Endangered Species UPDATE

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In This Issue:

Organization and Management of Endangered Species Programs

by

Tim W. Clark and John R. Cragun

Endangered species recovery is nearly always difficult, and as a result, conservation biologists need to use the best tools, skills, and experience available. It is not always easy to determine the precise causes for dwindling, small populations and habitats and to devise timely, efficient means to restore them to evolutionary health. While the use of good biology is absolutely essential to species recovery, other factors of an organizational nature are also indispensable, such as problem analysis and problem-solving strategies, organizational design, work group effectiveness, and clarity and specificity of goals and objectives. Inadequacy in any of these factors may result in inefficiency and ineffectiveness, and ultimately, the species may not be recovered.

In this paper, we introduce organization and management concepts and recommendations that can help the work of conservation biologists and managers. We offer only a brief introduction to the complex organizational dimension of restoration work. We also direct you to the extensive literature of this field and to several checklists and self-tests that allow you to diagnosis your present situation.

The Organizational Dimension of Restoration Work

The challenge of successful species restoration includes many organization and management issues (Clark 1989), although this fact often goes unrecognized (Clark 1986). It is obvious that good science is needed in restoration work. It is less obvious to many people that good organization and management are also needed. Our study of the organizational dimensions of conservation work and our participation in various species restoration efforts have led us to conclude that an explicit understanding of how organizations are structured and how they function is essential to successful conservation. By studying the activities and structures of programs and teams, for example, we can learn which ones best support the demands of conservation work (Clark et al. 1989). Understanding organizations and knowing how to make them work for species recovery can make the difference between a program that succeeds and one that fails (Argyris and Schon 1978, Clark 1985).

Unfortunately, it is common for professionals in many disciplines to ignore or depreciate the value of these organizational factors. They see only the biological, technical aspects of the problem and underappreciate organization and management dimensions. Because of this, their job may be harder than it should be. They may unconsciously create impediments or barriers as a direct consequence of how they organize and manage themselves, how they structure their thinking and actions, beginning with how they identify problems, how they define solutions, and especially how they design and implement jobs and working relationships. Because of this failure and because of the urgency and the risks in recovery efforts, conservation professionals would do well to incorporate knowledge of organizations into their repertoire of skills and to learn how different organizational designs and management modes can either facilitate or hinder their work. Extensive research on many different kinds of organizations has revealed common problems, patterns, and concerns. For example, it is estimated that 50-75% of organizational behavior, patterns, and problems is common to most organizations (Galbraith 1977). A little of this kind of knowledge can go a long way in saving species.

Embarrassingly little attention is paid to designing and managing organizations and decision-making processes in conservation despite evidence of chronic and obvious problems. Yaffee (1982) described many of these problems in his classic study of implementation of the Endangered Species Act, including: slow decision-making; rewards for incompetence and penalties for aggressive, effective action; overly rigid bureaucratic controls; long hierarchies of authority; and importantly, scientific and bureaucratic conservatism. These problems are probably more prevalent than is currently recognized in recovery efforts.

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People are surrounded by organizations all their lives. They take them so much for granted that their pervasiveness and influence are taken as a matter of fact. This has led organizational designers to observe that: "People who live their entire lives in organizations and are surrounded by them have only the vaguest knowledge of their workings— or underlying logics" (Jelinek et al. 1981:4).

Task Environments and Information Processing Models

Restoring species, of course, requires that we take their environments into consideration. Plants and animals evolve in dynamic environmental contexts. Indeed, the reason many species are now endangered is because these contexts have been drastically altered by humans. Just as species live and act in environmental contexts, the restoration task is recognized by organization designers to have an "environment." The sum total of all the forces and factors — technical, organizational, and policy — that affect the work of species recovery is the task environment. There are internal and external aspects of the task environment (Clark 1985, Clark and Westrum 1989).

The systems properties of many endangered species task environments are uncertainty, complexity, diversity, and instability (Clark et al. 1989). Uncertainty is the difference between what conservationists know when they start a recovery effort and what they must eventually know to be successful. In the beginning, uncertainty is often great. There are complex relationships between endangered species and their biological and physical environments often showing thresholds and indirect and nonlinear relationships. Such relationships possess much natural variability. Uncertainty and complexity lead to unpredictability.

