	Italy	Oman	United Arab Emirates
Comoros	Jamaica	Pakistan	United Kingdom
Congo	Japan	Panama	Uruguay
Cook Islands	Jordan	Papua New Guinea	Vanuatu
Costa Rica	Kazakhstan	Paraguay	Venezuela
Cote d'Ivoire	Kenya	Peru	Yemen
Croatia	Kuwait	Philippines	Yugoslavia
Cuba	Latvia	Poland	Zaire
Cyprus		Portugal	Zambia
			Zimbabwe

Rio that they could sign with the knowledge that the U.S. could withdraw if their worst fears were to come true.

Affect on "Domestic" Laws

The absence of an article on the effect on "domestic" laws, meaning the

ninetieth day after the thirtieth party deposits its instruments of ratification with the U.N.

The COP is to meet not later than one year after the entry into force and then set a schedule to meet regularly.

In the meantime, a resolution adopted in Nairobi suggests that UNEP

Continued on UPDATE page 12

Florida's Nongame and Endangered Species Programs

by

Don A. Wood, Brian A. Millsap, and Patrick M. Rose

Editor's note: In the second article of our special series on state nongame and endangered species programs, we learn of the varied programs in the State of Florida. If you would like to contribute an article for your state, please contact the editor.

The 1893 enactment of a protection law for the manatee (*Trichechus manatus latirostris*) marked the first action by the State of Florida intended specifically to accommodate the welfare of a "nongame" species. Subsequent laws and regulations over the ensuing 80 years provided varying degrees of protection to a number of other non-exploited individual species, primarily those believed to be under some threat. More specific attention and protection for such species was provided in 1972, when the Florida Game and Fresh Water Fish Commission (GFC) promulgated the first official state "endangered" species list, with attendant protective regulations. The listing concept was expanded in 1973 to include "threatened" species, and again in 1979 to include species "of special concern." By 1992, the total number of vertebrate and invertebrate species listed was 116 (42 endangered, 27 threatened and 47 of special concern). Fifty-one of those species are also on the federal list, along with 37 Florida plants. Three agencies share jurisdiction over listed species, and all other plants and animals in Florida: the GFC, responsible for terrestrial wildlife and freshwater fish, the Florida Department of Natural Resources (DNR), responsible for marine species, and the Florida Department of Agriculture and Consumer Services (FDACS), responsible for plants.

Research attention to nongame species in Florida began rather modestly in the mid-1960s when the GFC initiated annual aerial brown pelican (*Pelecanus occidentalis*) nesting surveys, and the DNR funded a manatee survey. In the

early 1970s, the GFC initiated annual aerial bald eagle (*Haliaeetus leucocephalus*) nesting surveys, which continue to date, and research projects involving sandhill cranes (*Grus canadensis*) and red cockaded woodpeckers (*Picoides borealis*). The DNR also increased its involvement in endangered species activities in the early 1970s with initiation of a sea turtle nesting research project and a green sea turtle (*Chelonia mydas*) "head start" program, and, in 1975, promulgation of manatee protection regulations in Blue Spring State Park.

Despite those early projects, however, the opportunity for Florida to embark upon a truly substantive and comprehensive endangered species program did not come until 1976 when federal funding for such a program became available through Section 6 of the federal Endangered Species Act of 1973. The GFC and DNR negotiated for participation in that federal program, and as a result Florida joined 10 other states in 1976 in becoming the first in the nation to enter into an Endangered Species Cooperative Agreement with the U.S. Fish and Wildlife Service (USFWS), thus qualifying for the Section 6 funds. A considerable proportion of both the GFC's and DNR's endangered species involvement continuing to date is funded through that federal program.

Significant developments independent of the federal grants-in-aid program, however, occurred throughout the late 1970s and 1980s. The Manatee Sanctuary Act was enacted in 1978, in part enabling the DNR to greatly expand its manatee efforts, initially through public awareness programs and the establishment, posting, and enforcement of 13 boat speed protection zones. Also, the Manatee Technical Advisory Council was appointed in 1980 (with funding from the Marine Mammal Commission), and the following year the Save The Manatee Committee was established by

Executive Order of Governor Bob Graham. The Florida Legislature established a Nongame Wildlife Trust Fund and Nongame Wildlife Program in 1983-84, with primary administrative responsibility for the Fund and Program vested with the GFC. Attention and some protection for endangered and threatened plants was provided by the enactment of the Preservation of Native Flora of Florida Act in 1985, with administration responsibilities vested with the FDACS.

