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# Ethical Questions for Resource Managers

These papers, adapted from talks given at the 1989 meeting of the Oregon Chapter of the American Fisheries Society, reflect the views of the authors and not necessarily those of the American Fisheries Society or the USDA Forest Service.

# Ethical Questions for Resource Managers

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## Abstract

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The decisions of natural resource managers are not simply scientific issues but involve fundamental questions of ethics. Conflicts in fisheries management, forestry, and other applied sciences arise from social and economic factors that affect natural resource values. Administrative processes, cost-benefit analyses, and various management "myths" have been constructed to avoid responsibility for difficult value-based decisions. Through these and other means, individuals and organizational systems tend to "filter" information to minimize conflict. The duty to inform the public of the alternative consequences of management actions remains a basic ethical obligation of the resource professional. This series of essays discusses conflicting values of resource management; the moral responsibilities of resource managers toward natural ecosystems, the public, and future generations; and the obligation of resource professionals to sustain for public scrutiny an open and honest debate about critical resource issues.

Keywords: environmental ethics, natural resource managers, the Land Ethic, Aldo Leopold, fisheries management, resource economics.

# Foreword

The wonderful books of Joseph Campbell and his memorable interviews with Bill Moyers remind us of the importance of myth. We moderns smugly think of myth as a pre-scientific mode of thought. But *Homo sapiens* is as innately mythic an animal as linguistic, social, and tool-using. We moderns have myths of our own.

Those for whom a particular myth lives never think of their beliefs as "myth" but simply as how the world is. Read Homer. For him and his contemporaries, the heroes at Troy were men of flesh and blood and their glorious deeds the simple facts of history. And the gods and goddesses were as real as lightning, war, and love. In all of Homer, not the shadow of a doubt diminishes the certain existence of either the superhuman heroes or the supernatural divinities.

As soon as doubt's shadow is cast, myths are revealed for what they are. Until recently, the myth of value-free science has reigned. Ren6 Descartes, "the father of modern philosophy." divided reality into two domains-the objective and subjective. In the former reposed all physical facts; in the latter, all of our beliefs, sensations, and values. Because science was supposed to ascertain the facts, then science, like its object of inquiry, physical nature, was proclaimed by its practitioners to be morally neutral and value-free.

But even the purest of scientific research is necessarily motivated by values. The pursuit of knowledge for its own sake is motivated by the value we ascribe to knowledge-the belief that it is good and worth having, even if it cannot be technologically applied. Applied science-practically by definition-is fraught with values. Yet until recently, resource management could proclaim with Olympian arrogance that because its policies were scientific, they were objective and value-neutral. The other fellow had values. And because values "are subjective, those values were merely personal preferences. Thus, scientific management placed itself beyond all ethical criticism, indeed beyond criticism of any kind, concerning ends. All debate could thus be safely confined to technical ways and means; about such matters, professional, expert, scientific opinion prevailed.

Today, we recognize the myth of a value-free science for what it is: a myth. This volume of essays begins with the assumption that values pervade science and calls us into a serious dialogue about the ends of resource management as well as the means. More deeply, it exposes the very concept of "resources" to be value-laden and demands that we reassess the culture of applied science and the world view that applied science has long taken for granted.

This is a remarkable set of essays. They are direct, brief, and accessible. They are also inspiring, candid, and critical. They should be required reading for anyone in the field of resource management-whether student, professor, technician, or administrator.

Being awakened from our dogmatic slumbers is painful. And to be disabused of our cherished myths is to be set adrift in a sea of ideas with no terra firma in sight. Indeed, we are living in a time when the old myths are debunked and no new enlightenment has crystallized to take their place. But it is also exciting. A rare moment of great opportunity and responsibility is given to our generation, for it falls to us to be the architects of

tomorrow's world view. Aldo Leopold is much quoted in this book, as elsewhere. Here are some lines penned by Edwin Arlington Robinson that Leopold thought worthwhile to repeat:

> Whether you will or not
> You are a King, Tristram, for you are one
> Of the time-tested few that leave the world,
> When they are gone, not the same place it was.
> Mark what you leave.

J. Baird Callicott
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# Introduction

Daniel L. Bottom

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In the last decade, natural resource professions such as fisheries and forestry have become intensely focused on techniques for resource protection, production, and harvest management. To be sure, technology has a major role in determining the human capacity to use and conserve natural resources. But technology cannot decide how natural resources **ought** to be managed. Resource management is much more than an engineering problem. It requires ethical judgments about how human beings are related to the rest of nature. The values that guide this interaction, rather than the techniques by which it is consummated, ultimately will decide the quality of resource management and the standards by which the results are measured.

Ethics is a system of moral values that governs the conduct of individuals and groups of individuals. Some of the most important ethical issues for natural resource professionals are contained in the many answers that might be given to the question: "As a resource manager, what are your moral obligations and whose interests do you serve?" In 1989, the Oregon Chapter of the American Fisheries Society organized a symposium to address this question. These papers, adapted from talks given at the symposium, describe several ethical concerns from the perspective of the natural resource professional:

- What are resource professionals' responsibilities to future generations?
- What are our responsibilities to the ecosystems we "manage"?
- What are our responsibilities to the public we serve and to the organizations we represent?

Perhaps one of the most important ethical problems that society and we, as instruments of public policy, face is the definition of our responsibility to future generations Some form of obligation to posterity has been recognized throughout the history of conservation legislation in this country. Today, this obligation is institutionalized, for example, in the National Environmental Policy Act that directs agencies of the Federal government to "fulfill the responsibilities of each generation as a trustee of the environment for

succeeding generations," Similarly, Oregon Revised Statutes require that "fish and wildlife of the state shall be managed to maintain optimum benefits to present and future generations of Oregonians." These statements notwithstanding, the future generations are not with us to see to it that their interests are served by the decisions of today. But the voices of multitudes of present-day resource interests can be heard loud and clear No easy formulas, no simple quotas tell us how we are to distribute resources between generations, fn an essay entitled "What Is the basis of our responsibility to posterity?," Garrett Hardin (1981) describes the problem in cost-benefit terms. How do we balance costs and benefits when the time lag between the two is considerable? That is. if the benefits come now but the costs are not incurred for a generation or more, or H present generations must bear the costs for future benefits. The answers are not contained in the Oregon Revised Statutes or any other State or Federal laws or statutes. But these questions are at the heart of all fish management activities-harvest regulation, habitat protection and enhancement, hatchery programs, gene conservation efforts, and so on.

Perhaps even more fundamental than our responsibility to posterity is the question of our responsibility to nature itself. That we somehow accept such a responsibility is implicit in the term we use to describe our profession-"resource management." How we choose to define the "resource" we "manage" may have more to do with ethics than with science. What social and natural resource values should be the object of our management?

The early period of the conservation movement in this country stressed the use of natural resources for the benefit of human beings. Gifford Pinchot, who served as Chief Forester fn the Theodore Roosevelt administration, expressed this philosophy (1973):

> The first principle of conservation is development, the use of the natural resources now existing on this continent for the benefit of people who live here now.

Although economic use remains a dominant factor in resource management today, many believe that the resources and processes of nature have intrinsic value aside from any utilitarian purpose, Do all living organisms have moral value, a right to exist? Do rivers, lakes, and streams? Do ecosystem functions? And do these values and rights exist whether or not these organisms, features, and functions directly serve economic or spiritual interests of humankind? As some suggest, do these nonpersons have legal rights themselves for which resource professionals should be held accountable (Stone 1974, 1988)? And how do we reconcile the technological capacity to dramatically change the Earth with the burden of responsibility to protect an ecosystem of which human beings are also a part? In 1970. Aldo Leopold suggested

> When we see land as a community to which we belong, we may begin to use it with love and respect....That land is a community is the basic concept of ecology, but that land is to be loved and respected Is an extension of ethics.

The ethical implications of a narrow definition of the resource become evermore apparent when, as is generally true in nature, the cost of intensive management of one species is the decline or loss of others.

Resource technicians, scientists, and administrators also face important ethical questions about their professional responsibilities. Although natural resource managers have no Hippocratic oath, some common values surely can define the ethics and obligations of the profession to society. One of the most important of these is the duty to provide information needed for society to make ethical choices about the use or protection of its natural resources. Because our science and technology have the capacity and we have clearly demonstrated the will to alter the course of all life on this planet, our responsibility to inform, even in so specialized a field as fisheries, cannot be taken lightly. In his essay on "The Ethical Basis of Science," biologist Bentley Glass (1965) wrote

> The scientist cannot make the choice of goals for his people and neither can he measure and weigh values with accuracy and objectivity. There is nonetheless an important duty he must perform, because he and he alone may see clearly enough the nature of the alternative choices.... It is the social duty and function of the scientist...to demand of the people, and their leaders too, a discussion and consideration of all those impending problems that grow out of scientific discovery and the amplification of human power.

In the political arena of resource management, the professional obligation to inform may come in direct conflict with the desire of resource agencies to

streamline decisionmaking and, particularly, to minimize public controversy. The responsibilities of science to society and of an individual to the organization she or he serves raise important ethical questions. We believe the answers are fundamental to the function of all public agencies charged with managing natural resources in a democratic society.

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# A Pilgrim's Progress From Group A to Group B[1]

Edwin P. Pister

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> Conservationists are notorious for their dissensions .... In each field one group (A) regards the land as soil. and Its function as commodity-production; another group (B) regards the land as a biota, and its function as something broader (Leopold 1947).
>
> Conservation is a state of harmony between men and land (Leopold 1947).

"Rest! cries the chief sawyer, and we pause for breath." My eyes fell upon the brass plaque, recently fastened to a large boulder near where the "good oak" had once stood (not far from "the shack"), and waves of nostalgia and emotion washed over me as my mind quickly retraced the events that led me here, and the role played by A *Sand County Almanac* in my evolution as a professional steward of natural resources. I remembered vividly that spring day in Berkeley, 36 years earlier, when A. Starker Leopold suggested that his undergraduate students in wildlife management read "this group of essays that Dad wrote." In 1949, I was unable to absorb much of Aldo Leopold's philosophy of conservation. It first had to be tempered by more than a decade of experience and exposure in the field.

Following the usual variety of moves, jobs, and agencies that accompany the earlier portion of most careers in fish and wildlife research and management, I settled, in the late 1950s, into a position as a fishery biologist with the California Department of Fish and Game in the eastern Sierra and desert regions of the State. My graduate studies in limnology had already given me considerable knowledge of the geography of the area and an insight into the biological characteristics of many of the waters falling under my jurisdiction. With but one assistant, I was relegated the responsibility for managing nearly a thousand waters extending from the crest of the Sierra Nevada eastward to the Nevada line, and ranging from the top of Mount Whitney at 4418 meters to the floor of Death Valley at nearly 100 meters below sea level. Management, ideally, meant responsibility for the perpetuation of **all** species of aquatic organisms-including fishes, amphibians, invertebrates, and even reptiles-and their habitats.

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[1] Adapted from: J. Baird Callicott, ed. Companion to *A Sand County Almanac*: Interpretive and Critical Essays. Published with permission of University of Wisconsin Press, Madison, Wisconsin.

The management programs I had inherited from my predecessors reflected the philosophies of the times. They were technologically "state of the art," and they were designed to meet the desires and demands of a public hungry for outdoor recreation after World War It. They were, in short, model "utilitarian" management procedures.

Fleets of tanker trucks from huge and highly efficient trout hatcheries did a superb job of meeting angler demand, despite the obvious fact that each planted trout was an "artificialized" trophy. But the program sold licenses (the department's primary income source), which increased funding for the program, which grew ever larger. And the larger it grew, the greater became the bureaucratic intransigence. It was popular, it kept us fully employed, it fueled the tourist economy, and it was heresy to think otherwise.