There is uncertainty not only in ecological systems themselves but also in the organizations involved. There are often differences in perception and expectations among the individuals and organizations involved (Hrebiniak 1978). Many differences exist between field level agency managers, top level bureaucrats, university researchers, conservation organizations, and others. For example, even though all these individuals may agree on the goal or end — to save the species — they frequently disagree on the means. When you figure these differences into the hundreds of decisions or clearances that must take place in a typical recovery effort, it can be seen that it is virtually impossible to create an effective, efficient, and equitable program without a good working knowledge of organization and management principles.

Organizational designers offer what they call "information processing models" for programs confronted with much uncertainty, such as recovery programs (Daft 1983). These models view the task basically as one of proper information generation and management. They generally illustrate that programs confronted with much uncertainty (e.g., little information about how to solve a problem initially) need to be structured and operated in special ways. Every program should have the capacity to get and process information matched to the demands of the task environment. To the extent that a program's information processing requirements change over time, the task of structuring and managing the program is a continuous job in itself. In the beginning, programs should be highly flexible. As the problem gets resolved, eventually more fixed, standardized procedures can be used.

Task Forces and Project Teams

Task forces and project teams can be one of the most useful program elements for endangered species recovery (Clark and Westrum 1989). Small, flexible teams are useful because, with the unpredictability of the task environment, problems arise which do not respond to traditional rules, roles, and regulations of bureaucratic management. The work team, once it has adequate resources, can move quickly to stay ahead of problems. A good team can generate and process needed information rapidly offering up solutions to the recovery task. We all know of so-called teams, for example, that are just rigid extensions of standard bureaucratic structures and operating principles. These are teams in name only and they often perform poorly in endangered species conservation.

The team needed for restoration, by contrast, should be task and action oriented, focused on getting the task completed successfully. It must be willing to accept the uncertainty and risk inherent in endangered species challenges. Considerable emphasis must be given to quality information flow and continuous evaluations. The amount of administrative control over the team will vary from case to case, but fundamentally, administrators must be committed to the task and provide the latitude necessary for professionals to do the work.

To be effective, individual team member's must be perceptive, energetic, willing to work without close supervi-

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

Readers include a broad range of professionals in both scientific and policy fields. Articles should be written in an easily understandable style for a knowledgeable audience. Manuscripts should be 10-12 double-spaced typed pages. For further information, contact the editors at the number listed below.

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Cover:
Eastern barred bandicoot (*Perameles gunnii*) interagency recovery team, Victoria, Australia
Photo by Tim W. Clark

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sion or extensive rules and regulations, and able to learn well. Team membership should be based on an individual's contribution to solving problems and less on the political representation he or she may provide. Both agency and nongovernment participation is necessary. A team set up and operated this way stands a much better chance of being successful than one which is not.

Understanding the Character of Your Organization

The previous descriptions of task environments and task forces and project teams are all characteristics of task-oriented organizations. Not all organizations are task-oriented, however. There are also power, role, and people orientations (Harrison 1972, 1975). These four orientations are defined and accompanied by a questionnaire about them which you can take to learn about your own organization's culture (Harrison 1972, 1975). NOTE: This information is available from the senior author. If the wrong culture or orientation is used by the team or the overall program, it is unlikely that the restoration job will be successfully met. So it is essential to understand the type of culture your organization has, and if it is not a task orientation, it needs to be changed to one that is.

Let's look briefly at the concept of organizational cultures. At the core of every organization is a culture or system of thought that is the central determinant of its character (Harrison 1972, 1975). The culture is a set of values and cognitive perspectives that are largely shared by members. Some people become highly socialized to organizational cultures, whereas other people are less well socialized. "An organization's culture affects the behavior of its people, its ability to effectively meet their needs and demands, and the way it copes with the external environment" (Harrison 1975:169). Much of the conflict between and within organizations is the result of cultural differences between organizations or subunits within the same organization.

From an operational point of view, an organization's culture may or may not be well matched to the conservation work to be done. If it is, it will aid task completion; if not, it will hinder the work. Both the program's culture and the team's culture should be predominantly task-oriented to be most matched to the work of species restoration.

In task-oriented conservation teams, members should have no ideological commitment to authority and order per se in such programs (Clark and Westrum 1989). Authority should be seen as legitimate if it is based on knowledge and competence and is used to meet the recovery task. Authority is illegitimate if it is based on power or position and is not used to meet task objectives.