GFC Program Organization and Content

The current GFC endangered species program consists of six basic elements: coordination, listing, research, technical assistance/habitat protection, law enforcement and information/education. [See boxes, pages 9 and 10, for case studies.] The coordination element, funded through the federal Section 6 program, involves oversight of the entire scope of the program. The listing process involves review of listing proposals by a recruited, ad hoc panel of "endangered species consultants," consisting of 90 members of Florida's scientific and conservation communities, and effecting changes through the state rulemaking process (the GFC's five-member Commission ultimately approves any listing changes). The research element consists of projects involving the Florida panther (*Felis concolor coryi*), American crocodile (*Crocodylus acutus*), snail kite (*Rostrhamus sociabilis*), Florida grasshopper sparrow (*Ammodramus savannarum floridanus*), bald eagle and brown pelican. The crocodile and kite studies and portions of the panther work are funded through the federal Section 6 program; the others are funded through state programs. The technical assistance/habitat protection element provides biological input and recommen-

Continued on UPDATE page 10

Case Study: Managing Urban Owl Populations

The Florida burrowing owl (*Athene cunicularia floridana*), a disjunct subspecies of this widespread species, occurs in native prairies, parks, pastures, and vacant lots across the Florida peninsula from Jacksonville southward through the middle Keys. Like many other arid-adapted taxa, burrowing owls probably colonized Florida from western North America during early to mid Pleistocene glacial periods when a circum-Gulf arid dispersal corridor existed. Early records of burrowing owls in Florida were mainly from the dry prairies of the central peninsula. Land clearing for housing developments and cattle grazing on the coasts and in the northern peninsula has increased the amount of suitable habitat for this species in Florida, and burrowing owls have expanded their range into these newly created habitats. Burrowing owls are currently very local in distribution but attain remarkably high densities (up to 44 pairs per mile) at some sites. However, these locally flourishing populations are not necessarily secure for long periods of time; there are numerous examples of population crashes leading to local extirpations. The net status of this subspecies is a function of the relative rates of establishment and collapse of these metapopulations. Because of

its uncertain future, the GFC listed the burrowing owl as a species of special concern in 1979.

Since 1987, GFC Nongame Wildlife Program staff has been working with local volunteers and city governments to determine appropriate owl management strategies. One of the largest extant metapopulations is located in the city of Cape Coral on the southwest Florida coast. Initial surveys there by students and faculty at Appalachian State University in

1986 documented 133 breeding pairs on a representative 24 mile study area there. Most pairs were nesting in burrows on small vacant lots in residential neighborhoods. Surveys also revealed a high rate of nest failure due to accidental destruction during home building and harassment by school-aged children.

In 1987, GFC, the Audubon Soci-



Burrowing owl. Photograph by Brian A. Millsap

ety of Southwest Florida, and a core of Cape Coral teachers initiated a campaign to increase awareness and appreciation of burrowing owls among Cape Coral's students. Concurrently, GFC and the Audubon Society of Southwest Florida initiated a five-year monitoring program of burrowing owl populations on the representative study area.

By the end of the 1988 school year, every elementary and middle school student in the city had attended at least one presentation on burrowing owls.

Many were card-carrying members of an ad hoc student organization named the Owl Watchers League (membership entailed commitment to protect owl nests around the member student's home), and many others were involved in school projects monitoring the fate of owl nests on schoolgrounds. In addition, staff in the City Planners Office in Cape Coral joined with the GFC to more fully protect occupied owl nesting burrows from destruction during development. Prior to the issuance of any building permits, lots are now inspected to determine if owl nesting burrows are present. If a nest burrow is found, and if the nest cannot be protected during the course of construction, development is deferred until outside the nesting season. In 1991, this policy resulted in the protection of over 250 nest burrows city-wide that would have otherwise been destroyed during the course of the nesting season.