Most California fishery biologists scurried about, robotlike, in a heroic effort to increase catch per angler-effort. With one exception, the golden trout *(Salmo aquabonita),* the game fishes in my district were introduced or exotic species. Nothing was being done to assure the preservation of the native life forms included within my stewardship. No one even knew what they were! No one had realty given the matter much thought. Virtually no attention was devoted to the study of the basic components of the biota. We were living in a make-believe world. The California Department of Fish and Game, as with most State fish and wildlife agencies of that era, was spending its resources painting the building while the foundation crumbled. Although my department as a whole seemed pleased with what was going on, I felt a strange foreboding and knew, somehow, trial tn'ings had to change. During the summer of 1964,1 returned to *A Sand County Almanac* and reread "The Land Ethtic" at leisure and in depth.

More than a decade of field experience gave Aldo Leopold's words new meaning. Within the principles that he so eloquently set forth, I found a rational basis for approaching and solving the problems that perplexed and seemed to overwhelm me so completely. I felt I had within my grasp the basic components for making management programs address the entire biota, not simply the superficial popular demands that had so fully and frivolously consumed my time.

*A Sand County Almanac* clearly articulated my intimations that, to be realty meaningful and to serve the long-term interests of the biota (and therefore the people), any management program worthy of the name must begin with the integrity of the land and water. Using this idea as a foundation, the resource manager can then build the pyramid upward, adding to this base the flora and fauna, and then build further to accommodate, finally, the species of economic and political interest I had toyed with this possibility, but up to that point I had been unable to muster the courage necessary to buck the system. Leopold's grit, as well as his clear purpose and simple means, seemed to be the very thing I needed to gain this courage. I was especially motivated by his wry observation that "nonconformity is the highest evolutionary attainment of social animals" (Leopold 1947).

The universe as a whole ts governed by the complex interaction of immutable and elegant physical laws. As I read through *A Sand County Almanac,* a set of natural laws, equally elegant and immutable, governing biological systems became evident. The futility of trying to circumvent these laws for any appreciable length of time in an effort to achieve short-term economic and political goals became even more apparent to me.

The early 1960s found the nation just entering the initial throes of a concerted conservation movement. The first (and very inadequate) Endangered Species Act was not passed until 1966, and the National Environmental Policy Act was several years away. Financial support for innovative programs did not exist, and administrative and public backing were almost totally lacking. The land ethic was not yet abuilding. But, to me, for the department to be spending the great majority of its fisheries budget planting put-and-take trout and conducting meaningless creel censuses, while we had no dear understanding of the indigenous biotic community. seemed unconscionable. When our pressing need to conduct biological surveys was brought to the attention of top administrators, even those with advanced degrees responded with either a blank took or a remark to the effect that the public and the legislature would never allow license money to be spent collecting "bugs or suckers," some of which we were in fact trying to eradicate to provide better angling (Kellert 1985).

Adding insult to injury, the department had commissioned several fine wildlife scholars and administrators (headed by Starker Leopold) to prepare a plan to guide the department's activities until 1980. The principles of the plan were ecologically sound and, had

they been followed, would have done much to change the status quo. Politics and tradition often speak much louder than logic, however, and we stumbled on as if the plan had never been written.

An interagency meeting was called in Death Valley in April 1969 to discuss the status of the native fishes of the Death Valley hydrographic area (the Pleistocene drainages entering Death Valley originate in both California and Nevada). I learned there that my colleagues in the Nevada Department of Fish and Game (now the Department of Wildlife), National Park Service, Bureau of Land Management, and the U.S. Fish and Wildlife Service faced a similar dilemma. Recognizing that at least a decade could be expected to elapse between recognition of a problem in the field and the mustering of full financial and administrative support from government in an effort to solve it, we realized that we would have to move independently of bureaucracy. In effect, "we moved underground. Had we waited for official support, I am absolutely certain that at least two, and probably five, fishes in two genera would now be extinct. We would have lost the last remaining individuals of the entire genus *Empetrichthys* and, as their habitats were destroyed, we no doubt would likewise have lost an unknown number of invertebrate species and plants (Miller and Pister 1971, Pister 1974). And by "lost," I mean extinct-gone forever-in the words of Alfred Russel Wallace (1863) "uncared for and unknown."

The obvious futility of continuing to blindly repeat conventional management procedures caused me to look elsewhere for long-term solutions to problems that were growing worse with each passing day, and with no relief in sight (Pister 1985). Unfortunately, the biologically sound concept of conducting basic inventories of native species was hampered because the habitat integrity and species composition of the Owens and Walker river systems had already been significantly altered during the early part of the twentieth century. Even so, "The Land Ethic" could serve to establish the ideal that we should be striving to achieve: habitat integrity and an adequate and complete complement of native species. *A Sand County Almanac* literally charted our course: "A land ethic of course cannot prevent the alteration, management, and use of these 'resources,' but it does affirm their right to continued existence, and, at least in spots, their continued existence in a natural state" (Leopold 1947).

A change could be felt, although our management and research programs remained utilitarian. Actually, "economically or politically expedient" would better characterize them because enlightened self-interest, the hallmark of utilitarianism, if carried to its logical limits must lead to a policy of basic resource integrity and protection.

With the blessings of an understanding supervisor, I kept the wolves away from the door with the fish-hatchery system while I began to substitute species inventories for creel censuses. The initial survey revealed that three of the four fishes native to the Owens River system were either endangered or of indeterminate status (Pister 1985). Eventually, informal species-recovery plans and similar nonconsumptive management programs were initiated, along with a plan designed to further self-sustaining wild trout. Major efforts were devoted to environmental protection. Additional efforts to "educate" the general public and to win the political support necessary for the perpetuation of an environmentally sound program of resource management have been undertaken. This new approach appears to be gratifyingly successful and has not, as was feared, provoked significant adverse public or political reaction.

Among the most profound of Leopold's observations is the following: 'To promote perception is the only truly creative part of recreational engineering" and its corollary: 'The only true development in American recreational resources is the development of the perceptive faculty in Americans. All of the other acts we grace by that name are, at best, attempts to retard or mask the process of dilution" (Leopold 1947). To assume for even a moment that government can continue for long in a specific direction, irrespective of the righteousness of its cause, without the support of the people is the height of naivete. the concept of public perception therefore becomes paramount.

Abraham Lincoln supposedly observed that understanding a problem constitutes half of its solution. I have come to believe, on the basis of my experience, that if *A Sand County Almanac* would constitute the humanities component-the values and philosophy-of fish and wildlife management, it would provide a sound moral basis for drafting an ecologically responsible agency approach. Unfortunately, few of our colleges or universities provide undergraduate courses in environmental philosophy or ethics. Most agency biologists, if they gain an interest in the values and

goals of resource management at all, do so through insight derived from experience

Although less so than In past years, that Leopold's A-B cleavage remains alive and healthy within the fish and wildlife profession should be no great surprise. The B types, who regard the land as an integrated biota, mostly remain in academe. possibly because they are primarily oriented toward research and theory, The A types, who regard the land primarily as a vehicle for producing a harvestable crop, abound in fish and wildlife agencies because a love of hunting or fishing may have provided the major motivation for their entry into the profession, and their thinking very often has not progressed much beyond that,

The significance of this fact is often overlooked by analysts seeking to understand the history and evolution of the Nation's fish and wildlife programs. The A types were quick to discover that the license buyers who funded most agency programs were also overwhelmingly of the A persuasion. Obtaining the legislative, administrative, and financial backing consistent with economically popular programs then became a simple matter. And this backing explains why the very basic and ecologically essential nongame component of the biota was almost totally neglected in favor of economical valuable species (Pister 1976). To paraphrase Leopold here, we in the agencies fancy that game species support us, forgetting what supports game species. Obviously, this support is manifested in healthy land and a healthy, intact, total biota: soil plants, invertebrates, nongame and game species alike. At this writing, the A-B cleavage is still strongly represented throughout fish and wildlife agencies. The A component is often given strong support by politically appointed commissioners, who then receive the accolades of the sportsmen's groups responsible for their appointments.

My transition from an A to a B philosophy in turn resulted in a major shift in my professional emphasis. In 1959, the Los Angeles Department or Water and Power applied to the Califomia Division of Water Rights for a permit to divert: several miles of lower Rock Creek-one of the eastern Sierra's most heavily used recreational streams, and an excellent fishery--into Crowley Lake to produce additional hydroelectric power from the Owens River Gorge power plants. As much as Los Angeles had already dried up several miles of the famous Gorge fishery during the early 1950s, the thought of losing additional stream mileage was unacceptable to me, especially because doing so would violate new laws resulting from the Gorge project.

The very rough studies we conducted to prepare for the court proceedings constituted one of the early predecessors of the instream flow technologies in current use throughout the West They were adequate to convince the court, however, in what turned out to be the first water battle that the California Department of Fish and Game had ever won, and the first that the city of Los Angles had ever lost

My motivation then was almost entirely to preserve a fishery for an exotic trout species. I would work ever harder now to accomplish the same thing, but primarily to preserve the basic stream ecosystem and its component flora and fauna. The brown trout is now part of this ecosystem, but by no means the most important part. I am consciously guided by Leopold's summary precept: "A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise" {Leopold 1947).

Twenty years later, after the "energy crunch" of the 1970s, Congress passed legislation encouraging entrepreneurial development of small hydroelectric projects. This legislation has placed in great jeopardy the entire stream system of the eastern Sierra Nevada- So far. we have been successful in saving these habitats, and the motivation again derives from Leopold's maxim. This precept is directly applicable and effective in virtually any problem that a resource manager may confront - whether to introduce an exotic species, to build a road near a fragile habitat, or whatever.

In 1985, for example, the Federal Energy Regulatory Commission decided to conduct an assessment of potential small hydroelectric developments in the Owens River Basin, We knew from our own analyses that 88 percent of our stream mileage downstream from USDA Forest Service Wilderness boundaries had already been affected by diversions of one type or another, and about 25 percent of the hydroscape no longer existed. To further disturb this tremendously valuable stream resource to produce a miniscule amount of electric energy seemed categorically unethical, as measured by Leopold's cardinal principle. And it should not require a study of any sort to prove it (Pister 1979). When I related this opinion to a project official, however, his response chilled me. "When you

start talking about morality and ethics, you lose me." I find such a philosophy (or lack of it) guiding a high public official frightening, to say the least.

Another illustration of a practical application of Leopold's precept of biological integrity occurred in the late 1970s when the National Park Service examined its policies and decided that because trout are not indigenous to the lakes of the High Sierra, they would no longer be planted in park waters. The intent here was to be consistent with a basic park policy to preserve the integrity of natural biota, although most ecological damage resulting from trout planting had occurred years before when the first trout introductions were made. The Department of Fish and Game opposed the new park policy primarily because it constituted revocation of a historic State management procedure that had never before been questioned. I sided with the Park Service against my own agency because the Park Service policy was clearly more in line with the fundamental directive of the land ethic.

Later, we reached an ethically sound compromise. We are not planting lakes in the National Parks, but the Forest Service, which administers High Sierra waters outside the park boundaries, has adopted an ecologically realistic and politically acceptable policy: continue to plant lakes that have been planted historically, but do not plant lakes hitherto barren of trout.

The concept of biological (environmental) integrity is comprehensive. As Leopold avers, "A land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such" (Leopold 1947). Moreover, *Homo sapiens* will benefit in the long run from a healthy biota. This benefit should provide enough of a utilitarian rationale to elicit political support for ecologically sound decisions. We, too, are part of the system, and if something is good for owls, trout, and lizards, it will, in the final accounting, be good for us as well.

Aldo Leopold lamented the failure of the American public to recognize the need for, and to implement, a land ethic. If he now were to look down upon us. "perchance in some far pasture of the Milky Way," he would likely be gratified by what has happened in the environmental field since he left us. The environmental movement of the 1960s and 1970s was in no small measure inspired by his philosophy. The National Environmental Policy Act, Endangered Species Act, Marine Mammal Protection Act. Clean Water Act. and similar laws -passed by the States were also in no small measure inspired by his philosophy. The publication of this volume itself contributes to the growing awareness of what he modestly called "conservation," and I predict that *A Sand County Almanac* will continue well into the future as one of the major forces shaping the Nation's environmental policies.

