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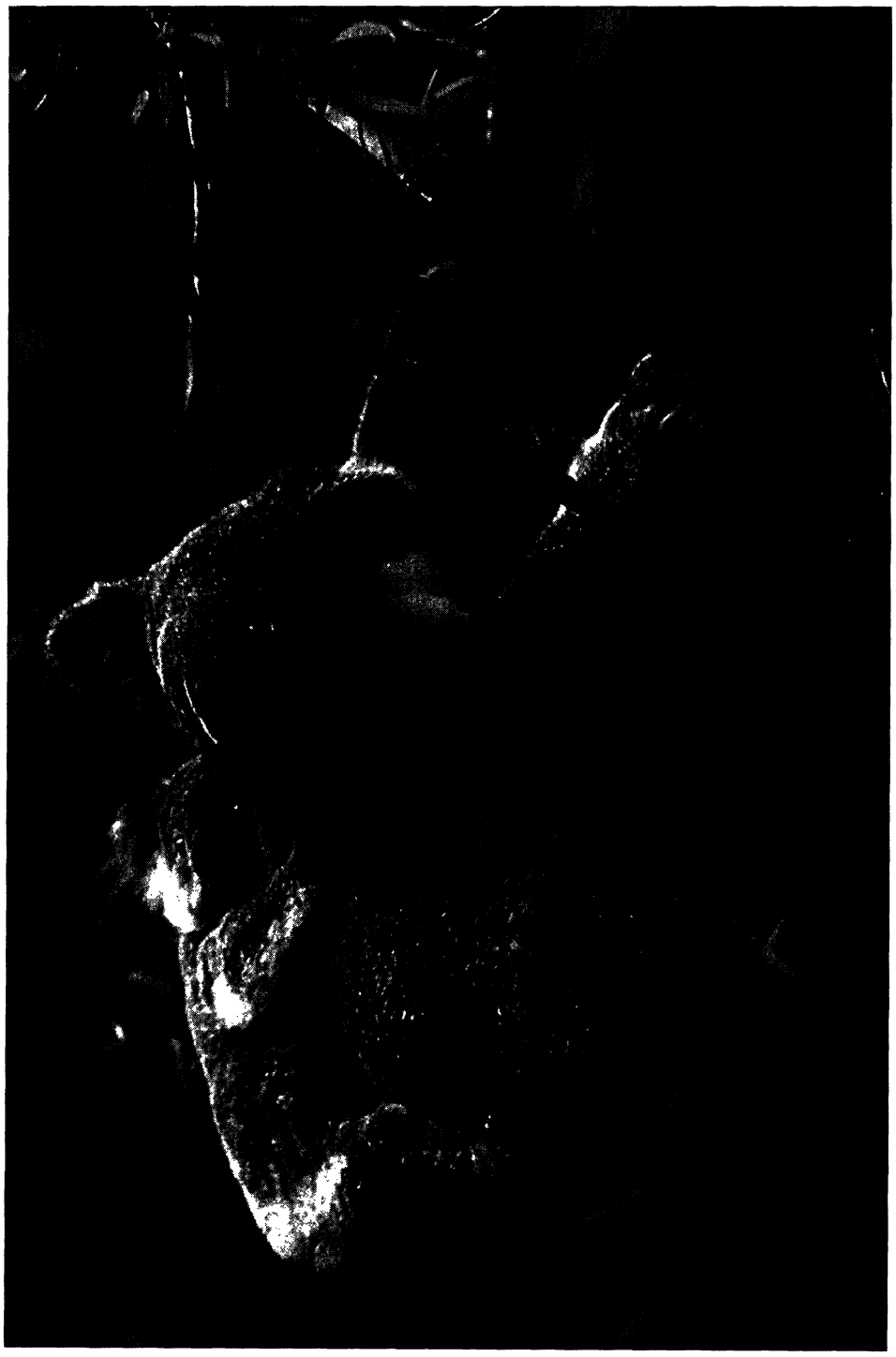

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Endangered Species Conservation in Australia: A Partial Review and Recommendations

by

Gary N. Backhouse and Tim W. Clark

Australia is in the middle of the planetary biodiversity crisis. It has the world's highest extinction rate for mammals in modern times, and an estimated 20% of the country's vertebrate fauna is currently at risk (Recher and Lim 1990). The growing list of threatened flora and fauna reflects wide-scale habitat alteration in Australia—50+% of the country's soils are significantly degraded, and over 75% of the native vegetation has been extensively modified by clearing, fragmentation, and alteration (Fry and Benson 1986). However, as the only country occupying an entire continent by itself, Australia has a unique opportunity to effect widespread improvements without the complications and delays of international agreements.

This paper reviews some recent initiatives to stem the Australian extinction crisis and looks at the recommendations of the 1993 Australasian Wildlife Management Society (AWMS) symposium. The proceedings, *Case studies and policy initiatives in endangered species recovery in Australia* (Backhouse and Clark 1995), were published together with those of another symposium, *Wildlife conservation and management on private land* (Bennett 1995), in a book called *People and nature conservation: Perspectives on private land use and endangered species recovery* (Bennett et al. 1995), published by the Royal Zoological Society of New South Wales.