How effective have these steps been? On the representative study area, the rate of nest success (percent of nest attempts that produced at least one fledged young) increased from 56.2% in 1987 to 67.2% in 1988. This increase, at least in part, can be attributed to a reduction in the number of breeding attempts lost to harassment and construction-related disturbance.

The increase in nest success resulted in about 60 more young fledging in the study population in 1988 than in 1987. Following the increase in nest success, the number of breeding pairs on the intensive study area grew from 149 in 1987 to 160 in 1988 to over 200 in 1990. Although data are still being analyzed, these preliminary results suggest that with proper management, Florida's urban burrowing owl populations can persist and even thrive.

dations to state and local governmental agencies, developers, landowners, etc. regarding the welfare of a given species

in a specific context (e.g. in a planning document, zoning action or land use change proposal). It also interacts with

state, regional and local permitting agencies to insure sufficient wildlife habitat protection measures in any permits that

Case Study: Re-establishment of Beach Mice

Beach mice, (eight subspecies of *Peromyscus polionotus*), occupy coastal and barrier island primary and secondary dune systems and feed on the seeds of sea oats, bluestem and other dune vegetation, and on small invertebrates. They are burrowers, excavating tunnel systems into the sides of dunes.

Beach mice are perhaps the most endangered closely interrelated group of terrestrial mammals in North America. Five of the subspecies are listed as endangered and a sixth as threatened. Beach development has brought about the precarious status of beach mice, primarily by directly destroying or usurping beach mouse habitat. Two other, more subtle, indirect factors are also involved. Development, especially housing, brings with it free-roaming house cats and dune system invasion by house mice. House mice displace beach mice, and cats are efficient predators of small mammals.

In 1986 the Florida Game and Fresh Water Fish Commission and the USFWS jointly planned, funded and initiated a project to increase the survival of the Perdido Key beach mouse and Choctawhatchee beach mouse through reintroductions into vacant areas within their respective historical ranges where suitable, protected habitat still existed. The Perdido Key mouse once occupied the dune systems of nearly all of Perdido Key, which is situated partly in Florida and partly in Alabama. By the mid 1970s, however, development had severely restricted its distribution. Then, in 1979, Hurricane Frederick struck Perdido Key (the eye passed over the Florida portion of the Key), and subsequent surveys revealed that the mouse was com-

pletely gone from the Florida side of the island. It survived only in Gulf State Park in Alabama, with an estimated population of fewer than 30 mice.

The Choctawhatchee mouse once occurred fairly continuously along a 50-mile stretch of Gulf coastal beaches from Panama City to Fort Walton Beach, but had become reduced to two small and widely separated subpopulations. About 500 individuals were estimated to comprise the entire population in the late 1970s.

The re-establishment site selected for the Perdido Key form was the protected dune systems of Gulf Islands National Seashore (on the Florida side of Perdido Key), where it had occurred prior to Hurricane Frederick. The site selected for the Choctawhatchee form was the protected dunes of Grayton Beach State Recreation Area in Walton County, which was intermediate in location between the two remaining, but separated, subpopulations.

Annual captures and translocations were made from fall 1986 through spring 1989, spread out over that three-year period to enable the donor populations to replace removals through natural reproduction. Seventeen pairs of Perdido Key mice and 14 pairs of Choctawhatchee mice were relocated during that time. All mice were marked for future identification, initially introduced into and briefly maintained in predator-proof acclimation enclosures, and then released. In addition, seven pairs of Perdido Key mice and six pairs of Choctawhatchee mice were transported to facilities at Auburn University for captive breeding purposes. Perplexingly, the former never successfully produced young, but the latter did, with that captive colony growing to over 100 individuals. Forty of the captive-produced Choctawhatchee mice

were released at Grayton Beach to augment the 28 wild-to-wild relocatees. Surveys and live-trapping at each of the re-establishment sites in 1987, 1988, and 1989 indicated the efforts were apparently a resounding success. In July 1988 at Gulf Islands, 55 Perdido Key mice were captured and released along a four-mile stretch of beach, 51 of which were unmarked and therefore the offspring or further removed descendants of translocated individuals. Continuous beach mouse sign was also found along an additional two-mile stretch of beach. Further trapping efforts on Gulf Islands in 1990-91 yielded 124 more captures. Considering the confirmed reproduction and expansion of the translocated population, the Perdido Key beach mouse is now apparently firmly re-established in Florida, representing the first such re-establishment of any vertebrate which had been previously extirpated from the state.