We see an increasing emphasis on nongame species by States. In California, for instance, a Natural Diversity Data Base, conducted in cooperation with The Nature Conservancy, is drafting an inventory of the State's flora and fauna. Although the program is embryonic at this stage, and small in comparison with traditional programs, progress in this direction is heartening. A strong effort by top administrators to achieve funding sources other than hunting and fishing licenses, and earmarked for the management of nongame wildlife, reflects the idea that wildlife resources are an amenity for all the people, and not just the property of consuming users. Additional efforts to acquire key habitats and to coordinate interagency activities are also underway.

A credit to Aldo Leopold is today's increasing concern for those creatures that share a common habitat with us. More and more scientists and lay persons alike conceptually integrate species with habitat in our efforts to preserve biological diversity (Williams and others 1985).

Some people might debate the practicability of the land ethic for contemporary fish and wildlife management programs. I would urge them to remember that Aldo Leopold was a great naturalist and wildlife professional whose humility allowed him to probe an unspectacular local ecosystem, to be informed by what he found there, and to record it with a beauty and clarity of expression unadorned by needless sophistication. His wisdom was forged by a lifetime of field experience and reflection on his own mistakes, and by his careful husbandry of a small parcel of poor land.

A loathing of freeways and asphalt has kept me in the field for more than 35 years now. The solitude of sand, sage, and pine has allowed me to hear "a few notes" of that "vast pulsing harmony-its score inscribed on a thousand hills, its notes the lives and deaths of plant and animals, its rhythms spanning the seconds and the

centuries" (Leopold 1947). And the lessons of the backward Sand County farm have allowed me to approach and solve the management problems presented both by an ever-increasing and demanding public, and those who would degrade or destroy the habitat that is basic to the recreational resource.

Because I know that the land ethic works well in the field, I have gained much satisfaction in recent years by relating my management experiences to students in places ranging from Nuevo Leon in Mexico to British Columbia in Canada, encouraging them to avail themselves of the wisdom born within the soil, waters, and winds of the Sand Counties. Learning that a nucleus of environmental philosophers was similarly engaged took me to a conference at the University of Georgia in October 1984. Not long after, J. Baird Callicott invited me to lecture to resource management classes and to participate in Earth Week activities at the University of Wisconsin-Stevens Point. My honorarium consisted of a visit to "the shack." While dinner was being prepared there, I stole away by myself and stood beside the "good oak" with Starker and his dad. There was really no reason to speak; I had long ago been well taught. Then, through the clouds of the early evening, I heard goose music as a single pair of honkers set their wings over the Crane Marsh and swung low over the Wisconsin River. Somehow I knew they would always do this, and I glanced for a moment into eternity. Like the "Round River," I had come home.

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# Managing for Sustainable Fisheries: Some Social, Economic, and Ethical Considerations

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Fisheries management is basically two allocation processes: managers allocate the resource among contemporary users and between this generation and future generations. Managers make a direct allocation of the fishery resource to the sport, commercial, and Native American fishermen. In addition, through various legal and administrative procedures, managers participate in allocating fisheries resources to agriculture, energy-producing utilities, industries such as timber, and so forth. Anyone harvesting or destroying a part of the resource-whether by fishing, turbine mortalities, or unscreened irrigation ditches-does, in effect, receive an allocation. A less obvious allocation of the resource goes to those who reduce habitat productivity by poor logging and agricultural practices or by discharging toxic wastes.

When allocating the resource to contemporary users, fishery managers often make decisions that determine the quality and quantity of resources available to future generations. Although management goals often imply a concern for long-term sustainability of the fisheries (Gulland 1977), platitudes about sustainable management are rarely implemented (Regier and Baskerville 1986). I am not aware of any monitoring program in Oregon designed specifically to measure the performance of allocating fishery resources between generations; a possible exception is the Elk River study (Nicholas and Downey 1989). Oregon, for example, does not record the loss of fish stocks, identify stocks in trouble, or monitor the loss of genetic diversity in hatchery stocks. Recent attempts to establish a program to carry out these functions (Oregon Trout 1989) were resisted by the Oregon Department of Fish and Wildlife (ODFW) (personal communication, Bill Bakke, May 10, 1989). Whether or not you agree with the view presented by Ernest Partridge (this volume) that we have a moral obligation to future generations, the Oregon Legislature has made the management of fishery resources for **present** and **future** generations the law (Oregon revised statutes 496.012 and 506.109).

Allocating fishery resources to contemporary users often boils down to a choice between immediate economic gain and long-term sustainability of a fish stock. This choice exposes different values held by the public about its fishery resource. The result can produce severe conflict. Avoiding these conflicts and removing them from public view by labeling them technical or scientific questions (Erman and Pister 1989) is tempting, but value-based conflicts over resource management must be clearly identified as such, and they must be resolved

through informed debate (Erman and Pister 1989). The role of technical experts, the professional fisheries biologists, is to ensure that the debate over conflicting values is carried out at the highest level of understanding by agency administrators, fish and wildlife commissions, and the public. It is our responsibility because we possess the knowledge to evaluate the outcomes and risks of management alternatives (Bottom, this volume).

This paper briefly describes some social and economic factors leading to value-based conflict in resource management. I also describe mechanisms that managers use to avoid their ethical responsibility to resolve these conflicts through informed debate.

Public values in a pluralistic democracy like ours are often difficult to interpret, particularly for natural resource management, because in this area we seem to have a split personality. America has many advocates for conserving wilderness landscapes, maintaining wild animal populations, and protecting the air and water quality of urban environments (Douglas 1965). National surveys show a majority of Americans strongly value wildlife and are willing to make economic sacrifices to protect wildlife and its habitat (Kellert 1981). Fish and wildlife agencies have responded in recent years to changing public values and attitudes by initiating nongame management and watchable wildlife programs.

Over the past 15 years or so in Oregon, I have seen what I believe to be a significant increase in the number of citizens involved in managing their fishery resource. Public involvement ranges from active participation in river basin planning, harvest allocation, and sport fishing regulations to less exciting issues such as the budgets of fishery programs. The Salmon and Trout Enhancement Program (STEP) is an example of the depth and breadth of the public's interest in their fishery resource. Volunteers from STEP work thousands of hours each year on fishery projects. Strong public involvement is showing up in other resource management agencies such as the USDA Forest Service (for example, in the Adopt-a-Forest Program).

The other side of the coin is the strong support Americans give to utilitarian individualism and the pursuit of narrowly defined economic efficiencies. The right of individuals to maximize their profits through their own initiative with minimum interference from the Government is a fervently held belief. Individuals trying to maximize the efficiency of their economic activity often do so at a cost to others (Okum 1975). The costs to public resources (fish, for example) from individuals exploiting private resources (grazing or logging) have traditionally been ignored (McEvoy 1986). Recently, however, these costs have increased to the point where reconciliation of public and private interests has been attempted (see Timber, Fish and Wildlife Agreement achieved in Washington State).

Individualism has been emphasized by national leaders recently, although it is not new to our national character. The French sociologist, Alexis de Tocqueville, studied America and Americans in the 1830s and saw individualism as a strong part of our national character. He believed that a people expressing such strong individualism will not only forget their ancestors, but they will also forget their descendants (Bellah and others 1985). Think about that in light of the past national administration. Individualism was given strong support ("get the government off the backs of the people" was a popular slogan), but at the same time we increased the national debt at a record rate-a debt we seem to be willing to pass on to our descendants. Our lack of concern about the debt we will pass on to future generations is matched by our apparent lack of concern about the condition of the resources they will inherit from us.

The values described above reflect the difference between conservation as defined by Aldo Leopold (1966) and Immediate economic gain; between thinking of the future and only of the present; and between thinking of the people downstream from us in time and space and thinking only of our needs. I believe the conflict Is, at its root. a conflict In economic systems.

Anyone who participates In making any decisions In fisheries has probably heard the phrase "economics Is the bottom line." This statement usually is intended to justify a decision to favor short-term economic consideration over long-term sustainability of the resource. Basically the statement is true: economic considerations **are** the bottom line. The question that results in conflict Is not whether economic considerations take precedence, but **which** economic considerations take precedence.

The words economics and ecology are derived from the same root word, from the Greek word *oikos,* meaning household. The common origin is appropriate because ecology can be thought of as a form of economics, a

natural economics. Traditional economics (what I call industrial economics) focuses on human beings; the study of human use and allocation of resources (Anderson 1977). Ecology focuses on ecosystems: the study of use and allocation of resources by elements of the ecosystem, including human beings. The two economies, however, have fundamental differences (table 1). Their operating principles foster different values, and those values conflict when managers must choose between short-term financial gain and sustainable fisheries management.

An important difference in the natural and industrial economies is their energy source. The industrial economy as we know it has a short-term horizon unless other forms of cheap energy are discovered before fossil fuels become scarce and expensive (Hall and others 1986). In addition, the side effects of our use of fossil fuels are causing global environmental problems, such as the greenhouse effect. Hatchery programs that use large, centralized production facilities are designed to meet the standards of the industrial rather than the natural economy. Large-scale use of monocultures and chemicals in agricultural production have accelerated soil loss and may be undermining the genetic basis of sustainable agriculture (Carter and Dale 1974, Jackson and Bender 1984). In fisheries, managers have barely begun to ask questions about the importance of genetics to the long-term conservation of stocks (Allendorf and others 1987). We are losing stocks of salmon and steelhead (Oregon Trout 1988) at the same time we are intensifying artificial production (Bouck 1986), which will promote hatchery monocultures. The industrial economy is linear and extractive, but the natural economy operates in renewable cycles. This difference leads to emphasis on production in the industrial economy and emphasis on reproduction in the natural economy (Berry 1987). The differences in table 1 are but a sample of the differences that can be derived from a survey of the two economies. And the differences have real consequences.

**Table 1—Some differences in Industrial and natural economies**

| Industrial economy | Natural economy |
|---|---|
| Fossil fuel supplies the primary source of energy | Solar radiation is the primary source of energy |
| Large, centralized production facilities (economies of scale and monocultures) | Dispersed production (stability through diversity, the principle of spreading the risk) |
| Emphasis on production (linear extraction of resource, continuous growth) | Emphasis on reproduction (renewable cycles, limits to growth) |
| Improvements and changes are external (humans dominate, shape the course of diversity, determine scope for change) | Improvements and changes are internal (natural processes and genetic evolution) |
| Independent spheres of economic activity (individualism) | Interdependent parts (contextual) |
| Global imbalance (greenhouse effect, holes in ozone) | Global gas exchange (GAIA effect) |

Conflicts at public hearings before natural resource commissions very often originate from values that are in turn derived from the operating principles of the two different economic systems. Sometimes differences are small enough to be ignored, and sometimes, genuine compromise and accommodation can take place. But often the differences lead to an impasse, and then tough decisions need to be made. Those decisions must be made carefully, after full and open debate at the highest level of understanding, by commissions, administrators, and the public. The choice between economic systems is not simply an either-or decision. Both economic systems are important to the economic and cultural well being of the region and Nation. Those who argue that economic considerations are always the bottom line (meaning industrial economics) fail to remember that our economy developed its strength through individual initiative **and** because of our productive and abundant natural resources.

Nobody likes conflict, especially the intensity of conflict that results from an intractable clash of the natural and industrial economies. Often, when confronted with the choice either to face the conflict, explain its roots, evaluate the economic and ecologic risks of alternatives, and promote intelligent public debate, or to avoid honest debate, administrators choose the path of avoidance. The mechanism of avoidance relies on a series of management myths.

I have chosen to highlight four myths. They do not exhaust the list, but are-in my judgment-the most important impediments to informed debate on value-based conflicts in fisheries management.

- Necessity is the mother of invention.

