Science, Ethical Arguments, and Management in the Preservation of Land for Grizzly Bear Conservation

MARIA DAVRADOU* AND GENE NAMKOONG

Forest Sciences, University of British Columbia, 3rd Floor, Forest Science Centre, 3041 - 2424 Main Mall, Vancouver, British Columbia V6T 1Z4, Canada

Abstract: Environmental groups advocate the preservation of an area within British Columbia’s coastal temperate rainforest as a sanctuary for grizzly bears (Ursus arctos horribilis). Debate among government, industry, and environmental spokespersons has provided arguments but no resolution. We have applied to this issue available biological knowledge on grizzly bears and the arguments of a range of ethical theories. The theories of three professionally trained ethicists were included: Tom Regan, Holmes Rolston III, and Arne Naess. Aldo Leopold’s prominent position in the conservation movement justifies his “land ethic” as a fourth ethical theory. All four theories agree that the area should be preserved. Contrary to this fundamental agreement, the theories diverge when tested against a “hard” conservation scenario, the conflict between the protection of the last surviving grizzly bears versus the survival of a culturally distinct human tribe. Application of the principles developed by Regan and Naess recommend that human interests should override the preservation of grizzly bears, whereas Leopold’s and Rolston’s arguments favor the preservation of the area for the bears. Our work can be used as a model of how the gap between biological sciences, ethical theories, and ecosystem management can be bridged successfully.

*Address correspondence to Barbara Hawkins (Attention: Maria Davradou), Department of Biology, University of Victoria, P.O. Box 1700, MS 7094, Victoria, British Columbia V8W 2Y2, Canada, email mdavradou@hotmail.com

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Introduction

A coalition of international and local British Columbian environmental organizations—the Rainforest Conservation Society, Greenpeace, the Valhalla Wilderness Society, the Sierra Club, and the Western Canada Wilderness Committee—recently joined forces to preserve approximately 3.2 million ha of British Columbia’s coastal temperate rainforests. The area is called the Great Bear Rainforest because of the large number of grizzly (*Ursus arctos horribilis*) and black bears (*Ursus americanus*). The environmentalists’ vision is to ensure a refuge for coastal grizzly bears. This area would form an extensive network of rainforest valleys free from large-scale logging and grizzly bear hunting.

Namkoong (1992) encouraged managers and policymakers to consider the ethical dimensions of their management choices. Our effort here is the first attempt to follow that recommendation and to engage environmental ethical theories with a real case in conservation biology. That is, we have examined the approach of various ethical theories as they apply to the conservation of an area as a sanctuary for grizzly bears. Although we focused on only four ethical theories, the selected views represent a broad ethical spectrum: they enlarge the scope of moral consideration from the individual to the species to the land. We also sought to indicate differences and similarities among the ethical theories when applied to a difficult conservation case. To reach this goal, we fabricated a “hard” conservation scenario with more severe consequences than are possible. We created a culturally distinct tribe; whose members depend solely on the exploitation of their environment. The area is shared by the last grizzly bears, and the activities of the humans pose an immediate threat to their survival. Finally, we sought to provide a practical example of how one could respond to similar conservation cases by drawing from the biological sciences and constructing ethical arguments to aid conflict resolution in conservation.

First, we present a short description of the biological features that make grizzly bears sensitive to human activities. Then we apply the arguments of three ethicists, Tom Regan, Holmes Rolston III, and Arne Naess, to the case of the proposed preservation area. Regan grants moral consideration only to individual mammals over the age of 1 year that are “experiencing subjects of a life.” Rolston argues that collectives, such as species, should receive moral consideration. We also considered two other theories that espouse a different outlook and give moral significance to the entire biotic and abiotic community: Aldo Leopold’s “land ethic” and the ideas of Arne Naess, the founder of the deep ecology movement. Aldo Leopold, although not a trained philosopher and ethicist, is acknowledged by many as the foremost contributor to western environmental ethics (Stegner 1987; Callicott 1989).