The release program for Choctawhatchee mice at Grayton Beach cannot yet be confirmed to be altogether successful. In late 1988, limited beach mouse sign was observed and one unmarked individual was captured, indicating reproduction had occurred, but those results were not substantial enough to form definitive conclusions as to the success or failure of the effort. Further live-trapping there in May 1989 resulted in only three additional captures, but extensive beach mouse sign was observed.

To ensure unqualified success, both re-established populations are being monitored, with plans to periodically capture and interchange individuals between each of the respective source and re-establishment sites.

Case Study: Manatee Salvage and Necropsy

Being struck by watercraft is the primary human-related mortality factor incurred by manatees. In 1985, the Florida Department of Natural Resources assumed full responsibility for a manatee carcass salvage program initiated by the U.S. Fish and Wildlife Service in 1974. The total

number of such watercraft related deaths set a record high in 1991 at 53 (see Table). Perinatal deaths (those manatees determined to have died at or around the time of birth or early post-natal development) also set a record high in 1991 at 53, continuing a steep upward trend. Deaths caused by water control

structures, primarily canal locks and salinity dams, are decreasing from historically higher levels; nine deaths were attributed to these structures during 1991. Approximately 16 manatees were rescued and 7 were rehabilitated and released during the last year.

Known manatee mortality, 1979-1992

Year	In Florida	Outside Florida	Total	Boat/Barge Collisions (%)
1979	77	1	78	24 (31)
1980	63	4	67	16 (24)
1981	116	3	119	25 (21)
1982	114	6	120	20 (17)
1983	81	0	81	15 (19)
1984	128	3	131	34 (27)
1985	119	9	128	35 (26)
1986	122	3	125	33 (26)
1987	114	4	118	39 (33)
1988	133	1	134	43 (31)
1989	166	8	174	50 (30)
1990	206	12	216	47 (23)
1991	174	7	181	53 (30)
1992 (thru June)	98	2	100	20 (20)
Totals:	1711	61	1772	454 (26)

are issued. The law enforcement and information/education elements have systematic, concerted aspects as well as function on an as-needed basis.

The GFC's nongame program encompasses the endangered species program as well as four additional coordinated but independent organizational elements: (1) a wildlife section, (2) a habitat protection section, (3) an education section, and (4) an urban wildlife section. Twenty-six GFC personnel are assigned to the program, as are three contractees at the University of Florida. The latter positions constitute the Urban Wildlife Section. Annual operating expenses of the program are about \$2.0

million. Revenue into the Nongame Wildlife Trust Fund is primarily derived from a \$4 surcharge on vehicles bought in other states, assessed when they are registered in Florida, and secondarily from contributions, donations and grants and contracts. Over 80% (\$1.4 million) comes from the \$4 surcharge on out-of-state vehicles. Nongame Wildlife Program activities fall into eight basic functional areas: research grants, survey and population monitoring, technical assistance, habitat and species management, habitat protection, information and education, utilization and exploitation assessment, and planning.

DNR Protection of Turtles, Whales, and Manatees

The DNR's protected/listed species efforts are administered through its Office of Protected Species Management (management) and the Resource Recovery Section of the Florida Marine Research Institute (research). Significant support activities, however, are provided by the divisions of Law Enforcement, State Lands, and Recreation and Parks. Program efforts are focused on the manatee, right whale (*Eubalaena glacialis*) and the five species of sea turtles which occur in Florida waters. The manatee program is long standing and securely

funded through the Save The Manatee Trust Fund, with an annual operating budget of approximately \$2 million. The sea turtle efforts, however, are in jeopardy if a secure funding source is not found soon. The DNR received a one-time state general revenue appropriation of \$300,000 for sea turtle work in fiscal year 1991-92, but unless another source of funds is found for subsequent years, five of six sea turtle positions will of necessity be terminated.