The myth that necessity is the mother of invention has led its proponents to conclude that natural resources are not finite in an economic sense (industrial economic sense), will become progressively less scarce and less costly, and that population growth is likely to have a positive effect on natural resources in the long run (Simon 1981). How this point of view limits informed debate on the allocation of resources to future generations should be obvious. If this myth were true, if we could depend on future generations to solve the problems we give them once those problems became large enough, then in our own time Ethiopia should have the most inventive and productive agriculture in the world. Necessity, in Ethiopia has been the mother of misery. Ethiopia is one of the world's greatest and oldest centers of domestic seed plants and the seat of the greatest genetic diversity of wheat and barley (Sauer 1969), but Ethiopia cannot grow enough to feed its children.

- The release of fish from large-scale artificial production facilities is a neutral factor in the ecosystem.

The myth that releasing hatchery fish has no effect on the ecosystem has led to the belief that hatcheries can compensate for all losses in fish production caused by overharvest or habitat degradation. Where is the need for debate if hatcheries can correct any problem in the supply of fish to the market in the present and future? Honest debate over resource issues is circumvented when management agencies make value judgments (hatchery vs. wild production) for society under the guise of science (Erman and Pister 1989). Reliance on hatcheries to solve resource allocation problems and avoid debate over value-based issues has led agencies to let wild salmon stocks fend for themselves (Wilkinson and Connor 1983). Because of the massive size of the hatchery input to the ecosystem, hatcheries may have been part of the cause of the depletion of the wild populations (Wilkinson and Connor 1983). Hatcheries are still seen as a solution to fishery problems (Bouck 1986), in the face of evidence raising doubts (Chilcote and others 1986, Nickelson and others 1986, Risenbichler and McIntyre 1977, Walters 1988).

- Protecting the resource management agencies by compromising the resource protects the resource.

Fishery management agencies honestly acquired the myth that protecting the agency by compromising actually protects the resource. When first created, the young management agencies had to regulate resource users, who for several decades had enjoyed unregulated exploitation of an abundant resource. Many of the individuals and corporations resisting regulation were politically powerful, and the legal system seemed to be on their side (McEvoy 1986). Consequently, many of the early environmental laws in Oregon were not enforced (Johnson 1983). Management agencies had a right to feel politically vulnerable, and lopsided compromises that hurt the resource were the result. The hatchery myth helped justify those compromises.

The political climate and legal support for conservation have changed. The strength and political clout of

citizens supporting effective fish and wildlife conservation have increased. Moreover, the constituency of the management agencies has changed to become broader than fishermen and hunters. What has not changed is the attitude of the agencies. Their ability to recognize changes in public attitudes about conservation and to give leadership to their expanded constituency will be one of the agencies' biggest challenges in the coming decades (Kellert 1981). In the meantime, a timid agency cannot effectively ensure open debate over value-based conflicts in the allocation of the resource.

- Agency biologists agree with every decision agency administrators make.

The myth that agency biologists agree with every administrator's decision has done much to circumvent honest, open debate over the value-based conflicts in resource management. Agencies that adhere to this myth exert a strong selective pressure on professional staff. Because it can influence career development, the pressure is effective. The pressure is so strong that it has selected for a unique species of bureaucrat, with a high level of fitness (upward mobility), known as "teamplayers."

The word "team" in teamplayer is misleading. A team is a group of individuals with different points of view, different skills, or different experiences brought together to achieve a common goal-a goal whose achievement needs the individual contributions of the team members. The **different** contributions of the team members are important. Contrast that with teamplayers-the individuals who wait until decisions are made and then conform their thinking to fit. The teamplayer believes that an agency decision not only directs what work he or she does but overrides his or her need to think independently.

Most of the fishery biologists in Oregon work for Government agencies, which means that in a indirect way they work for the people of the State and the Nation. Fishery biologists are employed as technical experts in fisheries. When a State or Federal fishery biologist speaks on the subject of fisheries, the public has a right to believe that he or she is speaking on the basis of technical expertise, **unless clearly stated otherwise.** Presenting yourself as a fisheries expert is wrong, if all you are going to do is repeat an agency policy that you do not support as a professional biologist. The strength of the teamplayer syndrome is inversely proportional to the strength of an agency's program and leadership.

As natural resource managers and professionals, we have an important connection to future generations. That connection is the quality and quantity of resource we pass on to the future. Our decisions will strongly affect the quality of life of our descendants-a big responsibility. In carrying out that responsibility, we need to remember that we are fortunate to live in a pluralistic democracy. To me, that means disagreeing with your neighbor is okay; disagreeing with the President's policies is okay; and even disagreeing with your boss is okay. It also means that the same decision can be both good and bad. A decision may make perfect sense from the standpoint of the industrial economic system and be a disaster to the natural economic system. Our challenge is to be sure that administrators, commissions, and the public understand the issues and consequences so they can make the most informed choices for us and our descendants.

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# Ethics and the Credibility of Applied Science

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Something is clearly wrong with the way our society assesses environmental impacts. Too many shortsighted policies, assumptions, and deficiencies continue without effective challenge. Too much of the written material is mere "filler" that satisfies procedural requirements in ways that allow programs and projects to continue without serious, critical review. Too many of the best environmental scientists, particularly those dedicated to the highest ideals of public service, have become cynical. Something is fundamentally wrong. In this paper, I explore what might be wrong and suggest what can be done-not to eliminate these problems because that is more than I could hope for, but to reduce them in some limited though meaningful way.

Stated simply, I believe that the assessments are developed, sustained, and promoted by organizational systems. Among the normal properties of such systems is the tendency to selectively produce and sustain information favorable to these systems. Favorable assessments, which do not disrupt organizational systems, have survival value; contrary assessments tend to be systematically filtered out. The cumulative outcome is systemic distortion. If each of us merely fulfills our organizational role. our own perceptions become distorted through a constant intellectual diet of systemically selected information. Those in the highest positions are most dependent on such a diet and thus their perceptions are most vulnerable to this risk. A society that depends on organizational systems and yields authority to those in high position faces the grave danger that systemic distortions will form the cultural bases for defining what is reasonable, what is responsible, and what is realistic.

Based in part on stories I have heard from many people who have dealt for decades with environmental impact assessments, I will attempt to develop a general framework that gives coherence to many separate observations and provides some basis for addressing common problems. But, because this framework is not the kind of stuff that organizational systems tend to sustain, it may at first seem unusual - it is.

Modern society depends on a complex array of services that require the continual coordination of large numbers of specialists. Such coordination arises through organizational systems that contain administrative hierarchies through which tasks and resources are distributed to diverse groups and individuals. Information is produced, condensed, evaluated, selected, and distributed to support coordination. Through such systems, vast numbers of individuals are able to produce complex goods and services in ways far beyond the capacity of any individual. Often, administrators cannot understand technical specialists.

Technical specialists cannot understand each other, and they are frequently baffled by the words and actions of administrators. But organizational systems allow such diverse individuals (who rarely even meet each other) to produce and sustain the vast technological systems that you and I depend upon (like telephones, central heating, and indoor plumbing). These same kinds of systems, however, now possess enormous power-including the power to extract and consume huge amounts of natural resources, alter and destroy wide ranges of habitats, and transform in significant ways the entire biosphere. Thus, while acknowledging our dependency on such systems, we must seriously consider their limitations and develop appropriate checks and balances.

Organizational systems share important behavioral characteristics, particularly in their influence on information transmittal. I developed a general model (fig. 1) to describe how organizational systems tend to assess the impacts of their own activities (Bella 1987b). The model was based on study of the environmental impact assessments that have been required for Federal projects in the United States for 20 years.

This model refers to a typical organizational system that includes several management levels and a variety of technical specialists. The model describes the tendency of organizational systems to distort information through the normal practices of its members-practices which, from the local view of each participant, appear reasonable and proper. That is, the model claims that organizational processes tend to distort information not through the malicious Intent of its members (although this might occur) but rather as an unplanned, systemic outcome. Such systemic distortion occurs not only in single organizations but also within systems (complexes) of organizations. Consultants can play critical roles by providing information favorable to the organizations that fund them.

After you read and reflect on the figure, conduct the following mental experiment. Assume that a very biased study has been produced by an organization as described in the figure. Imagine that you have read this report and are disturbed by its biased results. You learn that information unfavorable to the organization was omitted from the report. You decide to determine who is responsible, so you question all the participants in the system-including top and mid-level managers, professionals, and the particular individual (the "troublemaker") who had reported the unfavorable information. Your questions and the responses of the participants are given in table 1. Compare the responses in table 1 to the system of figure 1. The responses are not dishonest; they reflect the actually experienced environments of participants. That is, each participant works within a local environment of the organizational system. Within this environment, each perceives his or her own actions to be reasonable and responsible. But, despite the responses of table 1, the system (fig. 1) still produces distorted information. This is systemic distortion.

The model illustrated how organization systems have a selective influence on information. One study (Matzke and others 1976, p. 36-37) that traced environmental impact assessment information through several different organizational systems found the following:

> Research that has a negative effect on the project is challenged, contracted to another group of scientists, or explained away .... On the other hand, favorable research is subject to no such scrutiny and in several instances purely speculative discussions are introduced that have positive conclusions based on no hint of evidence.

Examples of such systemic filtering are common. A colleague told me of a cost-benefit analysis that clearly demonstrated that the costs of a proposed project far exceeded any feasible benefits. The project was not rejected; instead, the analysis was sent back for further review (see fig. 1). The young analyst was told by the branch chief, "We're not in business to kill projects." A positive cost-benefit ratio would doubtless emerge eventually. "Nobody wants to be a puppy killer," I was told. A "puppy" is a project that grows up to be a "dog," and a dog is a project with no real net benefits except to the systems that produce it.

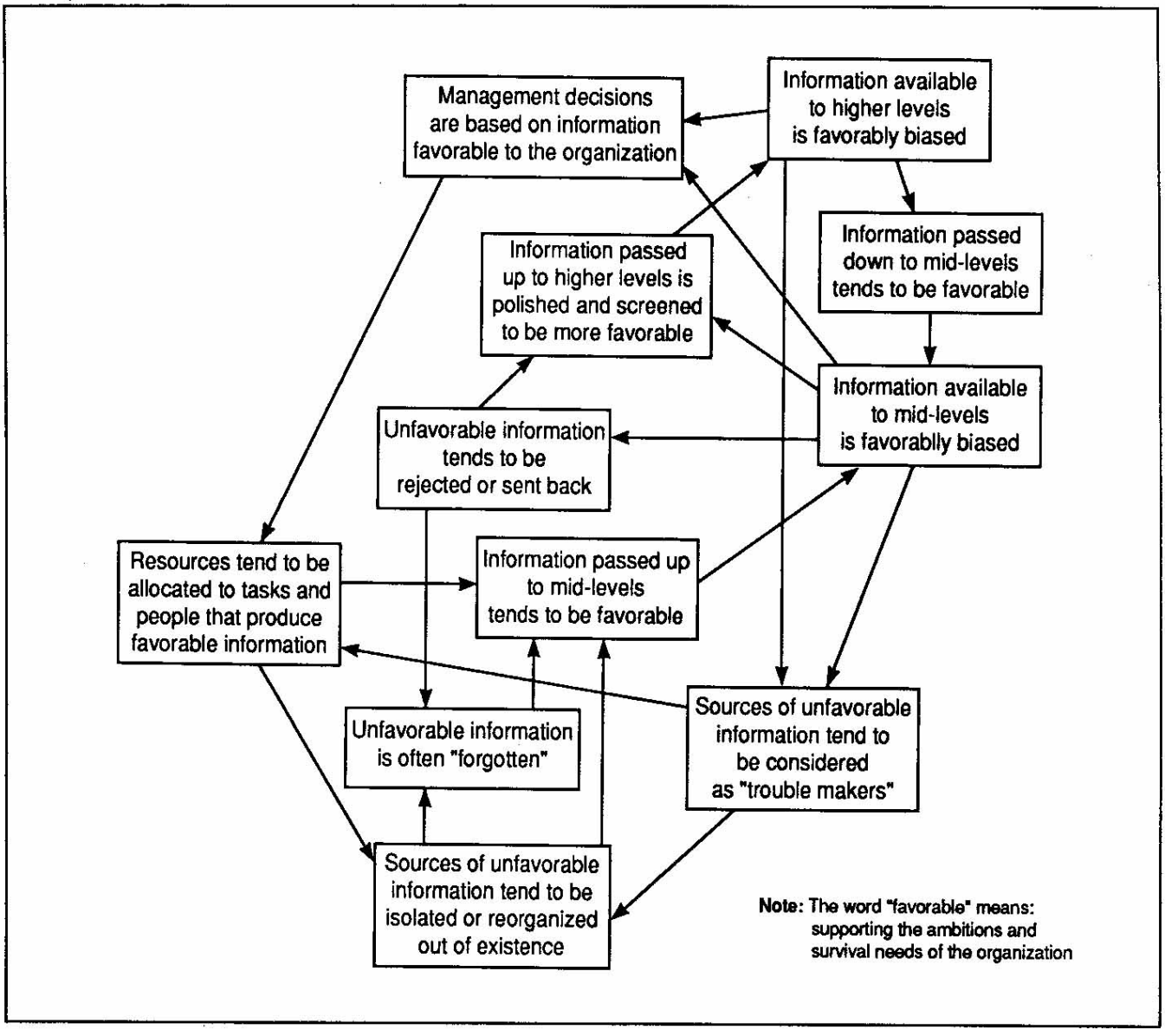


**Figure 1**—Distortion of information within an organizational system.

**How to read the figure:**

1. Start by reading any statement.
2. Move from that statement along an arrow to a connecting statement.
3. If you move forward along an arrow, insert the word "therefore."
4. If you move backward along an arrow, insert the word "cause."
5. After following an arrow (forward or backward) to a statement, read this statement.
6. Repeat steps 2 to 5 as shown above.
7. Read your way through the entire figure, moving forward or backward on arrows as you wish until you have gone through as many loops and cycles as you can find.