Focus on Grizzly Bears

A 1991 Canadian status report on grizzly bears designated 14 grizzly bear zones in Canada (Banci 1991). In 2 of these, grizzly bears are considered extirpated. The population status of grizzly bears in the majority of the remaining zones is considered vulnerable or threatened (Banci 1991).

There are conflicting estimates of the number of grizzly bears in British Columbia (Banci 1991). The Ministry of Environment, Lands, and Parks (1995) estimates 10,000–13,000 grizzly bears. It is estimated that before European settlement British Columbia was home to 25,000 grizzly bears, which is now the total number of grizzly bears in all of Canada (Banci 1991). Banci (1991) reviewed the status of grizzly bears in the zone that corresponds to the area under consideration for preservation, and reported approximately 3300 grizzly bears. In the most developed areas there are an estimated 90 grizzly bears, but the north coast supports 3200 bears (Banci 1991). The low numbers of bears in areas of high human density reflect the negative impact of industrial and urban sprawl on bear populations.

Grizzly bears seldom live more than 25 years, and they are among the slowest-reproducing mammals. Female bears reach sexual maturity between the ages of 4 to 8 years old and breed at 3- to 4-year intervals. A female bear may give birth to about eight cubs during her life. Males mature a little later, between the ages of 5 to 10 years (Ministry of Environment, Lands, and Parks 1995). In addition to their low reproductive rates, grizzly bears are solitary mammals needing territories between 200–600 km$^2$ (females) and 900–1800 km$^2$ (males) (Canadian Wildlife Service 1991). Furthermore, it has been argued that populations of 30–70 grizzly bears inhabiting <2,500–7,400 km$^2$ have a < 5% chance of surviving 100 years (Shaffer 1981).

It can be argued that there are already two north coast grizzly bear sanctuaries: the Khutzeymateen Valley, 443 km$^2$ with its surrounding reserve area (total 3850 km$^2$) and the Kitlope Valley, 3887 km$^2$ (Ministry of Environment, Lands, and Parks 1995). In the existing reserves, however, the long-term genetic viability of coastal grizzly bear populations may be compromised by threats such as poaching and hunting (Pirim 1996; Margolis 1997). Logging roads cutting through to otherwise isolated areas make grizzly bears a target for increased legal and illegal hunting (Tixier 1988). Grizzly bears are sensitive to human incursion that they will often retreat from areas used for light recreation such as hiking (W. M. Graham, personal communication).

Given that habitat fragmentation is one of the most serious threats to current conservation systems, protection of large, diverse landscapes instead of small, isolated reserves should be favored if we are to maintain biodiversity over time (Noss 1983). The recognition that ecosys-
tems are not static but change and evolve over time, suggests that plants and animals must be free to migrate beyond reserve boundaries (Shaffer 1980, 1981). Consequently, mammals with large home ranges, low population densities, and low reproductive rates, such as grizzly bears, demand large, intact landscapes.

Regan and Individual Rights

Tom Regan (1993) attributes inherent value to humans because they fulfill the “subject-of-a-life criterion.” He claims that we have a life that is valuable to us regardless of the actions of others, defining the subject-of-a-life criterion as follows:

To be subject-of-a-life... involves more than merely being alive and more than merely being conscious. To be the subject-of-a-life is to be an individual whose life is characterized by those features. ...to have beliefs and desires; perception, memory and a sense of the future, including one’s own future; an emotional life together with feelings of pleasure and pain; preference and welfare—interests; a psychological identity over time; and an individual welfare in the sense that one’s experiential life fares well or ill for one, logically independent of one’s utility for others and logically independent of one being the object of anyone else’s interests.

