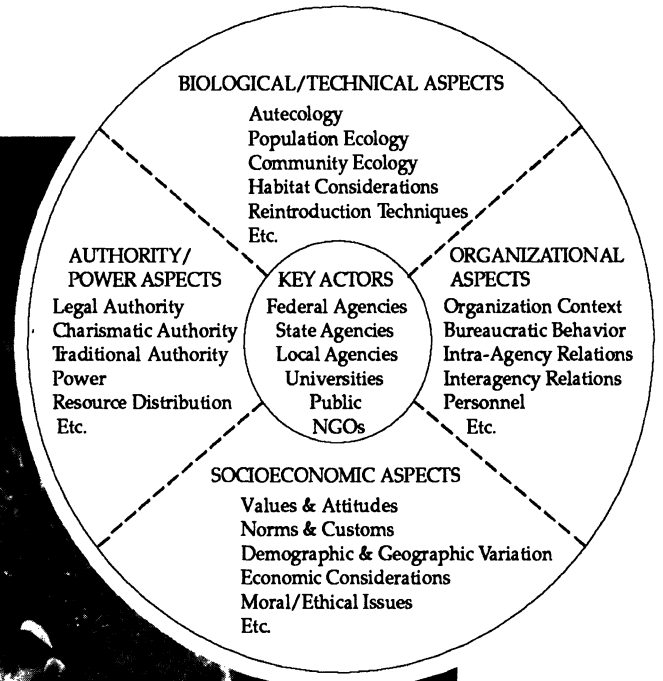
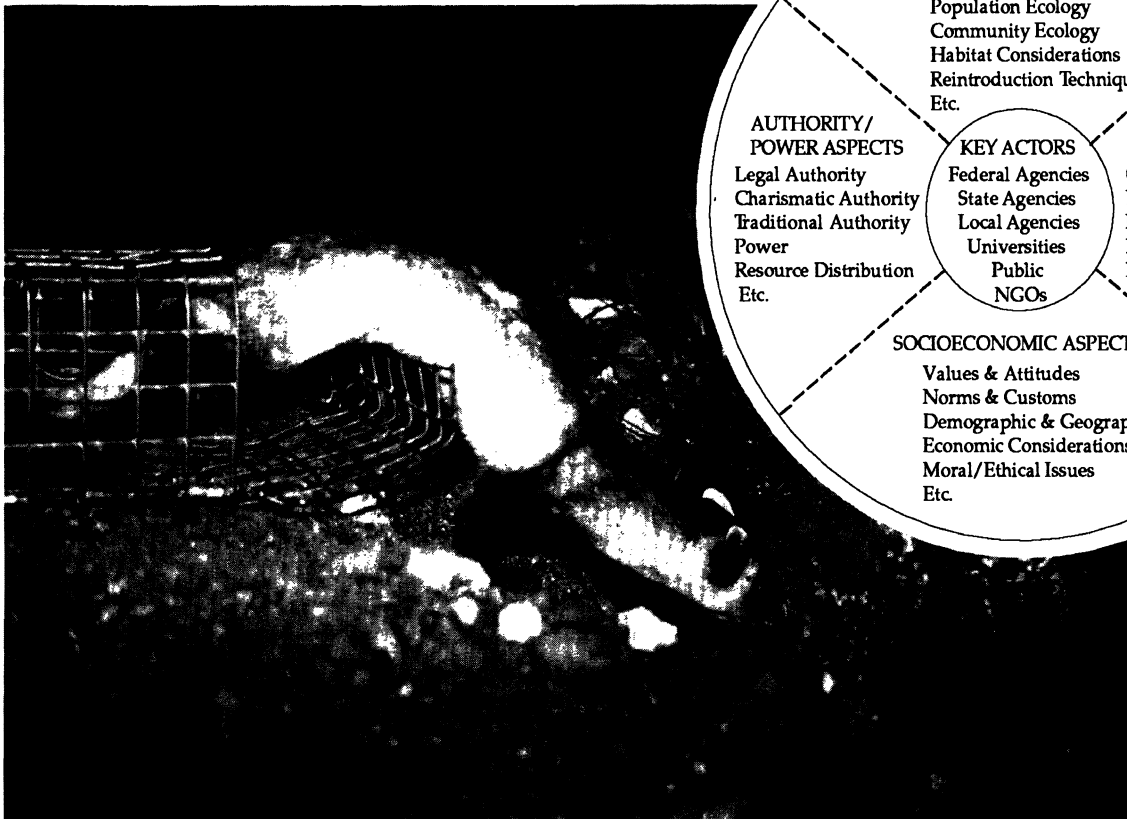