The model (fig. 1, table 1) was developed in 1979 to explain the organizational tendency that I had observed for more than a decade to distort environmental impact assessments. The model was presented and discussed in workshops and seminars with colleagues who do environmental impact assessments. I was surprised by how many examples participants cited. In effect, the model was saying something that almost everybody already knew.

The commission that investigated the Challenger shuttle explosion in 1986 found similar organizational behavior in the National Aeronautics and Space Administration (NASA) before the accident (U.S. Presidential Commission 1986). Unfavorable information concerning risks was filtered out right up to the time of launch. These systemic distortions resulted in misperceptions that, in turn, resulted in poor decisions. I sent figure 1 and table 1 to Nobel physicist and commission member Richard Feynman, who wrote back:

> I read Table 1 and am amazed at the perfect prediction of the answers given at the public hearings. I didn't know that anybody understood these things so well and I hadn't realized that NASA was an example of a widespread phenomena.

Feynman's own study had found systemic distortions of perceptions. Before the accident, managers perceived the risk of catastrophic loss to be about a thousand times less than perceived by working engineers (Feynman 1986).

Recent disclosures revealed that the U.S. Department of Energy (DOE) and its predecessor, the Atomic Energy Commission, had for many years suppressed information on accidents, operational problems, and waste disposal deficiencies at its huge nuclear weapon complexes. Particularly revealing is a memo written in 1981 by a DuPont supervisor attempting to warn higher management of the risks (Anonymous 1988). The memo read:

> .... I am convinced that you do not and cannot (with the present administrative system) know the residual risks that remain after we do what we do. This is not criticism of you or any individual personally. The problem lies with the system .... it is not realistic to expect any chain of command to report unfavorably upon itself.

The system continued to filter out information on such risks, top administrators remained unaware of unfavorable information (Schneider 1988). and the author of the memo took early retirement.

Several years ago, I participated in an investigation of DOE'S consultation and cooperation efforts in developing a permanent nuclear waste repository (Bella and others 1988). Our study found that people from a wide range of backgrounds did not trust the organizational process. We did find, however, that these same people tended to trust known individuals who were employees of DOE. In brief, the whole-the organizational process-was less trustworthy than the parts-individual members of the organization. This observation is consistent with the model of systemic distortion presented.

Jackall's (1988) study of corporations strongly suggests that accepted management practices, particularly at higher levels, have adapted to conform and sustain such distorting systems (fig. 1) in ways that allow individuals to advance their own careers. Jackall finds that ambitious managers can "outrun their mistakes." Problems can be avoided, resources can be "milked," and distorted analyses can be used to look good in the short term. If the time frames for consequences are longer than the time frames for promotions and career changes, accountability may never catch up. Careers of "successful" organizational advancement can leave behind wakes of long-term damage. Moreover, those who have such "successful" careers may end up in positions where they evaluate and direct those left behind to deal with the consequences. It Is no wonder that cumulative and long-term effects are neglected.

Interest in professional ethics has recently increased. Indeed, a "profession of professional ethics" has grown up-complete with journals, newsletters, conferences, and experts. Unfortunately, the dominant paradigms and methods of this emerging field have not adequately addressed systemic distortions because researchers tend to focus on individual deviations from accepted norms.

**Table 1 "Organizational system (fig. 1), as seen from within (assume that a biased report has been produced by the system)**

| Person | Question | Answer |
|---|---|---|
| Higher-level manager | Why didn't you consider the unfavorable information your own staff produced? | I'm not familiar with the information that you're talking about. I can assure you that my decisions were based on the best information available to me. |
| Mid-level manager | Why didn't you pass the unfavorable information up to your superiors? | I cant pass everything up to them. Based on the information available to me, it seemed appropriate to have this information re-evaluated and checked over. |
| Professional technologist | Why wasn't the unfavorable information checked out and sent back up to your superiors? | That wasn't my job. had other tasks to do and deadlines to meet. |
| "Trouble-maker" | Why didn't you follow up on the information that you presented? | I only worked on part of the project. I don't know how my particular information was used after I turned it in. I did my job. Even if I had all the information, which I didn't, there was no way that I could stop this project. |
| Higher-level manager | Why has the organization released such a biased report? | I resent your accusation! I have followed the development of this report. I have reviewed the drafts and the final copy. I know that the report can't please everybody but, based on the information available to me, I can assure you that the report is not biased. |
| Mid-level manager | Why has the organization released such a biased report? | It's not just my reporti My sections of the report were based upon the best information made available to me by both my superiors and subordinates. |
| Professional technologist | Why has the organization released such a biased report? | It's not my report. I was involved in a portion of the studies that went into the report. I completed my tasks in the best way possible given the resources available to me |
| "Trouble-maker" | Why has the organization released such a biased report? | Don't ask me! I'm not on this project anymore and I really havent kept up with the project. I turned in my report. I dealt with only a part of the project. |
| Higher-level manager | Why was the source of unfavorable information (the "trouble-maker") removed from the project? | I hardly know the person. A lot of people have worked on this project. I must, of course, make decisions to keep this organization running, but there has been no "plot" to suppress people! On the contrary, my decisions have been objectively based upon the available information and the recommendations of my staff. |

**Table 1—continued**

| Person | Question | Answer |
|---|---|---|
| Mid-level manager | Why was the source of unfavorable information removed from the project? | I don't like your implications! I've got tasks to complete and deadlines to meet with limited resources. I can't let everybody do "their own thing;" we'd never finish anything. I base my recommendations and assignments on the best available information. |
| Professional technologist | Why was the source of unfavorable information removed from the project? | I'm not sure about the details because I don't work with him. I guess that it had something to do with a reorganization or a new assignment. He is a bright person, somewhat of an eccentric, but I've got nothing personal against him. |
| "Trouble-maker" | Why were you removed from the project? | My assignment was completed and I was assigned to another project. I don't think that anybody was deliberately out to get me. My new job is less of a hassle. |

Case studies of individual fraud or deception provide examples of what "unethical" means. Hypothetical situations are used to illustrate the conditions that put individuals under pressures to violate ethical norms. Theoretical frameworks seek to provide guidelines to people who are faced with pressures to violate norms of acceptable practice. Surveys and interviews seek to identify violations of norms, pressures to violate norms, and how effectively individuals live up to ethical norms.

The systemic distortions I describe (fig. 1). however, do not arise from individual violations of established norms. Thus, the paradigms (as exhibited by case studies, hypothetical situations, theoretical frameworks, and research methods) that focus on individual violations of norms have been ineffective and even misleading when used to address systemic distortions.

In a discussion of the model (fig. 1, table 1), engineer David Colony describes the limitations of ethics as commonly understood.[2]

> It is clear from the author's analysis that we lack a system of ethics which can help resolve conflicts between the interest of society and those of a large and powerful organization. Existing rules of ethics, including those prescribed for professional engineers, seem to deal largely with relationships between individuals or between an individual and society; there is little consideration of organization systems as potent forces in that society.

Systemic distortions arise from normal practices of what may have been called bureaucratic individualism (MacIntyre 1981). Values compatible to the systemic needs of organizations become the norms for individual behavior (Scott and Hart 1979). Moreover, such norms have become necessary to sustain our technological world. They can also lead to systemic distortions that could have catastrophic consequences. Thus, normal practices must be critically examined so deficiencies can be recognized and corrective actions taken.

[2] The Journal of Professional Issues, ASCE, will soon publish discussions of this model by seven engineers. The quote given here is from a preprint of one of these discussions.

Stated simply, normal practices are functional behaviors that direct a person's efforts towards assignments and activities that serve to advance that person's own welfare. A pervasive function of assignments and rewards is to sustain the organizational system. Scott and Hart (1979) go so far as to say that "managers are rewarded only for the expedient solution of organizational problems, those who think about anything else are derided." From the perspective of functional rationality, "responsibility" means completing assignments in accordance with accepted norms. Questioning these assignments and pursuing inquiries beyond these assignments is optional and usually considered a waste of time with no prospect of reward or advancement. Given the pressures typically placed on people, the "optional" tends to be set aside, and time is not wasted. Such functional behaviors are not perceived as ethical deficiencies as long as ethical norms are not violated in the completion of assignments and advancing the Individual's own position. A person who lives out such behaviors is a "functionary" (Howard 1969).

Such functional behaviors were identified in the study of Impact assessments previously quoted (Matzke and others 1976). Systemic distortions were found, and individual behavior was described in the conclusions, as follows:

> Primary value seemed to be placed on meeting the contractual obligations, fulfilled by one's report, as opposed to the larger societal obligation that would be met by production of a full-disclosure environmental document, (p. 100)
>
> Seemingly, they upheld the ideal of scientific values and moral responsibilities, but largely perceived themselves as contract laborers who held to these values only insofar as was possible within terms of their contracts. If society expects that scientific participation ensures high standards, It is liable to be disappointed, (p. 103)

Like the characters of table 1, they acted out functional behaviors ("meeting the contractual obligations") that were perceived as normal, proper, and even necessary.

Many years ago, I was asked to assist in developing research objectives for the Environmental Protection Agency (EPA). We developed some very general objectives that would have permitted and encouraged more critical questioning and open inquiry. An administrator became angry at this approach. "We don't pay people to think," he shouted, "we pay them to deliver products." This is functional behavior and it is widely practiced. Research products accumulate in the form of reports; but few have time to study them and to think. "We don't have time to think" is a common complaint. Why? "We're too busy preparing products."

Even within the university, which has a thousand-year tradition of open inquiry, the normal practice is first to seek approval of questions and methods from those who distribute funds. "Successful research efforts" are typically measured in terms of the grant dollars obtained. In his farewell address. President Elsenhower (1961) warned about the "military-industrial complex." Less well known is his warning about universities and scholars, and the grave dangers of functional behaviors:

> .... the free university, historically the fountainhead of free ideas and scientific discovery, has experienced a revolution in the conduct of research. Partly because of the huge costs involved, a government contract becomes virtually a substitute for intellectual curiosity. For every old blackboard there are now hundreds of new electronic computers.

The prospect of domination of the nation's scholars by Federal employment, project allocations, and the power of money is ever present-and is gravely to be regarded.