Regan (1983) further argues that if humans have rights according to his proposed criterion, then other mammals do as well. These rights put emphasis on the value of the individual and defend the moral status of individual animals. He believes we ought to have well-grounded reasons when we argue that overriding the individual animal’s rights is the only way to prevent much greater harm to other innocent individuals. Regan furthermore distinguishes among those harms that are inflictions and those that are deprivations. He classifies, for example, any temporary impairment of strength or vitality as an infliction and limitations on one’s autonomy as a deprivation. He notes that not all harms are equal; premature death is prima facie greater harm than a temporary loss of freedom. He argues that harms may be unequal even when different individuals are harmed in the same way: the death of a senile mother becomes a lesser harm than the premature death of her daughter at the beginning of her adult life.

Regan (1983) states that to harm rare and endangered animals that are subject-of-a-life for the sake of aggregated human interests is wrong. It is wrong because, according to his rights view, it violates the principle of respect for individuals who fulfill the subject-of-a-life criterion. Disrespectful treatment occurs every time we treat individuals in ways that guarantee the best aggregate outcome, individuals who are possessors of inherent worth. The exploitation of the temperate coastal rainforest does not therefore provide a reason to allow harm to the individual bears in the area. The loss of logging jobs is a deprivation, a temporary loss of freedom, a prima facie inferior harm compared with the premature death of the bears. He adds, however, that restriction of those human activities that pose a threat to rare or endangered species is in accordance with the rights view only under the assumption that the involved individual humans will be treated with due respect. Regan’s view clearly indicates the ethical nature of the present conflict, an ethical case that raises economical and sociopolitical concerns.

Regan and the “Hard” Scenario

Would Regan have been in favor of the humans if the case had been different? To explore this aspect and expose another approach of the rights view, let us consider the following scenario. Suppose the human communities living in the area depend solely upon the exploitation of their immediate resources. Suppose also that this is done sustainably. The area where the communities are established, however, is the last available habitat for the last grizzly bears in North America. Forest practices, road construction, intense salmon fishing, and other interventions pose an immediate threat to the remaining individuals of an endangered species—the last grizzly bears. Let us suppose as well, for the sake of argument, that there are 1000 humans and 1000 grizzly bears.

Regan (1983) states that the rights view, as a theory on moral rights of individuals, does not grant rights to species as a collective. Immediately, it becomes apparent that the designation of the grizzly bear as an endangered species is irrelevant to the decision-making process. Individual bears, however, as subject-of-a-life, have rights. Grizzly bears are then entitled to the right not to be harmed. It becomes clear that according to Regan’s view we ought to save the grizzly bears not because the species is endangered but because individual bears have valid claims and consequently rights against those who would destroy their habitat. How are we then to decide between the survival of the individual bears and the individual humans? To resolve conflicts between individual members of different species, Regan applies what he calls the worse-off principle, defined as

Special considerations aside, when we must decide to override the rights of the many or the rights of the few who are innocent, and when the harm faced by the few would make them worse-off than any of the many would be if any other option were chosen, then we ought to override the rights of the many (Regan 1983).

He emphasizes that numbers are not important to the formulation of the principle. It applies in cases where we must choose between harming one innocent creature—the grizzly bear—or harming another, the human. Regan presents the scenario of the four normal adults and a dog in a lifeboat. The boat will sink if one of them...
does not go overboard because there is room for only four. Adult humans and the dog have interests, interests that grant them equal protection from sacrifice. How will we choose? The answer is found in the following reasoning:

[T]he harm that death is, is a function of the opportunities for satisfaction it forecloses, and no reasonable person would deny that the death of any of the four humans would be a greater prime facie loss, and thus a greater prima facie harm, than would be true in the case of the dog (Regan 1983).

Pursuing Regan’s rationale closely, we create the following case: Two normal adult individuals, H (human) and G (Grizzly bear), have an equal right not to be harmed. This right is based on the equal respect that is due to each one of them as a subject-of-a-life. This does not imply that each harm will harm each one of them equally. Following the above argument, other things being equal, H’s death is a greater harm than G’s death. An average adult human is a far more complex psychological entity than an adult bear. A human is capable of anticipating threat, pain, fear, and imminent death and as a result experiences great anxiety. To overlook the psychological damage we will cause to humans is against our obligation to treat them with due respect. Equal respect for the inherent value and rights of individuals demands not to count a lesser harm, in this case G’s death, as equal to or greater than a harm to H. If we override H’s right we would be giving G’s more than is owed morally. So, according to the worse-off principle, equal respect for the two individuals requires that we do not override H’s rights and override G’s rights instead.