Redressing Biodiversity Loss

The magnitude of Australia's extinction problem is indicated in two recent assessments at the federal level. First, the Commonwealth's Endangered Species Protection Act 1992 (ESP Act) lists 40 vertebrate taxa believed extinct and another 150 threatened, about 75 plant taxa extinct, and another 870 threatened since European settlement of the continent. Additionally, Briggs and Leigh (1988) list about 2,000 plant taxa most likely rare or threatened. Second, the federal government, in the form of the Australian Nature Conservation Agency (ANCA), is producing a series of comprehensive, national "Action Plans" for the conservation of threatened vertebrates. The four plans produced to date and currently being implemented cover 27 taxa of marsupials and monotremes (Kennedy 1990), 95 taxa of birds (Garnett 1992), 24 taxa of freshwater fish (Wager and Jackson 1993), and 47 taxa of reptiles (Cogger et al. 1993). Additional action plans for frogs, rodents, and cetaceans are underway. These are important and encouraging steps to stem Australia's biodiversity loss.

Conservation actions are also underway at the state level. Victoria, for example, has lost about 20 vertebrate and one invertebrate species since European settlement nearly 180 years ago. Another 170 vertebrate taxa and a minimum of 50 invertebrate species are currently threatened (Conservation and Natural Resources 1993). Nearly 30 plant taxa are possibly extinct and another 660 rare or threatened (Gullen et al. 1990). The state's conservation response was the Flora and Fauna Guarantee Act 1988 (FFG Act). As of October 1994, 98 taxa of vascular plants, 93 invertebrates and vertebrates, 14 biotic communities, and 12 potentially threatening processes have been listed under the FFG Act. Action Statements (mini-recovery plans) have been prepared and are being implemented for 53 taxa. Several other states are considering adopting legislation similar to Victoria's.

Australia's response to the extinction crisis is noteworthy for several reasons. First, appreciation of the biodiversity crisis is widespread right through to the highest levels of government, although, needless to say, more attention would be helpful. Second, the 1988 FFG Act and 1992 ESP Act differ significantly from the American Endangered Species Act of 1973 (as amended) in that they not only protect threatened taxa, but they also list and protect threatened communities and identify and eliminate threatening processes in the environment (e.g., habitat loss, feral predators). Third, a systematic strategy is developing in the form of the *Threatened Species Conservation Strategy for Australia* (Kennedy and Burton 1986) and the *Australian National Strategy for the Conservation of Australian Species and Communities Threatened with Extinction* (ANPWS 1992). Fourth, an increasing number of scientific, management, and policy conferences are focusing on this issue. Since the September 1989 Conference on Management and Conservation of Small Populations in Melbourne (Clark and Seebeck 1990), nearly a dozen conferences, small and large, have focused on biodiversity loss. Finally, in addition to government actions, numerous efforts are being initiated within scientific, academic, and citizen group communities to address this local, national, and global problem.

Case Studies and Policy Analyses

Ultimately, how these myriad policies, strategies, action plans, recovery plans, and other actions are implemented on the ground will make the difference between survival and extinction for species and communities. *Case studies and policy initiatives in endangered species recovery in Australia* (Backhouse and Clark 1995) focuses on implementation of conservation efforts and encourages improvements. Con-

An intensive cooperative program has helped to improve the status of the Eastern barred bandicoot, a grassland marsupial. Photograph by Tim W. Clark.

tributors to the AWMS symposium presented their implementation experiences and addressed such questions as: Are species being recovered effectively? Are "traditional" approaches to restore threatened species working? Do recovery programs target areas of greatest need? Are implementation problems being identified and rectified? What lessons can be learned from these experiences? Can more effective, practical means for improving threatened species recovery be suggested?

The cases in this book exemplify some of the challenges facing biodiversity conservation in Australia, explore the utility of various solutions, and make recommendations based on the contributors' hard-won experience. Invertebrates—the "neglected fauna"—are acknowledged as especially important in ecosystem functioning, yet very limited data are available and few recovery programs are in place. Habitat and community conservation is believed to be the only reasonable strategy to conserve invertebrates. Butterflies are a unique group amongst invertebrates, however. Because comparatively more data exist for them and because the public knows and enjoys them, butterflies may serve as a "flagship" for all invertebrates. They may even serve to elevate the profile of the extinction problem and educate the public and decision makers about all endangered species.

A new look is also being taken at freshwater fish conservation. A fundamental, strategic shift has taken place in recent years. Rather than view fish only as an economic resource, managers now realize that fish should be the focus of concerted conservation attention. This in turn has led to new conservation initiatives for habitat and watershed protection and public education.

Unlike the commercially important, heavily managed, and relatively well studied fish, the threatened striped legless lizard is a very rare grassland dwelling species, few specimens of which have ever been collected. As is common in many threatened species programs, uncertainty abounds in this case. The species persists in small, fragmented grassland habitats scattered over private and Crown (government) lands, a problem that adds another layer of complexity to the conservation challenges. However, progress is being made in managing key grasslands for the lizard.

Complexity and uncertainty also characterize the high profile freckled duck conservation program. Because illegal killing takes place during the

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Cover: Koala (*Phascolarctos cinereus*). Photograph by Ken Phillips.