Today, Eisenhower's words sound more like a description of established practices than a warning (Bella 1985). Of course, such practices influence teaching; they instill functional behaviors, and emphasis on preparing for jobs and assignments, with less effort given to the education of the citizen scientists and engineers who might serve to hold organizational systems accountable.

Functional behaviors are useful, of course; indeed, the services that all of us depend on are only possible because such behaviors are acted out in organizational systems. Moral failures arise when we tend to limit ourselves to functional behaviors and fail to realize that something more is called for (Bella 1987b, Ladd 1982). We become functionaries. The deficiency is revealed in our inability to even articulate this "something more." Deliberate acts of corruption, fraud, and deceit-acts that most of us reject-are much easier to talk about. We fail

to realize how the normal behaviors we do accept enormously influence organizational systems that, in turn, tend to sustain systemic distortions. Of particular importance is the distortion of the "science" used to assess the effects and consequences of the technological changes that organizational systems bring about.

Polls indicate that people trust science far more than they trust organizations, and most scientists share this perception. Thus, the public has supported the education and employment of scientists. Indeed, they have insisted on it. The expectation is that scientific assessments can expose, deter, and correct distortions of organizational systems. But what is science? More to the point, what gives science its credibility? Why should science be trusted?

Such questions have been in the forefront of inquiry and discussion since the publication of Thomas Kuhn's *The Structure of Scientific Revolutions* (1962). Kuhn reasoned that something is wrong with conventional notions of science. Although Kuhn has been challenged on many issues, significant agreements can be found in the debates that followed his work (Bernstein 1983, Mulkay 1983). A universal "scientific method" that provides the basis for Identifying "facts" from distortions is no longer credible. Any "universal scientific methods" have been shown to be either too vague to describe the history of science, or historians have demonstrated significant departures from stringent criteria. Science does not arise from "facts" that leap out of data through the "objective" application of "the scientific method." Nor does science gain its credibility because individual scientists are of higher character than others. Prestigious titles, elaborate equipment, sophisticated data, quantitative analyses, and an abundance of equations, charts, diagrams, and technical reports are insufficient and often misleading indicators of credible science. What is required?

Most of us like to believe that scientific communities (including the social sciences and engineering) have some degree of credibility. But why? Why should scientific communities be considered anything more than interest groups seeking more status, security, and income for their members?

Science is a social enterprise and the trustworthiness of science depends on the social character of its communities. Such communities must engage in free and open dialogue; hence, they may be called "dialogical" communities. Within such communities, disagreements should promote inquiries to see which of competing ideas best meet the demands of reasonableness, logical consistency, disciplined real-world observations, and, for assessments, prudence. Unlike organizational systems, inquiry and information exchange must not be limited to assignments and the allocation of funds. Ideas. concepts, models, and assessments must stand or fall on their ability to gain respect through open inquiry and dialogue in concerned and disciplined communities. The credibility of science rests on the ability of such dialogical communities to expose and reject what cannot survive the light of critical review and to retain what the community freely accepts. But are assessments of organizational activities based on the actions of such open communities?

The open scientific community persists in some isolated cells, but in the comprehensive assessments on which modern society depends for impact assessment, resource allocations, and public information, the process more closely corresponds to the model in figure 1. The organizational process rather than the community process dominates. Trappings of science abound; equations, data, graphs, charts, and computer models. But with respect to the direction of inquiries, the selection of questions, the review of analyses, the selective gathering of information, and the interpretation of this information, organizational processes are at work. "Scientific" activities are largely determined through the allocation of funds, divisions of "organizational turf," and assignments of tasks within organizational systems. Those who sustain such organizational processes are seldom held accountable through the open debate, dialogue, and inquiry within the communities that should characterize science. Instead, the organizational process directs debate, dialogue, and inquiry through its allocations of assignments, tasks, resources, and authority.

In virtually every field of applied science, accountability is primarily administrative (that Is. organizational) and "professional advancement" is nearly exclusively limited to "administrative advancement" in organizational systems. Those who advance in such a manner only rarely have either the interest or ability to defend their views in the open and disciplined communities that should characterize science. Efforts of administrators are directed toward sustaining the organizational process and yet their efforts do influence the information that is developed over time. Access to

information, time for studies, participation in conferences, use of equipment, and distribution of information are dominated by organizational processes that have strong interests in the outcomes. If the philosophers of science are correct that the credibility of science arises from "dialogical communities," then the credibility of applied science must now be called into question. The practical rationality of assessments arises, for the most part, not from autonomous communities of open dialogue but rather from organizational systems. The behavior of organizational systems (fig. 1) does not provide a basis for scientific credibility.

In the words of philosopher Richard Bernstein (1983), "We need to reclaim the autonomy of practical rationality." Bernstein goes on to say, "We realize that today the type of dialogical communities that are required for its (practical rationality) flourishing are being distorted, undermined, and systematically blocked from coming into existence." He concludes that we now have difficulty finding "concrete exemplars of the types of dialogical communities in which practical rationality flourishes." What types of dialogical communities are now required? This question should be the foundation for professional ethics. It is not. It should be a paramount concern for professional education. It is not.

How can "dialogical communities" be made more effective and trustworthy in this age of large-scale and technologically powerful organizations? Given the power of large-scale organizations, how can such independent communities be sustained? What can professional societies do to address such questions?

Professional societies put on conferences and publish journals. Individuals present results so that the audience and readers-other professionals-can critically examine and question assumptions, data, logic, and reasonableness. We tend to believe that this is what scientific communities are about, but it is insufficient in applied science because, for the most part, it yields the questions and inquiries to the organizational systems that employ the members and fund the research.

Organizational distortions arise because unfavorable questions and inquiries tend to be systematically avoided. Scientists who work within organizations tell me that unfavorable inquiries are not likely to be sustained until external pressures force an organizational system to take such inquiries seriously. Individuals often state that nothing short of a catastrophe will force some critical inquiries to be seriously undertaken. By allowing organizational systems to dominate the selection of questions and inquiries, professional communities themselves become caught up in organizational distortions. In a separate paper (Bella 1987b), I have reasoned that professional paradigms (the knowledge base of a professional community) evolve in response to the questions, inquiries, reviews, and observations that occupy the attention of a community over time. If organizational systems dominate the selection of questions, inquiries, reviews, and observations, then the professional paradigms themselves become distorted over time. If adequate steps are not taken, "scientific expertise" becomes a product not of scientific communities but of dominant organizational systems; applied "science" becomes the way organizational systems legitimate themselves. As one field person told me, "Science becomes the opiate of the people. It reassures people that all is well, and anyone who disagrees is not qualified."

If applied science is to recover its scientific credibility, then professional societies must serve to strengthen the activities of scientific communities in ways that compensate for the inherent deficiencies of organizational systems. Organizational systems tend to avoid unfavorable questions and inquiries; therefore, professional societies must serve to expose them for open review. When organizations fail to subject key assumptions, claims, and methods to independent review, professional societies should promote such review, exposing deficiencies and distortions. We know that organizational systems tend to deal with more immediate pressures ("brush fires") typically avoiding longer term cumulative impacts, particularly those that fail to conform to organizational routines, assignments, divisions of turf, and funding needs. Professional societies must make special efforts to address such long-term concerns. Reports and papers that challenge organizational behaviors and methods, such as the assessment of forest practices by Overton and Hunt (1974), tend to be set aside; they receive no followup. Professional societies should give them exposure-and, if necessary, re-exposure-so that the challenges they raise do not escape critical review by scientific communities. In these ways, dialogical communities can reclaim applied science. If they do not, applied science becomes merely another product of organizational systems, produced to meet their own needs and giving organizations, in the name of science, the kind of credibility they inherently lack. How can

communities reclaim applied science? I have a few suggestions.

Look again at figure 1. 'Troublemakers" can be seen as internal "indicator organisms." They raise troublesome questions, and consequently, they face organizational pressures. Procedural disputes, administrative reprimands, and other discomforts let individuals know that life would be far more comfortable if they merely did their assignments. Typically, the technical questions and issues become lost. From a broader perspective, these are adaptive mechanisms through which organizational systems protect themselves from disruptive information. In such cases, professional societies should serve to expose what is often covered up in such affairs. They should identify the substantial issues and questions involved, separate them from the organizational pressures, and arrange forums where these issues and questions will be examined in a manner befitting a scientific community. Those involved should be prepared to defend the technical merits of their statements and actions.

External "indicators" can also be used. Continuing conflicts between opposing organizations or between organizations and external groups can be interpreted as indicators of significant but unfavorable questions and inquiries. Unfortunately, when polarization becomes extreme, the most significant questions become lost in shallow and bitter exchanges. Indeed, one of the ways to win such a polarized debate is to define the conflict in terms that favor your own side (for example, in the recent old-growth forest debate in the Pacific Northwest, jobs vs. spotted owls). Such polarizations should serve to indicate that important questions may be involved and that these questions may be lost. Again, the role of the professional society should be to identify the key questions in such a way that the most significant questions become a primary concern of the open community.

Professional societies might also make use of independent panels to examine the statements of conflicting sides to identify crucial points of agreement and disagreement. People could then identify, expose, and examine the questions and inquiries that might resolve such differences. Professional communities could arrange for mediation between opposing views, if necessary. A mediation process that could be used to identify questions that should be the concerns of open communities is outlined in table 2.

**Table 2—Mediation approach to identifying key issues, questions, and assumptions that are often hidden in polarized conflicts**

| |
|---|
| Each party summarizes on paper its position, data, and reasoning. |
| Summaries are exchanged between opposing parties. |
| Each party explains, in writing, the opposing positions to the mediator until their explanation satisfies the opposing party. |
| When all parties have thoroughly understood how their arguments are related, the participants (opposing parties) are obligated to write a joint paper that explains each other's original position, where and why they originally differed, what has changed since the original position summaries, which differences remain (if any), what consensus has been reached on the original issue, and what studies might resolve the remaining differences. |
| The paper is published. The paper becomes a valuable and frequently cited reference for professionals, policy makers, and the broader public because it is a primary source in which proponents of different views spoke to the same issues with the same language with full awareness of the alternative arguments and opposing concerns. |

Based on the approach of Abrams and Berry (1977).

Professional societies should make special efforts to expose for open and critical review those analyses that organizational systems tend to protect from exposure. Cost-benefit analyses deserve such exposure. Self-serving assumptions and methods that would not likely survive scientific review are commonly used to support organizational actions. Such analyses are presented as science; however, among the professionals that I have met over many years, few see them as credible. A cynical attitude toward cost-benefit analyses is not uncommon even among professional employees of the organizations that produce the analyses. As an example, "fish and wildlife benefits" claimed in analyses are not infrequently ridiculed by fish and wildlife biologists. As one biologist lamented, "There are a lot of paper fish swimming around." Those

conducting cost-benefit analyses should be required to defend their assumptions and methods through open professional communities. Currently, they are not. I suggest, for example, that the cost-benefit analyses of the Elk Creek Dam In Oregon be given such critical review.

Special emphasis must be given to long-term cumulative effects. Where information is lacking, margins of safety (similar to the engineers "factors of safety") should be used to preserve options and avoid large-scale irreversible changes (Bella and Over-ton 1972). Guidelines for the use of such margins of safety should be developed by interdisciplinary task forces and, of course, subjected to ongoing open and critical review.

Accountability for long-term consequences should be sustained. In particular, independent reviews, studies, and evaluations should be conducted so that ambitious individuals do not advance to positions of authority by neglecting and even causing long-term problems so they will benefit in the short term. Jackall (1988) describes practices that need to be challenged. Where political influence is significant (Durbin 1990), open professional discourse should identify consequences.