Regan (1983) explains that what counts morally is not the size of the population in which the individual animal belongs. It is the fact that individual members are equal in value, have inherent worth, and therefore have the right to be treated with respect. The quality of being one of the last 1000 grizzly bears consequently carries no moral weight.

Rolston’s Theory

Holmes Rolston promotes two fundamental claims. First, all living organisms are teleological entities; they have a telos, or a goal. Moral agents (i.e., humans) can either foster or hinder the pursuit of the above end or goal with their actions. Second, all living organisms have inherent value. Rolston extends his argument defending the moral standing of species and ecosystems (Rolston 1996). Briefly, he constructs his arguments as follows.

Rolston focuses on endangered species and, contrary to Regan, states that duties to endangered species might override the requirements of individuals, including humans. He more specifically claims that “It could be more important to protect one million existing species than to bring into existence an additional one million persons . . .” (Rolston 1995). “[I] doubt whether the good of humans who wish more water for development, both for industry and for bluegrass lawns, warrants endangering species of butterflies and cranes (Rolston 1993).”

Rolston argues that the species is important because it is a dynamic manifestation of life, capable of persisting over time:

What humans ought to respect are dynamic life forms preserved in historical lines, vital information processes that persist genetically over million of years, overlapping short-lived individuals. It is not form (species) as mere morphology, but the formative (speciating) process that humans ought to preserve, although the process cannot be preserved without its products (Rolston 1988).

Rolston claims that our duty to preserve species is deontological, a duty to that dynamic expression of life for its intrinsic value. He perceives extinction as a “kind of superkilling” and justifies his terminology by explaining that “[extinction] kills forms (species) beyond individuals. It kills ‘essences’ beyond ‘existence,’ the ‘soul’ as well as the ‘body.’ It kills collectives, not just distributively. It kills birth as well as death.” (Rolston 1988).

Furthermore, Rolston (1995) makes clear that what we should strive for is not the preservation of a species devoid of its habitat: “It is not preservation of species we wish but the preservation of species in a system. It is not merely what they are but where they are that we must value correctly.” Grizzly bears then are not only entitled to their individual protection; they are also entitled to the preservation of their habitat.

Rolston and the Hard Scenario

Would Rolston’s argument favor the humans if applied to the hard scenario? To answer this question we apply the arguments he employs for the conservation of two other species at risk: the mountain gorilla (Gorilla gorilla beringei) and the Florida panther (Puma concolor coryi) (Rolston 1988). Rolsten argues in favor of the gorilla using three main arguments: (1) that the gorilla is a majestic, highly evolved species, (2) that it is on the verge of extinction, and (3) that its extinction will be an irreversible loss. He defends the protection of the Florida panther in the same manner, adding that the species’ majestic form has also been chosen as a symbol of the State of Florida. One could argue in a similar manner for the protection of grizzly bears. Grizzly bears are undoubtedly majestic; the Canadian Provincial Government recently chose the grizzly bear as the symbol of British Columbia’s wilderness. The grizzly bear is a species at high risk, and its populations are declining as a result of human expansion and invasion of its habitat (Hummel & Pettigrew 1991). Humans, on the contrary, regardless of their cultural heritage, are members of a
widespread species whose collective activities, such as agriculture, forestry, and rural settlements, appropriate approximately 40–45% of the terrestrial environment (Vitousek et al. 1986; Daily 1995). Indisputably then, according to Rolston’s ethical arguments, endangered species remain a collective notion much greater in moral significance than the harm done to the individuals of the tribe.