Endangered Species UPDATE

Including a Reprint of the latest USFWS
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School of Natural Resources



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Towards an Endangered Species Reintroduction Paradigm

by

Richard P. Reading, Tim W. Clark, and Stephen R. Kellert

Introduction

In response to the current extinction crisis, managers and conservationists are searching for innovative, more effective methods of species conservation. One such method is the translocation or reintroduction of species into formerly occupied habitat. As the list of threatened and endangered species lengthens, the need for employing reintroduction as a conservation tool increases (Jones 1990).

Most reintroductions, however, fail (Griffith et al. 1989). One reason for this, we suggest, is that the programs suffer from a narrow concentration on biological and ecological considerations and exclude a host of other equally important elements. As Clark (1989:3) stated: "Most descriptions of endangered species recovery focus only on the biology of species, thus creating the unrealistic view that conservation and recovery are strictly technical biological tasks. In fact, numerous non-biological factors and forces have direct, immediate and paramount significance to endangered species recovery, and if the conservation movement is to be effective, it must explicitly recognize the complexly interactive impacts and contributions of all the various dimensions."

Kellert (1985:528) also noted: "A compelling rationale and an effective strategy for protecting endangered species will require recognition that contemporary extinction problems are the result of socioeconomic and political forces." It has been our experience that these important elements often go unrecognized by most individuals working on endangered species reintroduction efforts.

To increase awareness and understanding of the importance of these elements, we are developing a systematic, more holistic approach to endangered species reintroduction which explicitly includes socioeconomic, organizational,

and political (power/authority) aspects, as well as biological sciences and technical aspects. A broadly applicable paradigm for the reintroduction of endangered species promises to enhance success rates greatly by providing managers and conservationists with a framework for guiding future species' reintroductions. The paradigm can both expedite the restoration process and render it more comprehensive, systematic, and rational.

Reintroduction Paradigm

Key actors are the focus, or center, of the model (cover photo). The key actors influence, and are influenced by, several variables associated with reintroductions. Key actors are usually easy to identify in specific programs. Although the variables form a continuum of influencing factors that affect each other in complex ways, we distinguish four variable classes; 1) biological/technical, 2) authority/power, 3) socioeconomic, and 4) organizational (cover photo). These are briefly described below. Several variables important to species recovery were previously identified and discussed by Clark and Kellert (1988), Clark (1989), and Kellert and Clark (in Press).

Biological/Technical Aspects

Booth (1988:241) summed up part of the difficulty of restoring endangered species: "[A] continuing problem with reintroductions is that biologists must often contend with manipulating a dwindling species they do not fully understand. Wild animals in wild settings have a way of upsetting the best laid plans."

Reintroduction is often an uncertain, risky venture. Indeed, Griffith et al. (1989) found that most past reintroduction attempts failed, and

Kleiman (1989:152) suggested that "high costs, logistical difficulties, and the shortage of suitable habitats make reintroduction unfeasible as a conservation strategy for most rare and endangered species held in captivity." Nevertheless, several reintroductions occur each year and many more are planned. Of all the factors influencing endangered species reintroduction success, the biological and technical aspects are the most obvious and most often stressed (see almost any U.S. Fish and Wildlife Service Recovery Plan).

Plans must carefully consider prospects for the species' survival in the release area given the characteristics of the organism and the ecosystem with which it is associated (Griffith et al. 1989). Important considerations include autecology (e.g., life history characteristics, habitat requirements, scarcity), population ecology (e.g., demographics, genetics, dispersal), and community ecology (e.g., predator/prey relations, competition, biotic and abiotic interactions; Stanley-Price 1989, Kleiman 1989). Because of the rarity of most endangered species, pertinent information is often absent and not easily obtained (i.e., technical uncertainty). However, time is at a premium and conservationists must proceed in the face of uncertainty using the best available data.