Objections to these suggestions include these: organizations will merely avoid such open review; key organizational members will not defend their decisions or expose their assumptions for critical review; and no one will accept professional responsibility for questionable assessments and assumptions that form the basis of organizational actions. What can be done? We must draw on the best traditions of science without becoming so narrow, as too often happens in science. that the most significant concerns escape notice. Scientific communities give high exposure to scientific discoveries or claims of scientific discovery. Recent claims for "cold fusion" provide an example. Applied science must give the same intense exposure to the discovery of deficient assumptions and methods. Similarly, the discovery of neglected but critical questions and inquiries must be exposed. Societies can hold special sessions and conferences, appoint task forces, request independent studies, and hold news conferences. In all such actions, the societies must demand accountability, particularly for clarifying assumptions. Failure to address critical questions and inquiries, the continued use of methods and assumptions unable to withstand critical review, or failure to define assumptions should meet strong professional disapproval. If continued, such deficiencies should be viewed as unprofessional and unscientific. In all such cases, of course, the final authority must rest with the open and disciplined community. Any claims that do not survive the critical review of such communities must be rejected as unscientific. In other words, the dialogical communities must reclaim the name of science.

Practical concerns must also be addressed. As an example, professional societies should probably draw more upon the services of retired members who are not vulnerable to powerful interests through their employers. We should also remind tenured professors to conduct inquiries and pursue questions that might not meet the approval of powerful interests. Often, however, they are too closely linked to their funding sources (Bella 1985). We should also promote interdisciplinary dialogue so that we ourselves are not captive of narrow paradigms.

Finally. I support the recommendation made by Russell Sadler at the 1990 meeting of the Oregon Chapter, American Fisheries Society. We need a code of ethics to support and strengthen those seeking to perform their work in the most responsible way. Such a code should reinforce the ideal that critical assumptions, decisions, and policies that claim or imply the credibility of science must, in practice, meet the tests of open exposure, inquiry, and examination that characterize the ideals of scientific discourse. Anything less is dishonest.

Thus, the code must clearly state that individuals are obligated to promote such open discourse-not on the terms imposed by organizations or political influence but on the terms of open and independent scientific communities. Few professional codes adequately address these concerns. Thus, to develop such a code requires extended effort, creative work, exposure, and critical review. The code must meet the test of open discourse that the code itself will call for.

Why should we sustain such communities? Why should we seek to identify "unfavorable" questions or expose self-serving assumptions? What is in it for us? Functional behavior cannot provide satisfactory answers to such questions. Those who accept ethical standards that do not demand more than functional behaviors will not sustain such communities. The extrinsic "payoffs" for the actions I suggest are likely to be negative; indeed, if they are not, one should be suspicious.

Functional behavior has become so much taken for granted that we seldom even recognize it. The word

"professional" is commonly taken to refer to a job which, in turn, means completing assignments. "Professional work" means the tasks a person does for pay. "Professional ethics" is about on-the-job situations and behavior. "Professional education" means preparation for "professional employment" which is, for the most part, provided through organizational systems. The word "professional" as commonly used assumes that organizational systems will assign tasks, questions, and inquiries-and the "professional" will complete all assignments and be paid accordingly.

Case studies in the professional ethics literature describe on-the-job situations and pose the question. "Given the context provided by an organizational system, how should a person behave?" But "given the context." the characters of figure 1 behaved reasonably. "Given the context," even Adolf Eichmann's behaviors were declared "sane" (that is, mentally healthy, sound of mind, rational, showing good sense-all definitions of "sane" from Webster's Dictionary.) Consider Thomas Merton's disturbing assessment (Merton 1966):

> One of the most disturbing facts that came out in the Eichmann trial was that a psychiatrist examined him and pronounced him **perfectly sane.** I do not doubt it at all, and that is precisely why I find it disturbing. ... He was thoughtful, orderly, unimaginative. He had a profound respect for system, for law and order.... We rely upon sane people of the world to preserve it from barbarism, madness, destruction. And now it begins to dawn on us that it is precisely the **sane** ones who are most dangerous.

The correction of systemic distortions requires external checks and balances, and these require independent questions, methods, and inquiries. It is not enough if people behave properly "given the context" of their work. Consider Eichmann's own words during his interrogation by Israeli police (von Lang and Sibyll 1983).

> They were not personal decisions. If I had not been sitting there, someone else would have had to make exactly the same decisions on the basis of the instructions, regulations, and orders of the higher-ups. I wasn't expected to make any decisions at all.

Such words sound too familiar for comfort. They reflect deficiencies not limited to a gross insensitivity to human suffering-even Eichmann suffered discomfort and nausea when he faced the horrible sights and sounds (Merton 1966, von Lang and Sibyll 1983). But such words reflect an exclusive commitment to functional behavior. Without denying the importance of individual acts of malevolence, we must face the fact that sane people, performing their jobs according to the accepted norms and acting reasonably and properly "within the context" can nevertheless bring about systemic outcomes of unprecedented destruction (Silver and Geller 1978).

We rely on independent communities to provide a check on the distortions of organizational systems. But such communities rely on something more than functional behavior. The ethical problem for us is to sustain this "something more." In other words, we must take on tasks that offer little or no promise of payoff and indeed, require sacrifice. We must actually live in ways that are not dominated by the mindset of functionaries. Without this "something more" that calls for initiative, concern, and sacrifice, open communities of dialogue cannot be sustained. Without this "something more," we do not merely work for organizational systems, we conform ourselves to them until our own perceptions have become so much shaped by systematically selected information that we have lost the ability to perceive little else but what these systems feed us. We all face such risks.

As a teacher, I should confront students with questions like "How do you intend to use your education other than making a living?" "Something more" than functional behavior is essential. We should prepare ourselves to discuss this "something more" in ways that are meaningful and relevant to the world we live In. We should sustain a language that is not dominated by functional behaviors; as an example, we should again refer to a profession as a "calling" that requires the practice of "virtues" (MacIntyre 1981) and that sometimes require sacrifices. We should insist that questions and inquiries unfavorable to organizational systems be pursued, particularly when powerful interests and irreversible changes are involved. We should hold administrators and analysts accountable to open communities so that the assumptions and premises behind decisions can be exposed. We should insist that higher education prepare professionals not merely for employment, but for citizenship in independent communities. Certainly, much needs doing and all of it requires that we insist on "something more" than living out the life of an organizational functionary.

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# The Moral Uses of Future Generations

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While an undergraduate, I encountered the following quotation by the literary critic, Joseph Wood Krutch (1955), written in support of Aldo Leopold's "Land Ethic":

> The wisest, the most enlightened, the most remotely long-seeing exploitation of resources is not enough, for the simple reason that the whole concept of exploitation is so false and so limited that in the end it will defeat itself and the earth will have been plundered, no matter how scientifically and farseeingly the plundering has been done.
>
> To live healthily and successfully on the land, we must also live with it. We must be part not only of the human community, we must acknowledge some sort of oneness, not only with our neighbors, our countrymen and our civilization, but also with the natural as well as the man-made community.

Though long on eloquence, the essay was short on argument. And while Krutch's and Leopold's position had a strong intuitive appeal to me, it raised more questions than it answered. In the quarter century that has followed my encounter with that passage, I have devoted much of my professional life to the task of addressing those questions, and seeking and assessing rational support for the land ethic. In these few pages, I would like to attempt a sketch of what I have discovered.

The title of this piece is deliberately paradoxical. After all, how can future persons be "useful" to their predecessors-as if the future could be a cause of the past? Paradox notwithstanding, I will attempt to show that. in an important sense, posterity is morally useful to us. To accomplish this, my task will be to indicate that morality itself is fundamentally paradoxical, not to mention complex, controversial, and imprecise. And when we lose sight of the paradox, the complexity, and the imprecision of morality in our personal lives and public policies, both moral principle and practical utility are undone. We all lose: ourselves, our neighbors, our community, our environment, and our posterity.

To be sure, the wildlife policy-makers, researchers, and managers, as reflective human beings, share the burden of moral responsibility with all humanity. But does the work of wildlife professionals entail a particular moral responsibility?

> Do they know, to a significant degree, the consequences of their professional actions?

Must they, in this work, choose among a set of exclusive options with variously foreseeable results?

Will these results variably affect the welfare and the rights of present and future individuals?

Because the answers to these questions are all affirmative, wildlife professionals in the course of their work bear an inescapable burden of moral responsibility.[3]

Given the anguish that accompanies the burden of moral responsibility and the travail of moral deliberation, we should not be surprised to find that many ingenious devices have been designed to ease this burden and anguish. In the realm of making and implementing public policy, the foremost such device is cost-benefit analysis-a scheme that evokes the enthusiastic endorsement of many applied economists and legislators, and which provokes the overwhelming condemnation of most moral philosophers. As we shall see, cost-benefit analysis is a scheme that is both intuitively attractive on the surface, and ethically troublesome in its implications.

The definition of cost-benefit analysis is simplicity itself: "If a policy, P, maximizes benefits minus costs, then P ought to be carried out" (VanDeVeer and Pierce 1986). Stated thus, the rule scarcely seems open to dispute. The troubles begin as we attempt to assign operational definitions to the key terms "costs" and "benefits," so that these various amounts and dimensions might be measured together to produce a result on the bottom line. The only available common quantity appears to be cash value or willingness to pay. Enter the economist.

The significance of cost-benefit analysis in public policy-making can scarcely be underestimated. About a month after taking office in 1981, President Reagan signed an Executive Order requiring that all agencies and departments in his administration justify their regulations with positive cost-benefit assessments.

The practice pervades public administration. Read most environmental impact statements, and you will find them saturated with the statistics, spreadsheets, and finally the bottom lines of cost-benefit analysis.

The application of cost-benefit analysis to fisheries management can only be guessed at by this outsider, but operating variables might include such items as costs of building and maintaining hatcheries and fish-ladders, survival rates, costs of transportation-leading, presumably, to "cost per fish"-- and then numbers of fishermen, their impacts on the State economy, and so forth.

Gather enough data, then "crunch" the numbers, and presumably the policy-maker will eventually arrive at bottom-line cost-benefit ratios that will allow her or him to decide, between, say, a policy of stocking a stream with hatchery fish or, on the other hand, protecting upstream water quality and habitat sufficient to sustain a native population of fish in a stable riparian ecosystem into the future.

The apparent advantages of cost-benefit analysis are that it is:

**Relatively simple.** However complicated this procedure of policy decision, alternative procedures are more complex.

**Based on values that are commensurable. A** myriad of separate scales of measurement are translated into a common scale of "cash value."

**Objective.** The variables can be determined by open, public, replicable ("scientific") means.

**Definitive.** Once the data have been gathered, the process will lead to an unambiguous result.

Value free. Because the process describes the preferences of the public in terms of "willingness to pay," it does not impose values on them. In true democratic form, it reflects the opinion and values of the public, not the analyst.

[3] This and similar analyses of moral responsibility appear in numerous places in my published work. In particular, note my Introduction to Responsibilities to Future Generations (Partridge 1981a).

Closer inspection reveals significant drawbacks. Cost-benefit analysis:

**Is deceptively "simple."** Simplicity is accomplished by distorting or even excluding essential ethical aspects of policy deliberation. (Imagine an offer to "simplify" your escape from a despotic regime by leaving your family in captivity.)

**Devalues fragile, incommensurable, and non-economic values,** while it inflates factors that can be more reliably and accurately measured and readily expressed in monetary terms. For example:

| Fragile Values | Hard Values |
|---|---|
| Friendship and loyalty | Contacts and access |
| Wisdom and virtue | Productivity |
| Natural beauty | Mineral resources |
| Humanistic education | Technical training |
| Long-term needs | Short-term demands |
| Ecological integrity | Return from investment |
| International respect and esteem | Military budget |

The preference of hard over soft values is reminiscent of the old tale of the fool, who knows he dropped a coin in the bushes away from the street but looks for it under the street lamp where the light is so much better!

**Favors the interests of the wealthy.** If values are to be assessed according to willingness to pay, then clearly the interests of those best able to pay will be favored. Thus, for example, the wealthy are able to afford to live in safer neighborhoods, to eat healthier foods, to pay for superior medical care. According to cost-benefit analysis, their lives are "more valuable." So much for the maxim that "All men are created equal."