The sea turtle efforts consist of (1) biological and ecological research, (2) population censusing, (3) assessment of mortality factors, (4) habitat protection, including reviewing permits for coastal construction projects, and (5) coordination of research and management efforts through a state permit system under cooperative agreement with the USFWS.

The DNR's right whale involvement is primarily contributory to the U.S. National Marine Fisheries Service's research and management efforts. The right whale calves in northeastern Florida coastal waters, and work there is directed toward determining the number of calves born and otherwise monitoring the seasonal presence of whales.

Twenty-six DNR positions are assigned to the manatee research and protection efforts. A salvage and rescue program is included within the scope of that work, designed to determine the various causes of mortality and facilitate actions to reduce future deaths, and the rescue, rehabilitation, and release of injured or sick manatees. A wildlife pathologist is assigned to the program, and a toll-free DIAL FMP hotline number is maintained for reporting carcasses and manatees in need of rescue. Con-

struction of a research-grade necropsy facility at Eckerd College is being planned.

Manatee populations are being censused via aerial surveys, with several statewide synoptic surveys of manatee wintering habitat in Florida and southeast Georgia made during 1991 and 1992. Those surveys resulted in a record count of 1,856 manatees in January 1992, a new minimum population figure.

VHF and satellite radio transmitter monitoring technologies are also used, involving capturing manatees, fastening a belt around the narrow part of the tail stock, and affixing a floating transmitter to the belt by way of a 4-foot semi-rigid nylon tether. The tag is designed to pull free of the animal if it becomes snagged and will eventually fall off the animal as a result of corrosive action over time. Locational data are recorded through radio tracking in small aircraft, boats, or land vehicles, and stored by the ARGOS system, and can be down-loaded by computer modem as to the latitude and longitude of the animal, as well as the date and time of the confirmed "satellite hit."

A Marine Resources Geographical Information System (MRGIS) is in place, containing databases on marine, freshwater, and wetland natural resources in Florida. Those data and mapping are used extensively in the preparation of manatee protection plans and speed zone rules.

A 13-county initiative to adopt rules regulating the speed and operation of motorboat traffic is underway in counties with the highest manatee mortality and abundance. The speed zone rules, however, are only one piece of the larger

protection picture which must consist of actions to protect manatees and their habitat through long term management strategies for their entire ecosystem and adjacent systems that impact their habitat.

The successful protection and recovery of manatees is dependent upon strong public support, which in turn is dependent upon the public's awareness of the difficulties the manatee is facing and how individual citizens can assist in the overall recovery and protection of the species. The human-related problems that face manatees and their ecosystem did not develop suddenly, nor will they be solved quickly. To be truly effective, manatee protection must be done in concert with the preservation of the remarkably diverse and biologically complex ecosystems in which the manatee lives.

While Florida's nongame and endangered species programs are substantial in comparison to many other states, the fact is that the welfare of only a relatively few species is being significantly accommodated. Being a peninsula extending from the tropical zone to the temperate, Florida is uniquely rich in biodiversity. Thus, the needs here are greater, and the problems larger and more complex than in most other states. The dilemma, of course, is whether to concentrate our limited resources on a few species so as to maximize effect, or spread them thinly among many, minimizing efforts on an individual basis.

Don Wood is Endangered Species Coordinator for the Florida Game and Fresh Water Fish Commission, (GFC); Brian Millsap is Chief of the Bureau of Nongame Wildlife for GFC; and Patrick Rose is Director of the Office of Protected Species for the Florida Department of Natural Resources.

Continued from UPDATE page 7

ings as an observer with no vote even if it has not ratified the treaty. It can also work with those who have ratified the treaty to persuade them to adopt such interpretations or changes as may be necessary to draw the U.S. in. Or it can sign and ratify it and seek to achieve whatever reforms necessary as a voting and contributing party. In either case it would be wise to work with the parties to ensure that as the treaty develops we are

mutually aware of procedures and technologies that make sense.