In addition to ecological considerations, plans must address reintroduction techniques. Kleiman (1989) and Griffith et al. (1989) identify several important aspects of reintroduction techniques, including a well managed, self-sustaining source population, release site preparation, preparation and training of animals to be released, and demographic and genetic considerations in animal selection.

Getting the biology and technical considerations right is, in itself, a difficult and demanding job. Obtaining and

using this information at the right time and in the right way only compounds the species restoration challenge.

Authority/Power Aspects

In any situation where multiple actors are working toward a common goal, issues of authority and power arise and can potentially dominate the interactive process. Endangered species recovery programs are no different. For example, in the California condor (*Gymnogyps californianus*) case, Snyder and Snyder (1989:176) observed that: "The process of attempting to preserve this species has been as much a political as a biological endeavor and has involved endless polemics, confrontations, and debates, as well as endlessly shifting alliances, as old controversies have been resolved and new issues have arisen." Endangered species programs tend to be characterized by broad participation, high visibility, and large financial resources. In addition, the restrictive nature of the Endangered Species Act (ESA) often mobilizes libertarians, agricultural interests, natural resource extractors, and others fearful of losing traditional power or authority (Yaffee 1982, Reading and Kellert, In Prep.). The interplay of organizations, laws, traditional roles, and power differentials can result in power struggles and ideological conflicts, which can significantly limit the effectiveness of the overall program and in some instances potentially cripple the entire reintroduction effort (e.g., see Kohm 1990).

Authority relationships and power dynamics among key actors evolve as programs are carried out, although in many instances, traditional inter-organizational relations and preexisting laws, regulations, and mandates are set and strongly influence the development of inter-actor relationships. Weber (1968) recognizes three types of authority: 1) legal authority, in which legitimacy is based on formal laws, rules, and regulations; 2) traditional authority, wherein legitimacy rests with tradition, custom, or loyalty; and 3) charismatic authority, which finds legitimacy in devotion based on perceptions of exceptional qualities of leaders by their followers or subjects. Any restoration program can contain all

three kinds of authority, and their interactions can lead to unproductive conflict.

Resource distribution and power regimes are closely related to concepts of authority, and to each other. Resources include money, personnel, knowledge or expertise, land tenure, and, importantly, control of the animals to be reintroduced. In some programs, conflict centers on who has authority over the animals and the decision-making process surrounding the animals. Power both determines and is determined by the control of these resources and by authority (Lindblom 1980). Power maintained in the absence of legal authority often results in charismatic or traditional authority dominating a program, which, in turn, often evolves into legal authority.

For these and other reasons, local people, organizations and individuals staffing many restoration programs, are constantly vying for power and authority. Factors influencing the power structure and power relations of local communities and organizations include land tenure patterns, access to, and control over, resources, property relations, social stratification, and traditional authority (Clarke and McCool 1985, Kellert and Clark 1991).

Organizational Aspects

A major variable in the success or failure of a restoration effort is the kind of organizational system used. As Clark and Cragun (1991:1) concluded: "Understanding your organization and knowing how to make it work for species recovery can make the difference between a program that succeeds and one that fails." The organizational dimension is perhaps the least explicitly perceived and understood of the four variable classes by people involved in species restoration. This fact has profound implications for the kind of organizational system used to restore a species and its effectiveness, efficiency, and adequacy (see Clark et al. 1989).

Since several organizations often participate in endangered species recovery efforts, organizational considerations should be given explicit professional attention because they can affect the success of these programs. Understand-

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Cover:

Black-footed ferret (*Mustela nigripes*) and a universe of reintroduction paradigm considerations.
Photo by Louise Richardson Forrest.

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ing organizations permits description, diagnosis, and prescription of situations and problems encountered within them (Gordon 1983). Even apparently technical problems may have unrecognized organizational bases because of the high uncertainty and wide decision-making latitude characteristic of endangered species recovery programs (Yaffee 1982, Clark 1989). The inability of the black-footed ferret (*Mustela nigripes*) recovery program to maintain a wild population of ferrets was at least partially attributable to organizational failures (see Clark and Westrum 1987, Clark et al. 1989).