Deep Ecology

Deep Ecology is founded upon two “ultimate norms or intuitions” (Devall & Sessions 1985), the norms of self-realization and biocentric equality. They both foster the quest for spiritual growth and the sense that all entities in the biosphere have an equal right to life and self-realization. In other words, all entities in the ecosphere are parts of an interrelated whole and are equal in intrinsic worth because they all possess equal rights to live and attain their individual potential within that common interrelated whole. George Sessions and Arne Naess in 1984 presented eight principles, the basic principles of deep ecology (Devall & Sessions 1985). The first two principles defend the inherent worth of all human and nonhuman life on Earth and of ecological and evolutionary diversity and complexity. The third principle claims that “Humans have no right to reduce this richness and diversity except to satisfy vital needs” (Devall & Sessions 1985).

At this point, we would like to emphasize that deep ecology is not an ethical theory based on rights. We assume then that the term “right” is used in the place of the term “liberty.” Also, although Sessions and Naess’s term “vital needs” allows a considerable freedom of interpretation (Devall & Sessions 1985), it is mandatory that lifestyles and choices be founded on deep ecological principles, satisfying vital needs by “the most simple, elegant and least environmentally destructive means” (Devall 1988). Deep ecological principles are reflected in both a microview and a macroview. According to the microview, personal safety can be given priority over the life of a bear. There is no objection from a deep ecological perspective to a human using a gun to defend herself or himself if attacked by a grizzly bear. The macroview of the deep ecological approach, however, defends the integrity of landscapes. It favors areas that provide habitat for wild species of plants and animals. It becomes important then that, besides grizzly bears, about 75% of the vertebrate species in the coastal temperate rainforest are directly affected by the condition of the forest cover (Bunnell & Chan-McLeod 1997). Deep ecology does not support the ways economic growth is perceived and implemented by industrial nations. On the contrary, it promotes “soft, intermediate, and alternative” “deeply” sustainable technologies that support cultural diversity (Devall 1988).

Deep Ecology and the Hard Scenario

Let us assume that the 1000 people are members of a native tribe, a cultural group whose traditional ways of life, as well as their survival, depend on the exploitation of their resources. We use Turner’s (1997) description of the native tribe and define it as a cultural group whose members exhibit a custodial concept of land and resources, show respect and gratitude toward the used resources, and experience an intimate connection with their homeland. In other words, this is a group whose lifestyle and choices fulfill the requirements of the principles of deep ecology.

Humans have physical and psychological needs that are satisfied by the way we interact with one another in the communities to which we belong. Moreover, members of the native tribe we have developed are intimately connected to their land. The ways they interact with it constitute a fundamental part of their psychological well-being. In this case, the removal of the people from the land will result in their psychological, if not physical, death. To destroy their community—the milieu where they dwell—is to damage them emotionally and spiritually, probably beyond repair. Because deep ecology considers deep (i.e., sustainable) cultural diversity as an analogue on the human level to biological richness, it is safe to assume that from the perspective of deep ecology we should be willing to forego the bears for the “vital needs” of the humans.

Aldo Leopold

According to Aldo Leopold (1949), “a land ethic implies respect for . . . fellow members and also for the community as such.” From the perspective of the land ethic, predators generally should be nurtured and preserved as critically important members of the biotic community to which they are native. Furthermore, if we accept, as Leopold argued, that biological diversity contributes to “integrity, stability and beauty” of the biotic community, then the members of rare and endangered species have a prima facie claim to consideration (Callicott 1980). In every case, the decisive factor in the determination of the ethical quality of an action is its effect upon ecological systems (Callicott 1980). Individual animals of species that function in ways vital to the economy of nature should be given moral priority over the psychologically more complex and sensitive ones (Callicott 1980). In the present case, if grizzly bears contribute to the “integrity, stability and beauty” of the biotic community more than the exploitation of their natural environment, then it would be morally right, according to Leopold, to preserve the bears. What then is the contribution of grizzly bears to the temperate rainforest?