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The helmeted honeyeater, Victoria's state bird, consists of a single remnant wild population of about 40 breeding pairs in a limited habitat. Managing for the survival of such a small population presents many difficulties to conservation managers. Photograph by Gary N. Backhouse.

duck hunting season, conservation of this species is not only a matter of protecting nesting and winter habitat and monitoring population status, but also of successfully addressing social issues raised by the large and well organized waterfowl hunting community, animal rights groups, and the public at large.

Another high profile case has been the eastern barred bandicoot, a small grassland marsupial. A renewed intensive cooperative effort in Victoria to restore this species, which was previously on a rapid decline, was initiated in 1988. This effort has restored bandicoot numbers through extensive field work, computer modeling, captive management, and a major reorganization of the recovery program, which improved key organizational and professional elements. Zoo participation in captive breeding and management of this species has been essential; the zoo community has contributed relevant expertise and centralized data management and analysis, two key elements in the program's successes.

The helmeted honeyeater, Victoria's state bird, is also one of Victoria's most endangered birds. The single remnant wild population of about 40 breeding pairs is limited to a narrow, six-kilometer length of forest along one stream system. It has been extremely challenging to coordinate management of the wild birds given the complex ecological dynamics within their limited habitat, competitor species, and an intensive, high profile captive breeding and reintroduction effort.

In addition to these several cases, the AWMS symposium proceedings examine Victoria's Flora and Fauna Guarantee Act 1988 — certainly one of the most progressive biodiversity laws anywhere — on the occasion of its fifth anniversary. There has been progress in meeting the act's goals and there have been notable achievements, but there have also been shortfalls and recommendations for improvements are offered. An analysis of how the act has been implemented so far quantifies many variables, such as the production rate of listings and action plans, and sets a benchmark for measuring future implementation progress. Social and economic issues have been central to successful implementation of the act; a "tool kit" of methods is described for managers and conservationists to use in addressing social and economic issues.

An international perspective on species conservation offers a framework for analyzing policy implementation and programs for species recovery. It can be applied to all restoration efforts regardless of species, issues, or setting and can serve as a means to learn about existing programs and to highlight variables that need attention.

Recommendations for Improving Conservation Prospects

The editors of the AWMS symposium proceedings conclude that Australia is making a commitment to biodiversity conservation and that several advances in recent years mark progress. Among these are substantial reservation of key ecosystems, such as wet tropical rainforests and coral reefs; development of strategies to overcome the pressing needs of land degradation in rural areas, feral predator control, and loss of native vegetation; and recent exemplary state and federal biodiversity legislation. Although a strong policy position is emerging in Australia to protect habitats, eliminate threatening process, and recover already threatened species, reversing the large-scale, long-

standing loss of biodiversity will not be quick or automatic, despite all the encouraging steps taken to date. Advances in endangered species recovery will be most successfully grounded in a thorough appraisal of past conservation efforts. This, in part, is what the AWMS conference aimed to do. The twelve threatened species cases and policy analyses in the proceedings represent one step in an open-ended learning and improvement process.

The cases and analyses revealed a number of recurring themes in the implementation of endangered species and biodiversity legislation, strategies, and plans. Participants in a single recovery program may not be able to see these patterns, but a comparative analysis permits these patterns to emerge. From these recurring themes, the editors derived seven recommendations that are applicable to most endangered species and biodiversity conservation implementation efforts.

(1) *Recovery programs need to be initiated much sooner than is frequently done.*

(2) *Participants need to recognize that the recovery task is a multifaceted effort with interacting biological, social, economic, and organizational elements, and they must pursue skills in interdisciplinary problem-solving methods.*

(3) *Reliable knowledge about all aspects of the extinction problem and the recovery task is essential, but lack of knowledge is not a reason to delay conservation action.*

(4) *Recovery programs need clearly defined, measurable goals. They should not be rigid, but instead should always be open to question and revision as knowledge is gained and advances made.*

(5) *Detailed, practical attention to implementation of policies and programs is necessary. Implementation is not an automatic or sure follow-up to enacted legislation or written recovery plans; it requires coordination, planning, and ongoing appraisal.*

(6) *All aspects of the recovery process need ongoing evaluation. Such feedback on performance is essential to any learning effort. Evaluation, both official and unofficial, can be carried out in constructive, positive ways as a genuine basis for improving recovery efforts.*

(7) *Recovery programs need to have a clearly defined ending. Termination forces participants to meet deadlines and to reappraise progress of their efforts regularly as a justification for continuing. Without planned termination, programs may shamble along indefinitely, without adequate evaluation or planning for program succession.*

The challenge for Australia is the same for other countries—to find the most successful ways to recover threatened species and conserve biodiversity. These suggestions for improvement are similar to those elsewhere (e.g., Yaffee 1994). The seriousness of the extinction crisis demands a renewed commitment and a continuing search for successful solutions.

