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The animal rights-conservation debate: can zoos and aquariums play a role?

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INTRODUCTION

There is growing public concern about the treatment of non-human animals in our society, and this has resulted in the rapid growth of membership in and support of animal rights and welfare organizations (Beckoff 1998). Similarly, there is strong public support for the conservation of endangered species and their habitats, and this has resulted in an equally rapid increase in membership in and support of organizations that identify wildlife and habitat conservation as their primary missions (Street 2004).

However, a survey conducted by the Association of Zoos and Aquariums suggests that the public is very confused about the concept of animal rights and its relationship to wildlife conservation. Preliminary results indicate that many laypersons perceive the two ideologies to be roughly equivalent (Mellen 2003); but, what are the differences between the animal rights and environmental/conservation ethics? Are these two worldviews always compatible?

ANIMAL RIGHTS AND CONSERVATION: A PRIMER

Animal rights and conservation are ethical perspectives; that is, viewpoints intended to guide us in our behavior toward animals and nature. Ethical questions are questions about right and wrong; that is, rather than focusing on "what is," which is the realm of science, ethicists focus on "what ought to be" done (White 1981). It should be noted, however, that ethical

viewpoints are not absolute and our conceptions of right and wrong can vary with context (situational ethics) and can also change over time. It should also be noted that the knowledge gained from scientific study does influence our ethical discussions. An ethical decision based on ignorance or incorrect information is unlikely to stand up to scrutiny. The purpose of ethics is therefore not to seek absolute truth or perfect resolution; rather, it is a continual process of debate and reconsideration. The process of ethical debate can eventually result in consensus building, as more and more people are compelled to accept one position over another, or conversely, it can result in an extreme polarization of views. In either case, it is important that various views be critically examined, especially in cases where our decisions have important implications for society or nature. Thus, before discussing some potential sources of conflict between conservation and animal rights, it will first be necessary to examine these viewpoints in more detail.

Before comparing the philosophical foundations of animal rights and conservation, a brief caveat is necessary. In framing these discussions, I fully realize that each individual's views on any topic fall somewhere along a wide spectrum of beliefs. It is often hard to classify individuals into one category or another and, in reality, people may use terms to describe themselves, which although technically inaccurate, seem to work for them. For example, I have had conversations with people who classified themselves as animal rights advocates who, upon closer examination, were more appropriately classified as animal welfare advocates. This may be due to the complex ways in which people gather information and form opinions, and partly to people's confusion over the definition of these terms. One of the goals of this paper is to clear up some of this confusion, but it is important to note that this discussion of the animal rights-conservation debate focuses on the philosophical foundations of the animal rights and conservation movements as articulated in the academic literature.

Animal rights and welfare ethics

Animal rights proponents invoke the philosophy and language of the civil rights movement, arguing that sentient, non-human animals, like disadvantaged human groups (e.g., women, ethnic minorities), have an intrinsic and inviolate right to life, liberty, and bodily integrity. Thus any human use of non-humans that harms individuals in any way is considered unacceptable (Regan 1983).

Animal rights advocates argue that individual animals should be the focus of our ethical concerns. Furthermore, they argue that sentience – the capacity to experience pain – is the only relevant characteristic needed

by animals to merit full moral consideration (Singer 1975, Regan 1983). They contend that if non-human animals have the capacity to suffer pain, then their suffering should be as important a matter of ethical concern as that of our fellow humans; that non-humans may be incapable of reason, speech, forethought or self-awareness is considered irrelevant. After all, some classes of humans (e.g., newborn infants and the severely mentally retarded) do not possess these abilities, yet are accorded rights.

The argument that human needs should take precedence over those of sentient non-humans is viewed as "speciesism" – a form of prejudice analogous to chauvinism, racism, or sexism (Singer 1975, Midgely 1983, Regan 1983). Thus, individual animals are seen as having a "right to life" and, except in very special circumstances, any attempt to kill them or to cause them to suffer pain is considered morally unjustifiable.

Animal rights differ from the concept of animal welfare. Welfare can be defined as a good or satisfactory condition of existence; thus animal welfare refers to the quality of an animal's life, whether in nature or in human care (Duncan and Fraser 1997). Like animal rights proponents and many conservationists, animal welfare advocates abhor human cruelty towards animals; they also detest unnecessary suffering or loss of life. However, many animal welfare advocates tend to be more flexible in their beliefs, arguing that non-humans can be utilized by humans, even for food, as long as pain, suffering, and loss of life are minimized. Not surprisingly, the welfare ethic does not sit well with many animal rights proponents, who see it as perpetuating aspects of the current belief system that they cannot support (Regan and Francione 1992).