**Discounts the future.** It favors the present and near future over the remote future. Future discounting follows directly from the monetization of values. The utility of a constant cash value is inversely proportional to the term of investment-hence, the necessity of interest rates. Accordingly, if human life is to be assigned a cash value, at a 5-percent-per-annum discount rate, the value of one life today is equivalent to a thousand lives in 200 years (Parfit 1981). Consider how such an assessment might influence nuclear waste policy.

**Is insensitive to "the paradoxes of morality." It** loses sight of the fact that 'There are circumstances in which one can give a selfish justification for unselfishness" (Scriven 1968). (Much more about this shortly.)

**Treats the public as an aggregate of consumers, rather than as a community of citizens.** Preferences count more than principles because, if principles are to count at all, they must be redefined as market preferences (Sagoff 1981).

**Regards value as reductive (to consumer preferences) and aggregative (that is, the simple sum of these preferences).** Accordingly, it disregards the contextual and holistic aspects of morality.

**Is value laden.** Even if it could be totally detached from the values of the analyst and policy-maker, which I doubt, cost-benefit analysis would only reflect the operative consumer preferences of the public. Cost-benefit analysis is not free of the analyst's values, however; they appear, in part, in the selection and weighting of items in the analysis. Most fundamentally, all policy-making is by nature value laden because 4t is, by nature, a deliberate choice among options that will affect the welfare and rights of persons.

Three items on this list require special notice and elaboration.

**Economic preferences vs. community principles.** Why should our individual, free, and rational choices, measured in economic terms, not add up to a valid statement of public opinion? Because, to put it bluntly, we don't merely function and evaluate as consumers. We also act, on moral principles, as citizens of our communities. Mark Sagoff (1981) points out the contrast with admirable clarity and wit.

> Last year, I fixed a couple of tickets and was happy to do do since I saved fifty dollars. Yet, at election time, I helped to vote the corrupt judge out of office. I speed on the highway; yet I want the police to enforce laws against speeding. I used to buy mixers in returnable bottles-but who

> can bother to return them? I buy only disposables now, but, to soothe my conscience, I urge my state senator to outlaw one-way containers.... I applaud the Endangered Species Act, although I have no earthly use for the Colorado squawfish or the Indiana bat. I support almost any political cause that I think will defeat my consumer interests. This is because I have contempt for-although I act upon-those interests.

**The paradox of morality.** It is an ancient insight: Selfishness is self-defeating. Philosophers back to Aristotle and beyond have reiterated that the single-minded pursuit of personal pleasure is likely to be less satisfying than a life focused outward on the well-being of other individuals, institutions, and ideals. Only recently, with developments in moral psychology and game theory, have we begun to understand why this is so. Time permits only three brief illustrations of "the moral paradox" at work.

Imagine that you are an infantryman facing a year-long tour of duty in combat. You are given the choice to be an egoist in a platoon of egoists (like yourself, "looking out for Number One"), or an altruist in a platoon of altruists. In the latter case, you understand that each member of the platoon (yourself included) is prepared, if necessary, to sacrifice his life for the safety of the rest. In which platoon would your self-interest in personal survival best be served? Military history supplies an unequivocal answer.

Consider the case of two couples, the Joneses and the Smiths. Jack and Jill Jones agree to the marriage on the condition that each will get his and her share of personal gratification from the relationship. Each is constantly on the alert to assure that this is so. In contrast, the foremost and loving concern of Sam and Sue Smith is for the happiness and well-being of the other. I will leave it to you to guess which of these four individuals are the happiest.

Finally, consider the tragedy of the commons-a paradigm that is presumably familiar to most of you. Following Garrett Hardin's (1968) original example, imagine a pasturage in common ownership, stocked to carrying capacity with individually owned livestock. Each herdsman, pursuing his rational self-interest is motivated to add a few additional animals to his aggregate wealth. The result, of course, is destruction of the common resource. The significance of this paradigm is that analogous cases can be found with air pollution, international whaling, and fisheries' management. When carrying capacity is exceeded, the result is the same: "Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons."

These examples, and many more, convey the same message of the moral paradox: A life predicated on self-interest is self-defeating. Sound self-interested reasons exist not for acting purely in self-interest.

The Ecology of Morality. If my argument has been successful so far, it has indicated that a moral community is not accurately portrayed as a marketplace comprised of rational, informed, self-serving consumers. Thus the advantages of living in a morally well-ordered society are not to be gained simply by calculating, then implementing, policies that show a maximum cost-benefit ratio. It then follows that policy-making, an inherently moral enterprise, should not be based exclusively on the cost-benefit method of analysis because that method reduces moral attention to individual preferences.

Moral enterprises, such as policy-making, should instead lead our consciousness in the opposite direction, namely outwardly, to encompass awareness and effective concern to all beings and entities that deserve our moral attention: namely, to people of other cultures and races, to animals, to wilderness ecosystems, and to future generations. The values that direct our moral concern in this direction, are fragile values-not readily translated into dollars and cents. The impediment to clear-cut and definitive policy analysis should not exclude effective concern for these distant others from our public policy concerns. Indeed, the lack of fit between cost-benefit analysis and fragile values should be regarded as more troublesome for the analysis than for these values.

Just as a zoo, with its isolated cages of specimen creatures, does not represent nature, so too does the market place of individual transactions fail to represent the morally well-ordered society (although, to be sure, a morally sound community sustains markets). And just as the life of the individual organism and its species is best understood in the context of a functioning and ongoing ecosystem, the moral life of the individual person is best understood in the context of a cherished community, society, and culture, with a legacy from the past and a continuity into the distant future.

In short, there Is an ecology of morality, just as there is an ecology of life forms. Because the parts of each system are in dynamic interaction, "you cannot do just **one** thing." Remove a native species or introduce an alien species into the ecosystem, and there Is no telling how the whole might be affected. So too with our moral and cultural systems. For example, who could have foreseen the consequences-including some regrettable moral costs-of introducing commercial television into mass culture? What are to be consequences of the personal computer? How might its undoubted, if largely unknown, impacts be directed to produce benign payoffs?

Our culture, and therefore our values, are in a state of unprecedented flux. Amidst this confusion of change, we are in peril of losing our sense of moral direction and with it, our personal identity and justification. If we are to find and sustain meaning and direction to our lives and to our culture, we must look outside the flux to constant points of reference-to fixed navigational points in the moral universe and not to the moving masthead lights of passing fads and fashions.

The science of ecology accomplishes a constancy amid the study of flux, through such enduring concepts and rules as energy flow, nutrient recycling, and Liebig's Law. Similarly, some constant points of moral reference may be available for those individuals who reflect responsibly upon the human condition, and their place in it. Among these points, I would suggest:

> Acknowledgment of the inalienable worth and dignity of personhood in oneself and one's neighbors. Personhood, the core concept of moral philosophy, refers to the gift of self-consciousness and reflective thought, and the consequent capacity to reflect on one's future, one's rights, and one's duties to others.
>
> Due admiration and respect for such universally acknowledged virtues as courage, compassion, loyalty, sacrifice, love. and wisdom.
>
> Perspective on the human enterprise as an adventure of many generations, with a priceless legacy from the past, and a responsibility to protect and enhance this legacy for the benefit of future generations.
>
> Respect for the natural conditions that nurtured our species, and that sustain and enrich the human adventure. In brief, a love and loyalty toward Mother Gaia-our planetary ecosystem, too complicated for us ever to fully understand, too marvelous for us ever to adequately appreciate.

In this final point of reference, social morality and ecological morality meet.

If we lose sight of these enduring moral beacons, our society and ourselves will drift, among the immediate currents of our egocentric preferences, toward alienation and eventual destruction. Because of our technological capacities, that last possibility-destruction-is now an ominous possibility-either by the "bang" of nuclear holocaust or the "whimper" of global ecological collapse.

The moral uses of nature and posterity.-In the ecology of morality, personal virtue and communal justice are interdependent and mutually reinforcing. And both the moral health of the person and the flourishing of the just society are enhanced by the broad perspective-through time, and across racial and gender divisions and national boundaries. But the manifest rewards of living a virtuous life in a morally well-ordered society exacts a price: we must give up the easy psychological payoffs of self-centeredness, of racism, of sexism, of nationalism, of anthropocentrism, and of historical myopia. However tempting, we cannot, in good moral health, allow ourselves to believe that we are life's culmination or history's favorites. Life on this Earth has not evolved for more than two billion years, and civilization has not advanced through a recorded history of two hundred generations, just for the benefit of our generation. We have neither the right nor the privilege, albeit we have the power, to bring civilization, and perhaps life itself, to an end. We must never allow ourselves to believe, far less to act, upon such cosmic conceit. For if we forget our past and ignore our future, our lives will be drained of significance. As we face our own mortality, and our personal days dwindle down to a desperate few, we will be unable to recognize anything of value that will survive us. Thus is egoism ultimately its own punishment. If we injure the future, we damage our present as well.[4]

Although I have, in this essay, been critical of some economists, I can find no more eloquent statement of my conclusions than that of an economist whom I admire immensely, Kenneth Boulding (1970):

> Why should we not maximize the welfare of this generation at the cost of posterity? Apres nous le deluge has been the motto of not insignificant

> numbers of human societies. The only answer to this, as far as I can see, is to point out that the welfare of the individual depends on the extent to which he can identify himself with others, and that the most satisfactory individual identity is that which identifies not only with a community in space but also with a community extending over time from the past into the future.... This whole problem is linked up with the much larger one of the determinants of the morale, legitimacy, and "nerve" of a society, and there is a great deal of historical evidence to suggest that a society which loses its identity with posterity and which loses its positive image of the future loses also its capacity to deal with the present problems and soon falls apart.

Herein we find the paradoxical "uses" of posterity, suggested by my title. For if Boulding is correct, we need the future, and we need it now. Judging from the deteriorating condition of our moral and global ecologies, that need may be desperate.

The moral "uses" of posterity, suggested above, provide an effective answer to the cynic's taunt, "What has posterity ever done for us?" Paradoxically, future generations-not yet born and presently merely potential-offer us a great deal, by very reason of their potentiality. To fully appreciate the gift from posterity, we must be reminded that the human achievements of rationality and moral agency are not free bestowals of evolution.

They carry a heavy price. For self-consciousness and knowledge of our human condition burdens us with the knowledge of our own mortality. And this knowledge is especially heavy to the egoist and the alienated, who are without self-transcending values and concerns. To those of us with expansive moral perspective-with self-transcending love and loyalty for enduring families, institutions, ideas, landscapes, and traditions-succeeding generations offer continuity for those things we value, and through this, a life-transcending significance for our own brief existence.

Posterity offers us all this-provided we keep our part of the bargain. We must leave future generations a flourishing moral order, just political and legal institutions, and free and productive scientific and intellectual activity. And if all this is to be sustained far into the indefinite and enforceable future, we must cherish and preserve an abundant and diverse planetary life community.

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[4] Time constraints allow only a statement of these views, without elaboration or supporting argument. Accordingly, these remarks are more rhetoric than philosophy. My supporting arguments may be found in Partridge 1981b, 1982, 1984.

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**Abstract**

**Reeves, Gordon H.; Bottom, Daniel L.; Brookes, Martha H.**, tech. coords. 1992. Ethical questions for resource managers. Gen. Tech. Rep. PNW-GTR-288. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 39 p.

The decisions of natural resource managers are not simply scientific issues but involve fundamental questions of ethics. Conflicts in fisheries management, forestry, and other applied sciences arise from social and economic factors that affect natural resource values. Administrative processes, cost-benefit analyses, and various management "myths" have been constructed to avoid responsibility for difficult value-based decisions. Through these and other means, individuals and organizational systems tend to "filter" information to minimize conflict. The duty to inform the public of the alternative consequences of management actions remains a basic ethical obligation of the resource professional. This series of essays discusses conflicting values of resource management; the moral responsibilities of resource managers toward natural ecosystems, the public, and future generations; and the obligation of resource professionals to sustain for public scrutiny an open and honest debate about critical resource issues.

Keywords: environmental ethics, natural resource managers, the Land Ethic, Aldo Leopold, fisheries management, resource economics.



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