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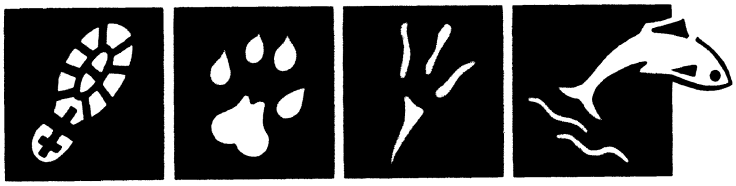
Report from Washington

The Fish and Wildlife Diversity Funding Initiative: An Attempt to Prevent Endangered Species Listings

By Deborah Richie



TEAMING WITH WILDLIFE

a natural investment

In the current political and fiscal climate in Washington, simply keeping present levels of government funding for species conservation is considered a victory; increased funding is considered unlikely at best. To overcome this problem the Fish and Wildlife Diversity Funding Initiative proposes a workable approach to preventing species and habitats from becoming endangered. The project, called "Teaming with Wildlife, a Natural Investment," aims to raise $350 million through user fees on outdoor equipment. The money would be used by the states to conserve a diverse array of fish and wildlife species and habitats, to provide outdoor recreation experiences, and to meet the rising demands for conservation education.

All 50 state fish and wildlife agencies, through the International Association of Fish and Wildlife Agencies (IAFWA), launched the campaign last year. Since then formal support has grown to more than 100 groups, ranging from the American Ornithologists Union to the Rivers Council of Washington and Quail Unlimited. The Steering Committee spearheading the initiative is composed of IAFWA, The Wildlife Society, American Fisheries Societies, National Audubon Society, Defenders of Wildlife, National Wildlife Federation, Wildlife Management Institute and the World Wildlife Fund.

The conservation focus will be on the more than 2,000 vertebrate species of fish and wildlife and countless invertebrate species now receiving less than 5 percent of all funding for wildlife. Their conservation, ironically, is seriously underfunded because they are not listed as endangered, nor are they hunted or fished. As a consequence, we may be losing species and habitats even before there is a chance to recognize declines. Efforts to expand state funding sources through such efforts as wildlife tax checkoffs and automobile registration tags have helped, but ultimately have fallen far short of what is needed.

Allan Egbert, Assistant Executive Director of the Florida Game and Fresh Water Fish Commission, has stated: "We know that we can reduce, on some occasions even minimize, the adverse impacts that continued growth and development have on fish and wildlife and their habitats if we have people in place with the right expertise, armed with credible knowledge and with practicable ideas . . . Those who may doubt that this is possible need only look at the successes of state fish and wildlife agencies with game species. All it takes is a little focus and predictable, adequate funding." The funding Egbert refers to comes from the Sport Fish and Wildlife Restoration Acts (Pittman-Robertson and Dingell-Johnson/Wallop-Breaux programs), which have demonstrated the ability of user fees on hunting and angling equipment to fund successful conservation programs. Hunters and anglers have seen a direct return on their investment in the dramatic comeback of species like white-tailed deer, wood duck, and striped bass, as well as the conservation of millions of acres of habitat.

The fish and wildlife diversity initiative simply expands on this proven model to include more users of wildlife and wilderness, from backyard watchers to avid hikers, by placing a user fee on tents, backpacks, hiking boots, canoes, bird feeders and seed, and recreational vehicles. The fee will be set as a percentage of the manufacturer's price and be progressive, so that higher priced items will pay a higher tax. However, the fee will never exceed 5 percent of the manufacturer's price. For example, a $10 field guide will include a 30 cent fee and $100 pair of binoculars, $2.50. Swarovski Optik, Swift Instruments, and Falcon Press are among the companies that have already endorsed the funding initiative.

As with hunting and angling user fees, the funds will be collected by the US Treasury from manufacturers or import duties and given to the US. Fish and Wildlife Service for distribution, with an administrative cap at 8 percent. The formula for distribution will be in the form of matching grants—75% federal: 25% state match. States will receive their share on a formula based on population (2/3) and land area (1/3) of each state. No state or territory will receive less than 0.5% or more than 5% of the funds. There can be no diversion of funds for purposes other than wildlife diversity projects focused on conservation, recreation, or education.

To give a sense of what is possible for preventing species and habitats from becoming endangered, here is a sampling of state fish and wildlife agency conservation projects targeted so far:

- Maine will fund management for the state's internationally significant

nesting populations of puffins, razorbills, terns, petrels and guillemots.

- Georgia will identify and protect critical habitat of the cold water darter, which is in decline from stream damming and siltation.

- Idaho will conduct a three-year study of the wolverine in the Sawtooth Mountains to identify factors affecting its welfare and improve conservation efforts.

- North Carolina will actively participate in "Partners in Flight," identifying and conserving Neotropical migratory bird habitats in maritime forest, bottomland hardwood, Carolina Bay, Pocosin and Piedmont oak-hickory natural communities.

- Oregon will help improve the status of Steller sea lions by monitoring their reproductive success at Rogue and Orford reefs and protecting critical foraging habitats.

- Virginia will increase the nesting success of upland sandpipers through an active education program with horseback riding clubs.