Managerial Processes

How should task forces and project teams be managed in a complex and uncertain task environment? Special attention must be given to management processes. Whether recovering species or conducting other complex tasks, organization and management concepts have wide application in problem-solving situations. Management is the use of people and other resources to accomplish objectives. This very brief overview of terminology, theory, and perspectives has practical value you can apply (Mintzberg 1971, Brickloe and Coughlin 1977, Kanter 1983, Boone and Kurtz 1984, Steers et al. 1985). We will describe briefly four of the primary functions that take place in organizations, focusing on how these functions should be carried out in the high performance teams that could be useful in conservation.

Organizing Teams. The way a team is set up and run provides a map of tasks to be performed, responsibilities, and reporting relationships. Obviously, a marine combat team should be organized differently from a day-care center or a program to save an endangered species.

Getting the organization right for a restoration team should be a major concern. Given the task environment of restoration work, the overall program should have little formalization and few hierarchical levels, rules, and regulations. Elsewhere, we have described many organizational concerns in conservation (e.g., Clark et al. 1989). The bureaucratic centralization of decision-making and other managerial functions should be minimal. For example, referring problems upward within bureaucratic hierarchies may destroy team cohesion and will frequently result in critical time lags if decisions by top management are delayed too long, if lines of communication become too long, if too many people are involved, or if the relevancy of the issue becomes distorted by the time it takes for the administration to make a decision.

Planning in Teams. The kind of planning that an effective restoration team uses may be quite different from that typically used by bureaucracies. In teams, planning requires continual re-evaluation, analysis, and adjustments — all directed toward the restoration goal. Plans need to respond quickly to changes suggested by field operations. Extensive preplanning and rigid overplanning should be avoided.

Establishing and putting a plan in place involves decision-making. Both the team and supervisors in the overall program must understand the overall system of decisions being made. The people and the decision-making process should collectively focus on the task. Team members are usually highly skilled in conservation science and management, and they should be included in all decision-making and planning.

Decision analysis has been used successfully in several endangered species recovery plans (Maguire 1986). In short, decision analysis is a form of risk assessment wherein the problem is outlined in a "decision tree." It is extremely valuable in unpredictable technical and socio-political task environments; endangered species restoration is a prime example.

Leading Teams. Leadership of the team and the overall program should be task-oriented. The team leader should be a team builder and a skilled manager of conflict. Differences of perception and interests will arise in any joint task, but coupled with emotionalism, differences can be magnified to unproductive levels. Team leaders should be evaluated on the overall performance of the team and not solely on their individual performance or on the basis of their

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employing agency's incentives. Team leaders can find themselves in a dual role. One role is task-oriented and the other is representation of their employing agency. The two roles can be incompatible, so team leaders should possess an ability to separate scientific fact from inference or judgments that reflect policy and politics.

Controlling Teams. Controlling teams is necessary to maintain working relationships and to insure that performance standards are met. In restoration teams consisting of professionals, the control function will largely be self-imposed by the members themselves, assuming a commitment to the task, an environment that provides feedback on team performance, an evaluation system, and appropriate recognition and rewards for performance.

All team members should participate in defining the problem they are working on, in designing appropriate strategies, and in agreeing upon the standards on which their performance will be judged. Once all members have accepted the legitimacy of the task and the performance standards, then controlling the task becomes less formidable. Feedback on individual and team performance should come regularly as the team conducts its activities.

Analyzing Organizational Problems and Developing Action Plans

Endangered species recovery requires a framework for analyzing organizational problems and for implementing change. For example, a team may recognize that their day-to-day effectiveness is hampered by a lack of freedom to confront one another on relevant task issues. Having agreed that they need to talk more openly, each team member waits for someone else to begin. After considerable frustration, they may ask, "Why can't we change the way we work together?"

In this example, there may be many reasons to be more open. An important one is that team members must perform effectively for their own sakes, for the good of the team, and for their employing organizations. Accomplishing needed changes, even if they are well recognized, is not always an easy task. Often forces hidden in the sociology of the team hinder change and may require a professional organizational consultant. By the same token, other problems, both organizational and technical can be effectively addressed by the team directly if they follow a systematic process of problem-solving and action-planning. NOTE: Some guidelines are available from the senior author. This procedure is self-explanatory and could be used by teams, agencies, and organizations experiencing technical, organizational, or other problems.