Grizzly bears, unlike many other predators, are omni-
vores (Hummel & Pettigrew 1991). Their diet consists up to 80–90% of plants, and they prey on mammals and migrating salmon only when they are available. In addition, for a brief time in spring, grizzly bears are significant predators of newborn elk (Cervus elaphus), deer (Odocoileus spp.), and caribou (Rangifer tarandus) (Canadian Wildlife Service 1991). Do these dietary habits satisfy the ecological argument for conservation of predators as regulators of the populations of the species they prey upon? Stephen Herrero, a biologist cited in Banci (1991) claims that

The grizzly bear does not play a critical role in ecosystem functioning. It is an ecological generalist, functioning as grazer, browser, scavenger or predator. Occasionally, grizzly bear predation may influence the population dynamics of ungulates. However, if we killed all the bears there would be no ecosystem collapse.

If we were to follow this rationale, killing the grizzly bears would be morally irrelevant. We should not assume, however, that we fully understand the ecological function of grizzly bears, as Leopold’s numerous calls for “humility toward man’s place in nature” remind us (Leopold 1935, 1949). Furthermore, Leopold (1949) several times has displayed his admiration for grizzly bears:

Only those able to see the pageant of evolution can be expected to value its theater, the wilderness, or its outstanding achievements, the grizzly.

In 1909, when I first saw the West, there were grizzlies in every major mountain pass, but you could travel for months without seeing a conservation officer. Today, there is some kind of conservation officer “behind every bush,” yet as wildlife bureaus grow, our most magnificent mammal retreats steadily toward the Canadian border. Only five states have any at all. There seems to be a tacit assumption that if grizzlies survive in Canada and Alaska, that is a good thing. It is not good enough for me. Relegating grizzlies to Alaska is about like relieving happiness to heaven; one may never get there.

Historically, grizzly bears were numerous south into California and Mexico and ranged across the western half of North America, approximately to the eastern boundary of Manitoba. As human populations have grown, the grizzly bear’s range has gradually shrunk. Presently, their range is limited, as Leopold predicted, to the northwestern parts of North America; their total range in North America has shrunk by more than half. More specifically, grizzly bears have lost approximately 50% of their original habitat in Canada. In the United States they have been eliminated from 99% of their home range and reduced from 100,000 individuals in the 1850s to 700–900 at present (Hummel & Pettigrew 1991). Leopold (1940), in his essay “Origin and Ideals of Wilderness Areas,” once more expressed his ideas on the conservation of grizzly bears:

I know of no serious attempts as yet to enlarge and consolidate wild spots for the benefit of particular threatened species in the Southwest. Thus the grizzly bear in 1909 persisted in 5 of the 6 wilderness areas already mentioned. Today the species is said to be gone from all but one spot in the national forests. The large facilities for land exchange, which have recently been available have not yet been used to create a single grizzly range.

Leopold suggested that the priority in the future should be twofold: preservation of wild areas in terms of the requirements of particular rare plants and animals and safeguards against the disruption of areas still wild (Leopold 1935). Elsewhere he argued that the preservation of threatened species in the end depends on our ability to preserve the suitability of their habitat (Leopold 1936a). Concerning rare or endangered species, Leopold (1936b) said that

The most pressing job in both Germany and America is to prevent the extermination of rare species. . . . [B]ears are exterminated in Germany. . . . In such cramped quarters it may have been impossible for Germany to perpetuate her bears. It seems incongruous for us to accept the better score for bear conservation when our Government has just finished eradicating the grizzly from all but few of our National Forests.

The main motive that drives the exploitation of the temperate coastal rainforest is financial. Leopold (1949) argues the inadequacy of this approach to our interaction with the land: “[L]and use ethics are still governed wholly by economic self-interest, just as social ethics were a century ago.”