The user fee concept appears feasible in the current "pay-your-own-way" political climate. The users of wildlife have expanded significantly from the traditional hunters and anglers. A Forest Service "Recreation Executive Report" released in May 1994 showed wildlife viewing as the number one outdoor recreational sport in the US, with 76.5 million participants, followed by fitness walking and camping. The same report predicted a 16% increase in wildlife watching and 23% increase in outdoor photography through the year 2000. The importance of seeing wildlife as part of an outdoor experience—from backyard bird observation to hiking and canoeing—also translates into dollars for the outdoor industry. More than $18 billion is spent annually on recreation related to wildlife viewing. Wildlife also often forms the basis for ecotourism. For instance, a survey in Yellowstone National Park revealed that 95 percent of the visitors consider seeing wildlife of highest importance. The throngs of people now flocking to Yellowstone in hopes of seeing wolves supports this finding.

In light of these facts, conservation of species and habitats must be tied to meeting the recreational and educational needs of users. That means offering more hiking trails, canoeing access, photographic opportunities, and watchable wildlife programs, as well as forging urban and rural wildlife appreciation projects, nature centers, and school-based conservation education activities. Specific needs do differ by state, and under the current funding plan each state will have the flexibility to design its wildlife diversity program to best meet its needs.

Well-rounded fish and wildlife diversity programs funded by all users–hunters, anglers and watchers–makes economic sense. Avoiding costly recovery programs and conserving the foundation of ecotourism and most outdoor recreation are certainly "natural investments." Perhaps most important, the Fish and Wildlife Diversity Funding Initiative will at last allow state fish and wildlife agencies to adhere to Aldo Leopold's first rule of intelligent tinkering, "to save all the pieces," by providing the means to fund management actions. Watchable wildlife experiences will give children and adults alike the chance to experience nature directly. The memory of an osprey plunging into the water, a whale surfacing, or the night chorus of frogs can spark a lifetime commitment to conserving our natural world.

The Teaming with Wildlife Campaign is looking for endorsements from a variety of businesses and non-profit organizations, and is conducting a letter writing campaign targeting outdoor equipment manufacturers and retailers. For more information contact the International Association of Fish and Wildlife Agencies at 444 N. Capitol Street, NW, Suite 544, Washington, DC 20001, phone (202) 624-7890, fax (202) 624-7891.

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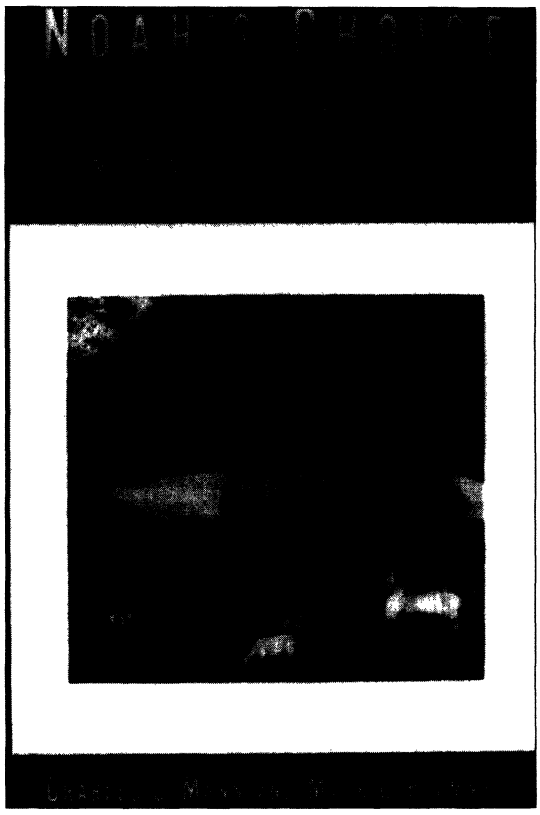
Book Review

Noah's Choice: The Future of Endangered Species

By Charles C. Mann and Mark L. Plummer. 1995.
Alfred A. Knopf. New York. $24. 302 pp.

Reviewed by Mark L. Shaffer



In the Endangered Species Act (ESA) reauthorization debate currently going on in Washington, *Noah's Choice* has become the "critics handbook" for politicians in Congress looking to weaken the ESA. Mark Plummer, Senior Fellow with the Discovery Institute in Seattle, and Charles Mann, contributing editor for *Science* and *The Atlantic Monthly*, have written an extremely readable book which makes an eloquent argument illustrating some shortcomings of the ESA. Mann and Plummer argue that we must make fundamental changes in the Act to add positive incentives for landowners, and do away with the perverse incentives that now exist. While many of these ideas are valid, there are flaws in the arguments presented by the book to justify the weakening of the Act.

Plummer and Mann look at areas of the country impacted by the ESA to make an argument that the nation cannot afford the cost of implementing the Act. In looking at examples of species conservation efforts in New York with the Karner blue butterfly, and Oklahoma with the American burying beetle, they develop a convincing argument that the costs of the ESA are unequal across the nation. However, it does not follow that the country cannot afford the total costs and would not choose to pay for species protection. The U.S. Fish and Wildlife Service currently spends about $80 million per year on endangered species. Even if we assume the total price tag of the ESA to be three times that amount, or $240 million, that is still less than $1 per person per year, or about the price of a lottery ticket.