Conclusions

There is evidence of poor performance in endangered species programs in this country (Kohm 1990). Many of these problems can be traced to poor design and mismanagement of organizations. Once biologists understand this, they will be able to apply the concepts, terms, and descriptions used in this introductory paper and the extensive literature cited to identify, analyze, and begin to rectify the problems in their own programs. The task of restoring species and their habitats to a healthy status is difficult enough without being hampered by poorly designed and managed organizations, especially when researchers in these fields already have valuable concepts and techniques which are directly applicable to conservation programs. It seems clear that conservation biologists must become knowledgeable about what makes for a good recovery program and how to achieve it.

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Book Review

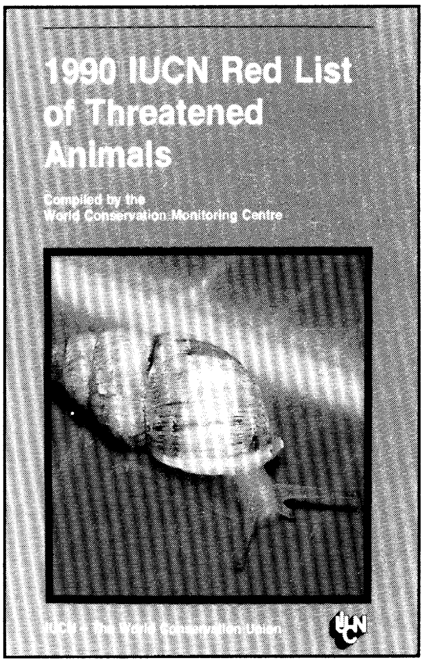
1990 IUCN Red List of Threatened Animals and 1990 United Nations List of National Parks and Protected Areas

by the World Conservation Monitoring Centre and IUCN - The World Conservation Union

The International Union for the Conservation of Nature and Natural Resources (IUCN) has recently published updated versions of two of its old standbys: the 1990 IUCN Red List of Threatened Animals and the 1990 United Nations List of National Parks and Protected Areas. Both are very valuable reference books for scientists, managers, and lay persons interested in conservation. They may be purchased from IUCN Publications Services Unit, 219c Huntington Road, Cambridge CB3 ODL, United Kingdom. The Red List, like its predecessors, is a list of animal taxa known to be threatened with extinction, with the caveat that many more species may be threatened for which there is no information. The word "threatened" in IUCN parlance is a general term, andso, for each listed taxon, a code is given for the specific status (e.g., extinct, endangered, vulnerable, rare, indeterminate, insufficiently known, or commercially threatened). The list is compiled and maintained by the World Conservation Monitoring Center.

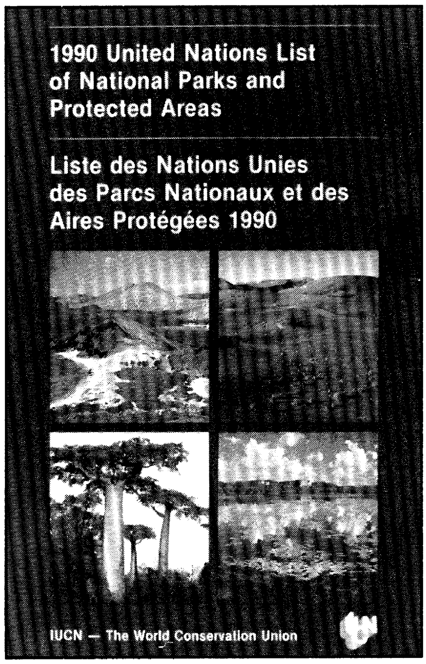
The lists, arranged taxonomically, give scientific names, English common names, threatened species categories, and geographic distributions for 698 mammals, 1047 birds, 191 reptiles, 63 amphibians, 726 fish, and 2250 invertebrates. The volume begins with a guest essay on the role of captive breeding in conservation by Nathan R. Flesness and Tom J. Foose of the IUCN Species Survival Committee Captive Breeding Specialist Group. An example Inventory Report Form is given, as well as a list of documents on which the IUCN Red list is based, and a list of references for the taxonomy used. The Red List itself is 179 pages long, and is followed by a very complete 14 page index.

The second book described here is the ever-popular list of National Parks and Protected Areas, which has had seven published versions since its 1961 inception. This bilingual book (English and French) lists, alphabetically in English, all countries recognized by the United Nations and the names, categories, and areal coverage of the parks and protected areas within their borders. The criteria for inclusion of a protected area in the volume are based on size, management objectives in comparison to IUCN Categories I through V (definitions provided), and authority of the



management agency (i.e., the reserve must be managed by the 'highest possible authority' to be included, usually the national govenment). Three items are provided for each entry in the main lists: management category, size of the area, and date of establishment. A summary of the total number and amount of areal coveage of protected areas is provided for each country.