Whether or not we join that body or join soon, it may be wise to adopt as many of its conservation and other practices as possible both in order to save our wildlife and in order to encourage trade in goods, services, technologies, genes and ideas. The treaty calls for access to these things generally to be provided to parties, and by inference raises the threat

that access may be cut off or reduced for those who do not comply with its terms. Whatever the result, it is now clear that the issue of the conservation of biological diversity will remain high on the agenda of policy makers here and around the world.

John M. Fitzgerald is Counsel for Wildlife Policy at Defenders of Wildlife in Washington, D.C. He represented Defenders at the Kyoto (CITES) and the Nairobi and Rio (UNCED) meetings.

Report From the Field

Public Education Efforts on the ESA Reauthorization

by Nancy A. Hotchkiss

The Endangered Species Act (ESA) has been essential in the preservation of endangered wildlife in the United States for the past twenty years. In November 1991, Congressman Gerry Studds (D-Mass) and 30 cosponsors introduced legislation to reauthorize and strengthen the ESA. As of July 1992, that number had tripled to 97. Next year's reauthorization of the Endangered Species Act of 1973 will be one of the most important conservation votes of the 90s. The American Association of Zoological Parks and Aquariums (AAZPA), a professional association dedicated to fostering excellence in zoos and aquariums, is actively working on the reauthorization of the ESA in two important ways: through lobbying and public education.

Why is the AAZPA involved? Modern zoos and aquariums rate conservation as their number one priority. They have been instrumental in some of the best comeback stories of the ESA. Black-footed ferrets, bald eagles, California condors and red wolves are just some of the species that zoos have housed, bred and reintroduced to protected wilderness areas.

Today's zoos and aquariums provide a unique view of wildlife. While television, books, movies and videos can provide factual information, they cannot match the emotional impact of seeing live animals. For some people, a visit to their local zoo or aquarium may be their only experience with animals outside their neighborhood. This eye-to-eye contact fosters positive attitudes toward wildlife and wild places. Our task is to take this energy and enthusiasm and turn it into positive action for the environment.

The AAZPA has joined forces with a number of other conservation groups as a member of the Endangered Species Coalition. Composed of over 40 environmental, professional and animal welfare organizations, the Coalition works as a lobbying force in Washington, DC. Preliminary involvement on the legislative front led to discussions about how

we can use our zoos and aquariums to get the word out; the AAZPA brings to the Endangered Species Coalition an unparalleled level of contact with the general public. Much of the future fate of the ESA lies in the hands of the public, and their actions taken towards their elected officials may make or break the reauthorization movement.

In the area of public education, AAZPA has formed a partnership with the National Audubon Society (also a member of the Endangered Species Coalition) to raise awareness of the ESA. By combining our resources we will reach a number of audiences which will make a big difference in public opinion and pressure. Pairing with the National Audubon Society seemed a natural mix: Audubon has a strong track record of producing timely written materials on environmental issues and encouraging advocacy; the AAZPA is able to reach a large percentage of the population.

Annual visitorship at the 158 AAZPA zoos and aquariums is nearly 105 million. People come to these facilities for a variety of reasons: to spend a quality family day, to be outdoors, to see animals, and to learn about wildlife. Zoos and aquariums are primarily informal education centers—allowing the visitors to learn and experience at their own pace. The educational message is conveyed through a variety of methods: graphics, publications, naturalistic exhibit design, interaction with keepers, volunteers and education staff, and structured programs. Each of these methods reaches different audiences with the same overall goal; to shape positive attitudes towards wildlife. AAZPA member institutions are pleased to be a natural "bridge" for the public to learn about the history and future of the ESA. Involvement with the reauthorization of the ESA is a perfect opportunity for our staff and visiting public to become a strong voice in the conservation movement.

Our public education campaign has focused on many levels and audiences. First, we have been communicating regularly with our combined member-

ship of 116,500 through newsletters and special mailings. We have sent "tool kits" consisting of fact sheets and background information on the ESA, as well as brochures of pointers for letter writing, making phone calls, and starting a grassroots campaign. By disseminating this information to AAZPA zoos and aquariums, education staff can in turn reach millions in the general public. Some zoos have already initiated on-site letter writing campaigns. Others have shown an educational video entitled, "An Act Worth Keeping", developed by Audubon and customized by each zoo.