Plummer and Mann's answer to this might be that if the country is willing to pay the price, then that fact would be reflected in a Congress that would appropriate enough money for protecting species by purchasing conservation easements and land and providing positive incentives for landowners. What this argument ignores is political reality, where short term financial benefits for a relatively few people will usually win out over long term benefits for all people who value biodiversity. In their recounting of the history of the ESA, they relate how prior versions of the law that commanded federal agencies to save species "where practicable" were toothless—any time the species was in the way of any economic interest, saving it was not considered "practicable." They seem to believe that we have reached a time where those interests would not always win out. Unfortunately, it seems that current events prove otherwise.

In another example, Plummer and Mann relate the story of the black capped vireo in the hill country of Texas, near Austin. There was tremendous development pressure in this area due to its proximity to a rapidly growing city, and developers offered to buy and preserve 125,000 acres of prime warbler habitat in exchange for permits to develop an area of prime habitat. However the Fish and Wildlife Service (FWS) had to turn down the deal, because the preserve offered was located several hundred miles away, and would have benefited a different population of birds.

This seems, on the surface, to be a perfect example of the problem with the ESA, for the FWS could not accept this plan which would have provided the 125,000 acre preserve. Whether this is indeed a problem for species protection depends largely on an unanswered scientific question of whether the two populations are linked or separate, and whether both need to be saved. However, the problem with the argument in *Noah's Choice* is this: without the ESA as it exists now, the developers would have had no incentive to offer to provide a warbler preserve. Back in the days when species protection had to be "practicable", that offer would not have been made.

Noah's Choice also discredits utilitarian arguments for the preservation of biodiversity; dismissing the argument that species are important for ecological function or direct benefit to people via their use as medicine, food, or other products. There is clearly an element of truth to this argument—many species are not

(continued on UPDATE page 10)

Report from Washington

An Overview of The National Academy of Sciences Report: *Science and the Endangered Species Act*

By Dennis D. Murphy

The anti-environmental right wing in Congress has had an open field as they have attacked the Endangered Species Act as the very epitome of environmental regulation out of control. But two events in recent months have moved the raging debate a little closer toward center. The more recent was the July Supreme Court decision in the case *Babbitt v. Sweet Home Chapter of Oregon Communities. Sweet Home* validated the Department of Interior's interpretation of harm under Section 9 of the Act as prohibiting acts that disturb and destroy the habitats of protected species, not just prohibiting those acts that directly kill, wound, harass or otherwise injure individuals of a species. The six-to-three decision in effect reaffirms the authority of the U.S. Fish and Wildlife Service to prevent the destruction of habitats of federally protected species on private property—currently the primary source of contention in Endangered Species Act reauthorization efforts on Capitol Hill.

Just preceding this decision, the National Academy of Sciences released its long awaited report *Science and The Endangered Species Act*, the product of two years of deliberations by a committee of sixteen scientists from academia and industry led by Professor Michael Clegg of the University of California at Riverside. In response to a bipartisan request from Congress in 1991, the committee considered a number of scientific issues central to Endangered Species Act implementation, issues that are also critical to ongoing policy reform and that figure in the Act's reauthorization. Although the committee's findings received substantial media attention—virtually every major newspaper in the country announced its release—by and large, most accounts offered few details and observations were restricted to a couple of controversial topics. In anticipation of publication of the report in book form in coming months, the following is a brief synopsis of the written product, prepared in response to queries from interested parties who do not have immediate access to it during this period of great reflection about the future of the law.

Of surprise to many was that the report was signed by all committee members. The committee that was selected by the Academy reflected a broad spectrum of disciplines, experience, and opinions, assuring significant disagreement on virtually every issue of substance. Chairman Clegg provides a clue about the dialectical nature of the process when he politely acknowledges the committee's "hard work and spirited debate" in the report's preface. Indeed, this "unanimous" report was borne of truly dynamic exchange and a few raised voices. While the entire committee did sign-off, this should not be viewed as a great convergence of views concerning implementation of the Endangered Species Act. Instead it reflects a much more narrow agreement that the scientific underpinnings of the Act are generally sound and that its stated goals are appropriate and defensible. Had Congress requested that the committee recommend policy standards and guidelines to best *implement* the Act, the result certainly would have been very different—in all likelihood no agreement would have been possible. Simply stated, the science in the Act is rather straightforward, but putting that science into action is a policy dilemma of the highest order.

Today the 104th Congress might ask the Academy for clarification of a different set of scientific issues, but in the autumn of 1991 it requested guidance on the following:

- *Definition of species*—a review "of the manner in which the term 'species' has been implemented in order to evaluate how to identify those units that will best serve the purposes of the Act."
- *Conflicts between species*—a clarification of how implementing agencies could or might "reconcile the conservation needs of different listed species where those needs may conflict."
- *Role of habitat conservation*—"an evaluation of the role of habitat protection in contributing to the conservation of species" and "a review of the relationship of habitat protection mechanisms of the Act to its other requirements."
- *Recovery planning*—a "review of the role of recovery planning in the Act" and recommendations on how it "could better contribute to" the Act's purposes.
- *Risk*—a determination of "whether different levels of risk ought to apply to different types of decisions" associated with listing, recovery, and assessments of jeopardy, adverse modification of habitat, and taking, to better serve Act purposes.
- *Issues of timing*—a consideration of the timing of key decisions under the Endangered Species Act.