In the three previous versions of this book, the biogeographic region in which each protected area fell was also given. This was unfortunately omitted from this version, but a section on biogeography provides the total amount of protected area coverage for each Udvardy biogeographic region. Subsequent lists, again on a country by country basis, are provided for other types of protected areas: Wetlands of International Importance, Biosphere Reserves, and World Heritage Natural Sites, all of which are special types of reserves emerging from various international agreements and conventions. The list of Biosphere Reserves provides the biogeographic code for each, and the list of Wetlands of International Importance provides geographic coordinates of each area. The volume also provides information on the ecological coverage of



protected areas and information on the growth of protected area coverage, both on a global scale. In total, the list includes 6,940 protected areas, for a total land area of 651,467,596 ha worldwide. This is a valuable source of information for conservation planners, as well as a good reference on the topic of international protected area management.

Reviewed by Joel Heinen, Co-editor of the Endangered Species UPDATE and Doctoral Candidate in the School of Natural Resources, University of Michigan, Ann Arbor, MI 48109-1115. USA.

Technical Notes

Grazing and Endangered Species Management

by S. B. Weiss, K. R. Switky, and D. D. Murphy

Few scenes distress biologists more than those of overgrazed rangelands. Livestock grazing has been responsible for wholesale ecological changes across diverse landscapes — changes that led John Muir to describe range animals as "hoofed locusts." Berger and Wehausen (Conservation Biology 5:244-248) have described how livestock transformed grasslands in the Great Basin by encouraging the spread of forbs and shrubs. These changes allowed dramatic increases in populations of deer and, subsequently, mountain lions, in densities high enough to prevent the reestablishment of bighorn herds in numerous Great Basin mountain ranges. Such scenes of overgrazing, and concomitant ecosystem disruption, have led to controversy over the roles of domestic grazers on public and private lands.

While numerous examples attest to the destructive potential of uncontrolled grazing, grazing is a necessary component of many ecosystems. Grazers selectively crop certain grasses and create surface disturbances, processes that encourage early successional species and contribute to biological diversity. Widespread declines in populations of native grazers have left many grassland ecosystems with empty functional niches. The use of grazing to manage habitats for threatened and endangered organisms is a necessary option for species dependent on early successional stage habitats — not only plants, but invertebrates, cold-blooded vertebrates, and small mammals. The decline and eventual extinction of many butterflies, among other organisms, is thought to be the result of an absence of grazing; managed grazing regimes may be key to the conservation of these and other rare and endangered organisms.

The large blue butterfly (*Maculinea arion*) provides a classic example of the indirect effects of grazing. The large blue, like many of its relatives, must be tended by a particular ant species to survive its larval and pupal stages. That ant species requires a short grass sward, historically maintained by grazers. Reduction of populations of native grazers and the elimination of domestic grazing led to the decline of the ant species and consequent extinction of the large blue from the British Isles. The large blue was successfully reintroduced from continental Europe; now it and a number of other British butterflies (and their ecological associates) survive under strict grazing regimes designed to maintain early successional species.

Along the coast of New England, the regal silverspot butterfly (*Speyeria idalia*) expanded its range in the 1800's after pastures were created from the wooded terrain. As these pastures were abandoned, however, silverspot populations declined dramatically. Ungrazed pastures — even those that offer violets, the butterfly's larval hostplant — apparently do not provide adequate thermal conditions for silverspot larvae. Today fewer than ten small remnant populations of the regal silverspot remain, all in grazed pastures on offshore islands.

Cattle grazing is implicated in the nearly complete transformation of California's grasslands from forb-rich perennial bunchgrass communities to those dominated by introduced annual grasses and forbs. Native species are now largely restricted to rare edaphic situations that have proven less invasable by non-native species. The largest population of the federally protected Bay checkerspot butterfly (*Euphydryas editha bayensis*) exists in a grazed native grassland; one of the first management experiments carried out at that site was the removal of grazing from a several hectare plot. Introduced annual grasses rapidly invaded the exclosure, restricting the once widespread native forbs — including the larval hostplants and adult nectar sources of the butterfly — to shallow soils around rock outcrops. Similar "experiments" on a larger scale, where grazing was removed from native grasslands, have provided similar results.