An organization, especially a government-dominated bureaucracy has several dimensions. First, there is the context of the organization, including its internal and external environments, its structure, its culture, its goal orientation, and the characteristics of its personnel. The internal environment is shaped by several factors, including specialization and interdependence, competition and conflict, status equalization, and over staffing (Warwick 1975). Factors shaping an organization's external environment include complexity, uncertainty, threat, dispersion, diversity, and change (Warwick 1975, Gordon 1983). An organization's culture and its goal orientation are derived from philosophies, legislation, policies, and the kind of professionals it has as staff (Byars 1984).

Second, and closely related to organization context, are variables associated with bureaucratic behavior. These include policy formation and implementation, managerial orthodoxy or obedience, standard operating procedures (SOPs), degree of organizational conservativeness, and constituency/public relations (Yaffee 1982, Gordon 1983). Within agencies, formal policies are often significantly altered by substantial discretion in implementation and administration, which exists because policymakers lack the technical knowledge to specify implementation policies (Lindblom 1980, Yaffee 1982). Finally, organizations are sensitive to external pressures from controllers, clientele groups, constituencies, allies, and adversaries (Yaffee 1982, Warwick 1975). This is why restoration programs rapidly bureaucratize even to the point of stifling

creativity and problem solving (see Clark and Westrum 1987).

The last category of organizational variables is inter- and intra-agency relations. Agency relations often deal with the authority and power issues discussed above, but difficulties may also arise from differences in the organization characteristics mentioned above. In addition, organizations often struggle for control of communication (Weinstein 1984).

The kind of organization that dominates nearly all endangered species restoration efforts is conservative, government bureaucracies with fixed SOPs. In some cases, power differentials and states' rights vs federalism ideology can come to dominate the kinds and frequency of interactions among the program's organizational actors (Ernst 1990). In turn, this has major implications for the actual work of restoring the endangered species.

Socioeconomic Aspects

The socioeconomic context of the endangered species reintroduction effort is critical to the performance of the program. For example, Tilt (1989:38) observed that: "The general public's perception of an endangered species issue may not seem important to a wolf lover or a darter supporter. But if the general perception runs against an animal or plant's continued survival, all the biological data in the world will be useless against the perception."

A systematic examination of socioeconomic aspects is necessary to understand the values, attitudes, and perceptions held by people involved with, and potentially influenced by, endangered species reintroductions. Such considerations are usually lacking or insufficient in endangered species management efforts (Kellert 1985).

Local support is crucial. The experimental reintroduction of eastern timber wolves (*Canis lupes lycaen*) into the Upper Peninsula of Michigan during the mid-1970s illustrates this. All four wolves were killed within 8 months of being released. Hook and Robinson (1982:382) examined local attitudes following the release and suggested that "the wolf's future in Michigan depends

upon the attitudes of Michigan residents toward this animal." Assessing public views and knowledge of wildlife permits program managers to design pertinent and effective public relations campaigns to develop support and to enable people to make more rational and intelligent decisions (Kellert and Berry 1980, Reading and Kellert, in Prep.).

A number of factors influence people's attitudes and values towards wildlife, including many characteristics of the species (e.g., phylogeny, morphology, size, sentient capacity), the perceived worth of the animal, and its symbolic nature (Kellert and Berry 1980). It is far easier to garner support for species with high public appeal (i.e., the 'charismatic megafauna') than for lesser known and so-called 'lower' life forms (Westman 1990). Values of wildlife and attitudes toward wildlife are strongly influenced by the perceived economic or material worth of the animal. These include aesthetic, ethical, ecological, biological, recreational, cultural, utilitarian, genetic, and unknown or undiscovered values (Ehrenfeld 1976, Ehrlich et al. 1977, Rolston 1981, Kellert 1987). The perceived worth of a species is, in turn, often based on knowledge of the species, moral and ethical issues (i.e., animal rights), and traditional market values (i.e., pelt values). Local norms and customs can also play a strong role in shaping attitudes and values, especially in the absence of accurate knowledge. Variations in norms and customs often follow demographic and geographic patterns.