The interdependence of these concerns is clear. The committee's response therefore was not particularly linear, nor was its attention balanced. In fact, as media reports indicated, two issues dominated the final document—first, the taxonomic level at which animals and plants should receive federal protection, and second, how those habitats that support imperiled organisms should be conserved.

What could possibly be more straightforward than defining exactly what should constitute those "species" that the Endangered Species Act should

protect? The Committee found that superficially simple task to be the most challenging of all. The final version of the chapter on the definition of species was the result of uncountable revisions. The enormous amount of scuttled text reflected the centuries long debate over the evolution of species, the process of differentiation of populations, and the categorization of those entities. In the end, however, the recommendations were sharp and on-point. The inclusion of not only taxonomically recognized full species as targets of the Act's protections, but also the subspecies and "distinct population segments" that comprise them, was viewed by the committee as scientifically justified. In essence, the only effective means of conserving species is to save their constituent parts.

The scientists recognized, however, that the delineation of subspecies and, in certain cases, species can demand the skills of specialists, and that the determination of distinct population segments can be a particular challenge. A population that truly is distinct implies that it has an "independent evolutionary future," reflected in uniqueness that might be morphological, physiological, biochemical, or behavioral. Such an "evolutionary unit" is the appropriate target of species conservation. While targeted protection of an evolutionary unit should not demand significant change from the current application of the law, the committee hoped that the evolutionary unit concept would "move decisions of eligibility for protection away from arguments only about taxonomic ranks and into a realm where more substantive views about the degree to which populations are evolutionarily significant and new techniques can be applied."

The committee noted that invertebrates and plants are not conferred the same protections as vertebrates under the Endangered Species Act. Protection under the Act for distinct population segments is restricted only to vertebrate species, a wholly political decision that is unlikely to be modified by Congress any time soon, and the committee would have been remiss not to note that no real scientific justification exists for that situation. Appreciating political reality, however, the committee chose to merely point to the fact, eschewing a formal recommendation for change.

Guided by the statutory language of Section 2 of the Act, where Congress mandated that there be found "a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved," the committee strongly linked species protection with habitat protection. In light of upcoming reauthorization bills in both houses of Congress that likely will seek to reduce habitat protection for imperiled species on private lands, some strong language from a committee with such diverse membership merits close attention. It unequivocally stated that "habitat protection is a prerequisite for conservation of biological diversity and protection of endangered and threatened species. The Endangered Species Act, in emphasizing habitat, reflects the current scientific understanding of the crucial biological role that habitat plays for species."

Here the committee jumped into the political fray by calling for a strengthening of Act provisions that confer protection to habitats that are essential to listed species. It had no other choice. With barely half of all listed species benefiting from formal recovery plans, and with the designation of critical habitat for listed species burdened by the requirement that economic impact assessments be completed, the two most important sources of guidance to agency staff involved in identifying and protecting the habitats that sustain species at risk are often unavailable. To try to bridge the gap between species listings and the availability of crucial information, the committee called for the identification of "survival habitat" at the time of species listing. Survival habitat would include that habitat necessary to support extant populations of the species, or that habitat necessary to ensure species survival over the short term (25-50 years). It would receive the same consideration as habitat designated as critical in the current Act language, and would expire as a designation with the adoption of a recovery plan and formal designation of critical habitat. The idea was not to burden agency staff with another bureaucratic step, but to better inform permitting processes under Sections 7 and 10(a) of the Act, processes that move forward with or without the essential information provided by recovery plans or critical habitat designations.

The committee also endorsed a new priority scheme for listing candidates. Following committee recommendations, a given species that is rare and taxonomically distinct might be *lower* in the listing queue relative to another species that is more widespread and less distinct, but which could generate regionally focused multiple species conservation efforts. The committee embraced such efforts, framed either as more traditional Habitat Conservation Plans, or as programs similar to southern California's innovative, ecosystem-based Natural Community Conservation Planning effort. They called for the U.S. Fish and Wildlife Service to provide explicit guidelines that would better advise permit applicants in the development of biological data, including assessment of the habitat requirements of target species, analysis of genetic and ecological information, and creation of reserve design and management options.

Unquestionably, determinations of which animals and plants should be listed and how their habitats should be conserved are dominant considerations in the ongoing debate. Nevertheless, encouraged by its broader job description from Congress, the committee offered a number of other observations and recommendations. It stressed the need for scientifically rigorous, habitat-based recovery planning with an emphasis on research and effective monitoring schemes. It pointed out that no biological reasons exist to support different standards for the determination of species jeopardy, survival, or recovery on private versus public lands. The committee also reviewed Act regulations that were amended during the Reagan administration to distinguish between species "survival" and "recovery" in the determination of critical habitat. Currently, an action that results in the taking of a protected species can proceed if it does not compromise the

likelihood of species *survival*, even though it might compromise species *recovery*. Previously, an action was allowed only if it did not compromise survival *and* recovery. The committee underscored the obvious linkage between species survival and recovery, noting that "any action that jeopardizes recovery also decreases the probability of long-term survival." Recognizing that federal appropriations to Act implementation have been limited, and budgets only promise to become tighter yet, the committee called for rigorous application of risk analyses to help agencies prioritize their actions and allocations of resources.