Secondly, we have provided training and opportunities for members to lobby in Washington, DC in support of the Act. Delegates to the AAZPA Northeast Regional Conference and the Audubon Regional Conference participated in training and issues workshops, then went to Capitol Hill. Meetings were scheduled with their home jurisdiction representatives so their opinions could be heard.

Lobbying can be intimidating, but exhilarating. It is not an exclusive job. Any informed and interested citizen has the right to speak with their elected officials, and we encourage you to speak out in favor of the reauthorization. Timing is one of the hardest issues in conducting a public education campaign dealing with legislation. We must be careful not to get our public fired up prematurely, and lose all that positive energy. Until the Congressional debate is scheduled, our efforts are focused on information and readiness. Once the debate begins in earnest, we can activate our groups to take action. For a complete information packet on the ESA reauthorization and lobbying tips, please write the author.

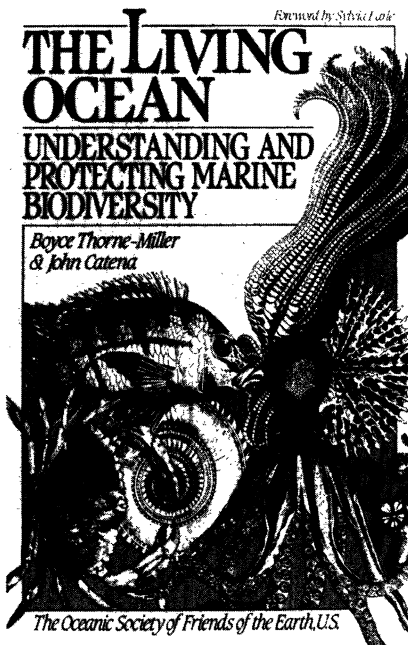
Nancy Hotchkiss is AAZPA's Director of Education. Her background over the past 12 years involved positions at the National Zoo, Bronx Zoo, Philadelphia Zoo and the National Aquarium in Baltimore. Her address is: AAZPA Conservation Center, 7970-D Old Georgetown Road, Bethesda, MD 20814.

Book Review

The Living Ocean: Understanding and Protecting Marine Biodiversity

By Boyce Thorne-Miller and John Catena. 1991. Island Press, Wash., D.C.
Price \$12.95. 189pp.

Reviewed by James S. Diana



This book is designed to present "an overview of biological diversity in marine environments to help open the way to a new global policy on the relationship of human societies to the living ocean". It is directed to environmentalists, environmental policy makers and managers, and to lay readers. Writing to this broad audience is difficult. The book overviews many areas of marine biology, of biodiversity, and of marine policy but does so at a technical level which is too shallow.

The book carries through it several important lessons. The first lesson is that the ocean system is under-appreciated in the management of biodiversity. One of the most convincing reasons why we should pay more attention to marine biodiversity is that the marine fauna and flora often represent diversity at much higher taxonomic groups than in endemic terrestrial systems. The second lesson was the recent determination that deep benthic communities are much more diverse than previously believed. A third very important concept they emphasize is that higher species diver-

sity should not impart greater value to certain ecosystems; what is important is the diversity required for ecological function to be maintained.

The authors acknowledge several types of diversity: species diversity, ecological diversity, genetic diversity, and functional diversity. They believe that the last category is more important than species diversity as a management concept in the marine system because it does not require the cataloging of species, yet I fail to see how we can understand and protect functional processes. The authors list several threats to marine diversity, such as debris, habitat destruction, pollution, and over fishing. In the last case they present the typical argument that the catch is declining and the seas will never produce the food that was expected by scientists of the 1960s. FAO (Food and Agriculture Organization of the United Nations) fishery statistics indicate that catch has not yet declined, and while many people expect it to decline in the future, policy decisions should be based on data rather than expectations.