Values and attitudes towards endangered species in general, the ESA, and endangered species recovery programs are also important. Threatened or endangered status elicits fear and hostility among certain sectors of society (e.g., agricultural interests) and compassion and support among others (e.g., members of conservation organizations; Reading and Kellert, in Prep.). Negative attitudes are often based on real and perceived fears of the restrictive components of the ESA which many people view as a threat to their livelihoods and lifestyles, on negative attitudes toward wildlife, and on the affects of past recovery programs (Reading and Kellert,

Continued on UPDATE page 4

in Prep.). Positive attitudes are often rooted in recognition of, and concern for, the loss of biodiversity and positive attitudes toward wildlife (Kellert 1985).

Finally, there are economic aspects. In spite of their importance, most of the values of species conservation are difficult to quantify and therefore often ignored. Costs associated with reintroduction, however, are more easily ascertained and more often stressed. Bishop (1978) stresses the irreversibility of extinction and its implications in terms of unknown future losses. He suggests that society should avoid extinction unless the costs of maintaining viable populations are unacceptably large.

Conclusions

As reintroductions become more important in endangered species conservation and management, the need for more systematic, holistic reintroduction efforts grows. Such efforts should address the socioeconomic, political, and organizational aspects of species reintroductions more comprehensively, rather than focusing strictly on biology, as is currently the case. All the variables discussed above affect the success of reintroduction programs. Incorporation of these variables into reintroduction efforts promises to minimize problems, barriers, and conflicts, and enables the program to draw upon the constructive expertise of each key actor involved. It is crucial that reintroduction plans address these aspects to ensure orientation of all the actors toward successful reintroduction and rapid, efficient movement toward that goal.

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Book Review

A Race to Save the Tropics
1990. Island Press. Washington DC.

This book is a collection of articles by applied ecologists and economists with vast experience in developing countries, and is concerned with issues of conservation and sustainable development in the tropics. It does an admirable job of integrating ecology, too often regarded by its practitioners as strictly a "pure" science, with economics in an attempt to guide the development, implementation and evaluation of sustainable development projects. Almost a third of the book is devoted to the connections among agriculture (including agroforestry), conservation, and sustainable development. This is a welcomed departure from previous books on the same topics written or edited by other Western academics, usually focusing on wildlife, nature reserves, and biodiversity, ignoring the pivotal role played by agriculture in conservation; environmental degradation in the tropics is linked directly or indirectly to agriculture and land distribution issues.

The book can be conveniently divided into three sections: (1) the introduction and conclusion, (2) a section devoted to agriculture and natural resource management, and (3) a miscellaneous section that includes, among others, a chapter on conservation and development policy, and a chapter on the role of applied ecology in national conservation strategies. The introduction and conclusion, written by the editor, provide coherence to the book. They set a conceptual framework for sustainable development and argue for the importance of applied ecology therein, concluding with a discussion of four key environmental aspects of development: sustainability, carrying capacity, ethics, and irreversibility.

The authors acknowledge that the greatest environmental deterioration on this planet has occurred in the last 100 years, as the market economy has spread globally. They note that "the very process of economic development (assuming a market economy) leads to environ-

mental degradation," and that "nothing in the structure of the market induces conservation. On the contrary, if the demand is there, all incentives are to overexploit in modern societies." The point is worth a special focus because failure to acknowledge this contradiction is arguably the reason why many attempts at sustainable development in the Third World have failed.

As frequently happens when difficult issues are tackled head on, internal contradictions arise from what appear to be ideologically neutral assumptions. After recognizing the incompatibilities between development models based on notions of a market economy, and the crucial role played by multilateral development banks in promoting those models, the authors indicate that these organizations can play a critical role in "fostering the use of applied ecology so that the process of economic development achieves the goal of improving quality of life, i.e., maintaining environmental quality". And it is here where the authors become somewhat muddled in their analysis. If, as they claim, western-style development is the problem, programs must seek its reform.

Another weakness of their framework, partially rectified in the final chapter, is the assumption that environmental degradation is a result of "overpopulation", or as the authors eloquently call it, "exceeding carrying capacity", and that, therefore, national planners can respond by implementing population policies, failing to recognize the accumulated evidence linking environmental degradation with inequalities and poverty (and not overpopulation).