Finally, although not explicitly asked for its opinion on the overall merits of the Endangered Species Act as public policy, the National Academy of Sciences committee could not contain itself. It opined that the Act has been successful in slowing if not arresting the erosion of this nation's biodiversity. It noted that the Act was not intended to be the dominant policy tool for the preservation of that biodiversity. It embraced in concept true ecosystem management as the way to effectively manage natural resources and as the best means of limiting species extinctions. It called for the reconstruction or rehabilitation of degraded ecosystems as a component of imperiled species policy, for cooperative management by government agencies and private interests, and for revised economic accounting to better account for the costs and benefits of conservation policy.

All in all, the committee set forth a rich agenda for a Congress that has promised immediate and decisive action. Of course the real question remains—what are the chances that this new Congress will heed the warnings and consider the recommendations of a committee that its predecessors commissioned?

We'll soon find out.

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(Noah's Choice *continued from page 7*)

known to serve any of these functions. However, the issue that remains is that we don't know which species are valuable in a utilitarian sense. Indeed, our concept of utility constantly evolves as our understanding of the natural world increases. Agreeing that not every species contains a cure for cancer is different from agreeing that the loss of a species does not represent potentially significant opportunity costs for society, especially in the "information age" and the "era of genetic engineering."

One major area that Plummer and Mann largely ignore is the effect of the ESA on public land. Their focus on the conflict between the implementation of the ESA and private property rights might suggest that in a place with substantial amounts of public land the ESA would not create such conflict. Of course this has not been the case, as some of the most heated and publicized battles over endangered species, such as the spotted owl and pacific salmon, have taken place primarily on public land. The picture of the ESA that *Noah's Choice* draws largely ignores these issues (Plummer and Mann do acknowledge that they ignore the spotted owl as a "special case") and in doing so ignores the political reality of the West. This is especially ironic because in a situation where we as a society look to protect biodiversity while protecting property rights, we must look to public lands as the first line of protection; yet these are the lands that are most often under assault.

In an appendix to *Noah's Choice*, the authors question whether the ESA has achieved its goals of species preservation. They look at a series of measures, such as the number of species fully recovered. Their determination is that the ESA has been largely a failure, although they do qualify their judgment with an acknowledgment of the difficulties faced by FWS that are outside the parameters of the Act. They conclude that the future of the ESA is not bright, and that we must "accept that fact" in order to begin "reforming the law and strengthening our efforts to save biodiversity." What they overlook, or de-emphasize, are many measures by which the Act can be considered a success, for instance the number of species that are stable or improving, or some larger success stories such as the recolonization and reintroduction of wolves in the northern Rockies.

The accounts in *Noah's Choice* of private landowners unfairly impacted by ESA restrictions should not be discounted. They are real, and they are the fuel that in some cases drives the wise-use movement. Some of the reforms that Plummer and Mann suggest, to make the ESA more flexible, more efficient, and less burdensome on small landowners, are valid and valuable (and some of these are in fact currently being implemented). However, their arguments are being used by opponents of the Act in a way designed not to improve the Act but to destroy it. Those with a good understanding of the issue should not allow that to happen.

Mark L. Shaffer is Director of Heritage Network Operations, Conservation Science Division, with The Nature Conservancy in Arlington, VA.

Bulletin Board

Job Announcement

The School of Natural Resources and Environment at The University of Michigan invites nominations and applications for the position of Dean of the School of Natural Resources and Environment, to be filled by July 1, 1996. The Dean is the chief academic and administrative officer of the School and reports directly to the Provost and Executive Vice President for Academic Affairs.

Desired qualifications include an earned doctorate in an appropriate discipline, a national reputation of scholarly productivity and professional leadership, strong leadership and management skills, and strong national and international contacts with environmental institutions and skills in raising funds.

Nominations and applications should be directed to Jonathan W. Bulkley, Chair, School of Natural Resources and Environment Dean Search Advisory Committee, The University of Michigan, 3068 Fleming Administration Building, Ann Arbor, MI 48109-1340; telephone (313) 449-2955.

New Endangered Species Video

Endangered, a thirty minute video produced by the National Wildlife Federation, provides an introduction to how human activities are endangering thousands of species, why protecting nature's diversity is critical to us all, and how the Endangered Species Act helps us do that. The video also presents a case for protecting whole ecosystems instead of individual species, Among those featured are E. O. Wilson and Sylvia Earle, former chief scientist at the National Oceanic and Atmospheric Administration. The program's distributor, The Video Project, is the nation's only non-profit organization specializing in the distribution of videos on environmental issues and related global concerns. For more information, or to order the video, call The Video Project at 800-475-2638.

1995 Plant Conservation Directory

The 1995 Plant Conservation Directory is now available from the Center for Plant Conservation. This recently revised directory contains the names, addresses, and telephone numbers of botanical, conservation, governmental, and scientific personnel and organizations nationwide that may be able to assist with plant conservation efforts. In addition, the directory identifies rare plant laws and rare and endangered plant lists by state. To order the directory, send check or money order for $18 to the Center for Plant Conservation at P.O. Box 299, St. Louis, MO, 63166-0299.

Announcements for the Bulletin Board are welcomed. Some items from the Bulletin Board have been provided by Jane Villa-Lobos, Smithsonian Institution.

Endangered Species UPDATE

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