The authors present a nice overview of key concepts and issues in biodiversity, and review nicely some of the ecological factors that cause gradients found in marine biodiversity. They speculate that endemic marine species may be more frequent than previously thought, but present no references or data to support this assumption. They also give a very unusual explanation (the constancy of the environment) for the dominance of poikilothermy in the sea, while it is most commonly believed that the high heat capacity of water makes endothermy too costly for most aquatic animals. The authors struggle with the dichotomy between use and conservation, stating once that conservation and use may not be reconciled, yet later evaluate means to reconcile them. This

struggle is inevitable for all thoughtful ecologists, and managers must develop methods to conserve natural systems in the face of this use if we are to succeed. The authors discuss economic incentives for restricting destructive uses (e.g., the "debt for nature" exchange with developing countries) that really must be reversed—it is the developed countries which have often produced the economic incentives and the demand for those destructive uses! Developed countries must put their exploitative ways behind them before we can expect to effectively restrain exploitation in developing countries, and policy makers must understand this dilemma in order to be effective.

The review of marine communities is reasonable, but lacks enough detail for most readers to learn much. The discussion of national and international policy suffers from the same problem. The final chapter emphasizes future needs for conserving marine biodiversity, including more long-term and more taxonomic research in oceans. The authors evaluate economic values of diversity while ignoring the work of H. T. Odum and his colleagues on ecoenergy, or the value of organisms based on their energy fixation.

In summary, I find this a book that initiates ideas, but does not develop them sufficiently. Its broad approach and its superficial coverage of most topics fails to meet its titled objective of understanding and preserving marine biodiversity. However, it stimulates enough thought that it may initiate more evaluation of the ocean as a critical and diverse environment, which is in itself a worthwhile goal.

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Bulletin Board

USFWS Endangered Species Technical Bulletin

Our readers will be happy to note that this issue of the *Endangered Species UPDATE* contains the Jan/Feb 1992 USFWS Endangered Species Technical Bulletin. Please be assured that you have not missed any Technical Bulletins. As always, the *UPDATE* includes the latest issue of the Technical Bulletin as soon as it is produced and forwarded to us from the USFWS. However, due to the current irregularity of the Technical Bulletin's production schedule, you may, at times, receive an *UPDATE* without the Bulletin, simply because there is no Bulletin. Thus rather than hold up production of *UPDATE* issues, the *UPDATE* publishes on its regular schedule. Thank you for your understanding and patience.

Book on Naturalistic Exhibition of Primates Available

Applying Ecological Principles to Captive Primate Environments draws upon an extensive literature review and over a decade of captive primate husbandry. It is a revised M.S. biology thesis (211 pp. + iv) submitted for degree August 1991 to the University of

Toledo, Ohio, by Bruce Clark. The manuscript is being sold at cost to individuals interested in quality and dignified captive care and innovative colony management. Copies cost \$15.50 (in U.S.) and \$17 (Abroad; money order in U.S. dollars only) including surface postage and handling, and are available from Bruce Clark, 1958 Brame Place, Toledo, OH 43613-4515.

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Special Sale of Special Issues

Special Issues of the *Endangered Species UPDATE* are comprehensive treatments of selected topics in endan-

gered species conservation. The 1990 edition is entitled *Captive Breeding and Reintroduction* (27 articles, 88 pp.); the 1989 edition is entitled *Recovery Planning* (8 articles, 40 pp.); the 1988 edition is entitled *A Fifteen Year Retrospective on the Endangered Species Act* (8 articles, 48 pp.). Each issue costs \$4.00, or order all three for \$11.00 and save! Make check payable to The University of Michigan, and send it to the address below on the left of this page.

Conservation Genetics and Evolutionary Ecology Symposium

The Ohio State University and the Columbus Zoo are hosting this international symposium subtitled: A case study of the cichlid fauna of Lake Victoria. It will be held from Oct. 30–Nov. 2, 1992 in Columbus, Ohio. The meeting will bring together geneticists, ecologists, fisheries scientists, aquarium and zoo curators, among others, to discuss endangered fish communities. Registration deadline is Sept. 30. For more information, write to Conservation Genetics Symposium, P.O. Box 188, Powell, OH 43065-0188.

Announcements for the Bulletin Board are welcomed.

Endangered Species UPDATE

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