The next section of the book concerns agriculture, management of natural forests and environmental effects of dam construction. The inclusion of this section in a book about conservation and sustainable development is a significant one. The chapter on pest management in particular has an excellent summary of the relationship between pest manage-

edited by Robert Goodland

ment problems and ecological principles. The chapter on natural forest management is perhaps the highlight of the book. An excellent discussion on the integrated approach to forest management where socio-economic and cultural aspects of local populations are taken into account without ignoring or de-emphasizing ecological ones, solidifies this chapter. The connections between unstable land policies and failure to conserve forest lands are made clear, and represent a welcome departure from conservationists who believe that tropical forests can be saved by fencing them.

The chapter entitled "Teaching applied ecology to nationals of developing countries" has an elitist tone; there is no mention about the importance of accumulated traditional knowledge, nor is there even an acknowledgement of a two way and dialectical learning process.

The chapter on national conservation strategies and the role of applied ecology juxtaposes the previous one. In this excellent chapter, the author states that the World Conservation Strategy (IUCN, 1980) should be used as a guideline for nature conservation and natural resource development or management in a sustainable manner, but emphasizes that "national conservation strategies must be related closely to the structure and culture of decision-making and policy-making in each country, and must respond to . . . environmental, technological, social, economic, and political awareness and capability."

As with most collections, it is not surprising to find such unequal treatment, from brilliant summaries of forest management, to inadequate proposals on environmental education in the Third World. But accolades are due the editor for breaking the usual mode of the 'how to save the tropics' venue.

Reviewed by Ivette Perfecto, Assistant Professor, School of Natural Resources, University of Michigan, Ann Arbor, MI 48109-1115. USA.

Rejoinder

More on the Ethics of Captive Breeding

by Gary E. Varner and Martha C. Monroe

We appreciate the attention paid by Michael Hutchins and Christen Wemmer (*ESU* 8(8,9): 5-6) to our recent article on captive breeding (*ESU* 8(1): 27-29). Our over-arching goal was to encourage researchers and managers to think more critically about the values served by captive breeding programs and their place in our overall environmental policy. The fact that Hutchins and Wemmer took the time to respond to our article suggests that we achieved this goal. In this rejoinder, rather than reply to the specific charges levelled at us, we seek to further this important discussion by clarifying certain areas of agreement and disagreement.

Hutchins and Wemmer point to certain cases in which captive breeding looks quite good from two of the ethical perspectives we discussed: cases in which animals arguably are better off than they would be in the wild, so that the program scores well from a sentientist or animal welfare perspective, and cases in which whole ecosystems have been preserved as a result of a captive breeding program, which therefore scores well from the holistic perspective. In our brief article, it was not possible to consider various types of cases in detail (nor can we here). Our goal was (and is) to clarify the valuational framework within which captive breeding programs are evaluated in ethical terms.

We agree that in some cases the lives of captive bred animals are safe, healthy, and interesting enough to satisfy the concerns of the sentientist or animal welfare/rights perspective. Such programs are, however, the exception to the rule. Probably the Pere David's deer who wander over acres of fenced Shenandoah hillside in the National Zoo's captive breeding facility don't really know that they are captive, but the vast majority of captive bred animals still live in relatively small, undoubtedly boring enclosures. From the sentientist perspective, these animals cannot plausibly be said to be well off, because they are not leading fulfilling lives, however

healthy they may be according to purely physiological measures.

We also agree that the golden lion tamarin reintroduction project is to date a laudable success from a holistic perspective, because the major public relations program associated with it resulted in an endangered ecosystem's preservation. This multidisciplinary program is indeed "a model worth following for any organizations intending to pursue a captive breeding/reintroduction effort in the future" (Kleiman *et al.* *ESU* 8(1): 82-85). However, we must stress that what makes the program successful from a holistic standpoint is not the captive breeding but the habitat preservation. We may have underestimated the ability of captive breeding programs to inspire habitat preservation, but our central point remains true: from the holistic perspective enunciated in Aldo Leopold's *Sand County Almanac*, captive breeding is never an end in itself, only a means to a goal which cannot be achieved through it alone.