But, the prescription for grazing is not simple. While a lack of grazing can cause deterioration of checkerspot butterfly habitat, grazing during periods of extreme drought can impact all plants in the grassland community, even leading to local extirpation of the insect's hostplants. Nonetheless, the very process that led to the transformation of California's grasslands — livestock grazing — appears to be crucial to one of the ecosystem's most threatened species.

While these and other case studies call for carefully managed grazing as a part of endangered species protection schemes, the story of the Great Basin exemplifies the hazards of using livestock to replace native ungulates: their patterns of grazing can be very different. The major differences appear to be in timing and intensity; native ungulates tend to graze an area heavily and move on, while domestic livestock usually are managed in such a way that grazing pressure is more continuous. Well-managed rangelands, where grazing regimes approximate patterns of native ungulates (those with which the native plant communities evolved) can support a large number of native species.

Application of this understanding to the management of threatened and endangered species requires that we put aside our knee-jerk distaste for domestic grazing, and instead employ it as the best substitute for native processes that we have all but lost. Experimentation is called for, including the use of livestock exclosures and other controls over grazing patterns. And, the distinction between grazing for meat production and grazing for vegetation management is critical: to make these experiments scientifically and practically valuable, we must rearrange some societal priorities. Finding proper grazing regimes may be more difficult than maintaining the status quo or unconditionally prohibiting livestock, but our efforts may result in richer habitats for numerous species, including many of the rarities we seek to protect today.

Weiss, Murphy, and Switky are biologists at the Center for Conservation Biology, Stanford University, CA 94305.

Bulletin Board

Center for Conservation Biology Post-Doctoral Assistantship:

The Center for Conservation Biology, Stanford University, is taking applications for a post-doctoral research assistantship. A plant ecologist with research interests in conservation biology is sought for a renewable 12-month position with their small, active research group. Requires strong quantitative experience and, especially, expericence in application of science to practical conservation problems. PhD and at least 2 peer-reviewed papers required; background in community ecology, monitoring, and pollination or herbivory preferred. Send letter, c.v., names/phone numbers of 3 references, and statement of research interests to Dennis Murphy, Center for Conservation Bilogy, Dept. of Biological Sciences, Stanford Univ., Stanford, CA 94305. USA. Applications are due by Aug. 31, 1991.

Rainforest Conservancy Conference

The Rainforest Conservancy, a student-run rainforest conservation organization headquartered at Princeton University is sponsoring the first nationwide student rainforest conference in the US. It will be held September 27-29, 1991 in Princeton, NJ. Rainforest experts will be giving keynote addresses and addressing panel sessions and workshops. All students are invited to attend. Workshops will focus on rainforest issues, as well as recruitment, marketing, leadership, and organization of Rainforest Conservancy chapters at campuses around the country. The conference is designed not only to inform, but to generate action. For further information, contact the Rainforest Conservancy at their Princeton office, (609) 924-1000.

Natural Areas Association Conference in Estes Park

The Natural Areas Association will hold its Eighteenth Annual Conference in Estes Park, CO on October 15-18, 1991. The theme of the conference will be "Natural Areas in the Western Landscape." Special sessions are planned on: riparian restoration, livestock grazing and natural diversity, ecology of exotic species establishment, the Colorado Natural Areas Program, and rare plant management. For conference information contact Natural Areas Conference Coordinator, PO Box 260550, Lakewood, CO 80226-0550.

Saving Our Ancient Forests

The Wilderness Society has launched a national public education campaign intended to protect spectacular stands of trees that have been the focus of intense local and national controversy. This effort includes the publication of *Saving Our Ancient Forests*, which, in easy-to-read style, outlines a blueprint for protecting these national treasures. It provides colorful descriptions of the animals that populate ancient forests and highlights several endangered plant species that directly benefit human health, including the Pacific yew, whose bark contains a powerful cancer-fighting chemical, taxol. A companion coloring book, *Color the Ancient Forest*, introduces children to the unusual animals and plants that give these forests their unique character. *Saving the Ancient Forests* can be purchased for $5.95, plus $3.00 postage from: The Wilderness Society, PO Box 296, Federalsburg, MD 21632-0296. The coloring book is available for $4.95 from TWS, 900 17th St, NW, Wash. DC 20006-2596. USA.

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

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