Aldo Leopold and the Hard Scenario

B. J. Callicott (1990), interpreting Leopold’s ideas on conservation, claimed that conservation must aim at something larger and more comprehensive than the maximum sustained flow of desirable products such as timber, game, and human experiences. Conservation practices must take into account the integrity of ecosystems, and they must secure the enduring function of natural processes. In this context, the instrumental value of the grizzly bear as an indicator species should not be underestimated. Stephen Herrero agrees, viewing mammals with large home ranges as substitutes for entire ecosystems that function well on their own (Hummel & Pettigrew 1991).

Another point to consider is Leopold’s (1936b) comment on the nostalgia he witnessed in Germany for “wilderness,” as distinguishable from mere forests or game:

We Americans, in most states at least, have not yet experienced a bearless, wolfless, eagleless, catless woods. We yearn for more deer and more pines, and we shall probably get them. But do we realize that to get them, as the Germans have, at the expense of their wild environment and their wild enemies, is to get very little indeed?

On a visit to Sierra Madre, in Chihuahua, Leopold was impressed by the exemplary ecological condition of its flora and fauna:

It is ironical that Chihuahua, with a history and a terrain so strongly similar to southern New Mexico and Arizona should present so lovely a picture of ecological health,
whereas our own states, plastered as they are with National Forests, National Parks and all the other trappings of conservation, are so damaged that only tourists and other ecologically color-blind can look upon them without a feeling of sadness and regret (Flader 1974).

Leopold (1949) argued that “Humans are plain members and citizens of the biotic community.” More recently, Callicott (1999) has pointed out that if we are to follow Leopold’s “land ethic” then, in case of conflict between notably stronger holistic environmental interests and individualistic human oriented ones, holistic interests should override individualistic ones.

Conclusion

We have explored the way in which biological and ecological knowledge intertwines with environmental ethical theories to guide our management decisions in conservation. First, we applied the arguments of four major ethical theories to a real conservation case: the preservation of an area within British Columbia’s coastal temperate rainforest as a sanctuary for grizzly bears. All chosen theories were in support of the preservation of the grizzly bear’s habitat. When we applied the same theories to a harder scenario, however, in which the interests of a native tribe were in conflict with the survival of the last grizzly bears, two of the theories supported the human interests: Regan’s theory of individual rights and deep ecology’s more holistic philosophical approach. In contrast, Leopold’s position remained the same. His emphasis on minimizing the effect of our interference with nature, his personal concern for grizzly bears, and his ecological conviction that humans ought to be humble in their relationship with the natural world did not favor the interest of a group of people even in the tough, imaginary case. Similarly, Rolston’s position continued to favor the bears because of his belief that cultural components of human societies ought not to override the rights of a species at high risk of extinction.

Different theories focus arguments on different aspects of a given situation. A vaguely described imaginary case immediately exposed the difference between Regan’s and Rolston’s theories. Regan morally favored the people, whereas Rolston favored the grizzly bears. Accurate application of the deep ecology perspective was undetermined until we revealed more features of the imaginary scenario. A fundamental difference between the ethical position of Rolston and Naess then became apparent: Rolston does not appear to favor the vital cultural needs of any group of humans against the survival of a species. In contrast, cultural diversity is valued by advocates of deep ecology and is considered worthy of consideration in the process of reaching a decision.

Another point to consider is our chosen theories. Had we selected different theories, such as a narrower animal welfare view, strict utilitarianism, or a theory with a rigid human focus, the results would likely have been different. Nevertheless, differences among theories should not discourage their application. On the contrary, the application of diverse ethical arguments in conservation cases promotes and sustains a thorough analysis of each individual case; it forces the consideration of other relevant arguments that are otherwise not readily perceived and evaluated.

For these reasons we consider our study to be relevant to conservation policy. Bringing to bear our set of values and including sound ethical arguments in our decision-making processes indicates that a close cooperation between conservation biology and environmental philosophy is not only possible but provides practical ways to apply conservation theory to management decisions. Most important, this work indicates that we must continue to pursue the definition of a biosphere ethic.

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