Hutchins and Wemmer argue that because larger vertebrates exist at the tops of food chains and require considerable space to roam, their preservation carries with it the preservation of many less charismatic species. But while this argument clearly makes *in situ* preservation of higher mammals look better from a holistic perspective, it is unclear why it should enhance the captive propagation position. It is precisely because captive breeding preserves a species in isolation from its ecosystem that captive breeding only looks good from a holistic perspective if it is accompanied by an aggressive program of habitat preservation.

From the enlightened anthropocentric perspective championed by philosopher Brian Norton, captive breeding is also only a means to the end of preserving evolving ecosystems. And so, as we concluded in our article, "both environmentalists arguing from a holistic perspective and conservationists ar-

guing from an enlightened anthropocentric perspective should push for an intelligent balance between habitat preservation and captive breeding."

Admittedly, our article did not answer the difficult question of where to strike this balance, but that was not our purpose. To strike an intelligent balance one must be consciously aware of and able to think clearly about the values one is trying to serve, and our article was an attempt to clarify the nature and implications of the three ethical perspectives from which environmental policies are commonly evaluated. While this philosophical exercise will not by itself solve the endangered species problem, we cannot say what counts as a solution without engaging in it. To solve the endangered species problem from the holistic and/or enlightened anthropocentric perspectives, efforts must be made to couple captive breeding with habitat preservation. Some projects, like the golden lion tamarin project, do just that, but to insure that our nation's captive breeding programs are meaningfully related to the goals of holists and enlightened anthropocentrists, the partnering should be institutionalized as a matter of national policy. A recent US Fish and Wildlife Service report estimated that habitat acquisition accounts for only about one quarter of all endangered species expenditures (*ESTB* 16(5):3). One way to couple habitat protection more tightly to captive breeding would be to require that **at least as much** be spent on the former as on the latter. We mention this only as a starting point for further discussion of the ethical question raised here and in our previous article: How can we best insure that endangered species programs serve the values they are intended to promote?

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If so, please send change of address forms promptly. The UPDATE is sent bulk-mail, and will not be forwarded by the US Postal Service. Please indicate both your old and new addresses on the change form so we are able to update our mailing list in a timely and accurate fashion.

Genetic Conservation Courses

The Genetic Resources Conservation Program at the University of California, along with the Education Center of the University of California Extension Service on the Davis Campus, will offer two courses from July 6 to August 7, 1992, titled: Animal Genetic Resources Conservation and Plant Genetic Resources Conservation. Students should have at least a baccalaureate degree, fluent in English, either advanced university students or employees of national conservation groups or NGO's. For enrollment information and further details contact International Training and Education Center, University Extension, Dept. P, University of California, Davis, CA, 95616, USA. Phone: (916) 757-8686. Fax: (916) 757-8676.

Declining Amphibian Populations

Due to recent major concerns about the global decline in amphibian populations, the World Conservation Union (IUCN), Species Survival Commission (SSC), has started the Declining Amphibian Populations Task Force chaired by Dr. David B. Wake of University of California-Berkely. The focus of the program is to provide a global coordinating center for researchers and governments concerned with documentation and causes of these declines. One goal is to prescribe uniform protocols by which studies of different species and habitats can be compared. The IUCN/SSC invites interested persons and organizations to contact James Vial, Coordinator, Biological Sciences, University of Tulsa, Tulsa, OK, 74104, USA. Phone: (918) 631-2757. Fax: (918) 631-2762.

Invertebrates and Conservation Planning

The Xerces Society and the Department of Biology at the University of Oregon co-sponsored a workshop on the use of invertebrates as indicators for conservation planning. Biological and practical criteria were developed for selecting

appropriate taxonomic groups, and two case studies were presented: temperate grasslands and tropical forests. A document detailing the results of the workshop is in preparation. For information contact Dr. Claire Kremen, The Xerces Society, 10 Southwest Ash Street, Portland, OR, 97204.

Raptor Conservation in the West

Birds of prey play an essential role in natural systems and serve as excellent indicators of ecosystem health; recent declines in some populations signal ecological damage. The Western Foundation for Raptor Conservation is the only group monitoring the status and movements of raptors in western North America on a regional scale, and invites individual, family, and corporate members. For information contact WFRC, Inc, PO Box 304, Albuquerque, NM 87103, USA. Phone: (505) 291-9224.

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

Announcements for the Bulletin Board are welcomed.

Endangered Species UPDATE

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