Conservation ethic

Conservationists seek to ensure a future for naturally occurring biological diversity (Primack 2002). Biodiversity is defined here as the variety of organisms (species, subspecies, etc.) that inhabit particular ecosystems. The term "natural" is used here to distinguish between diversity that has occurred as the result of natural ecological/evolutionary processes (i.e., speciation, colonization, and "natural" extinction), and that which has occurred because of relatively recent human interventions (i.e., introduction of non-native invasive species, human-caused extinctions) (Aitken 1998). Aldo Leopold said that: "A thing is right if it tends to preserve the integrity, beauty and stability of the biotic community. It is wrong when it tends to do otherwise" (Leopold 1949). While change not stability is now recognized as an inherent aspect of natural systems (Callicott 1989), the dynamic systems themselves and the species that inhabit them are seen as worthy of

our moral consideration (Gunn 1980, Norton 1987, Callicott 2000, Regan 2000). Thus, the biological richness of an ecosystem, as characterized by the number and variety of native species it supports, is seen as intrinsically good. Conversely, the loss of naturally occurring biological diversity, especially as the result of human activity, is seen as intrinsically bad (Aitken 1998, Primack 2002).

Proponents of the conservation ethic recognize and value the complex interdependencies of organisms within functioning ecosystems (Primack 2002). In simple terms, ecosystems consist of a source of energy (usually sunlight), a source of raw chemical materials (rocks, soil, air, water), "producers" capable of transforming and storing solar energy (usually green plants), "primary consumers," which feed on the producers (i.e., herbivores), "secondary consumers," which feed on the primary consumers (i.e., carnivores), and, finally, "decomposers," which break down the dead bodies of the producers and consumers and cycle their energy back into the system (Ricklefs 1973). According to Leopold (1949), such "food chains are the living channels which conduct energy upward; death and decay return it to the soil . . . like a slowly augmented revolving fund of life."

Conservationists have identified habitat alteration, fragmentation, and destruction as being the primary threat to wildlife populations (Ehrlich and Ehrlich 1981, Primack 2002, Wilson 2002). Therefore, a concern for wild animals should be expressed in a willingness to protect natural habitats and ecosystems. All living organisms are tied closely to the habitats in which they have evolved. It is therefore difficult to separate individual animals or species from their ecological contexts. It is equally difficult to draw a strong distinction between living and non-living components of the environment. All living organisms, whether they are bacteria or humans, are composed of non-living matter. Carnivores, for example, are as dependent on soils for their existence as they are on their prey.

CONFLICTS BETWEEN ANIMAL RIGHTS AND WILDLIFE CONSERVATION

Decisions regarding the future of wildlife and their habitats are complex. All such decisions involve the weighing of various, sometimes competing, values, and it is often excruciatingly difficult to determine which path will lead to the "greatest good." Clearly, the animal rights ethic and the conservation ethic will lead to the same decisions in many situations. For example, both ethics would consider it wrong for humans to destroy critical wildlife habitat, or to pollute it with chemicals and wastes. But, when the two

viewpoints are compared, it is evident that disagreements will arise when the "rights" of individual, sentient animals come into conflict with efforts to conserve populations, species, habitats or ecosystems (Hutchins and Wemmer 1987, Norton 1987, 1995, Temple 1990, Soulé 1990, Hutchins *et al.* 1995, Vrijenhoek 1995).

Species or ecosystems do not warrant moral consideration according to the rights view, though they are considered to have "inherent value" (Feinberg 1978, Regan 1983). Ideological differences between animal rights and conservation are evident in their contrasting views of the endangered species problem. While both ethics favor saving threatened or endangered species or populations, they differ in their reasons for doing so. Regan (1983, p. 360) argues that we should conserve endangered species "... not because the species is endangered, but because the individual animals have valid claims and thus rights against those who would destroy their natural habitat, for example, or would make a living off their dead carcasses through poaching and traffic in exotic animals, practices which unjustifiably override the rights of those animals." Thus, all sentient animals, regardless of species, rarity or other considerations, are given equal moral consideration, according to the rights view.

In contrast, conservationists argue that endangered populations or species should be given special status because of their scarcity and heightened risk of final and irreversible extinction (Gunn 1980, Norton 1987, Aitken 1998, Callicott 2000, Regan 2000). That is, extraordinary efforts should be made to preserve rare populations or species, especially when an organism has become scarce due to some action on the part of humans.

The animal rights ethic is very clear on its position regarding human–animal relationships, but it is unclear with regard to pain and suffering inflicted on animals by animals. For some animal rights advocates, what predatory animals do to their prey is beyond the realm of their concern, presumably because it is done by "innocent killers" lacking in malicious intent or the knowledge of the ethical consequences of their actions (Feinberg 1978, Regan 1983). Such views open the animal rights ethic to logical criticism (Hutchins and Wemmer 1987, Callicott 1989). From an individual's standpoint, pain is pain, regardless of the intent of the predator. In addition, predation is not the only way that one animal can have a detrimental effect on another. Indeed, one weakness of a view of nature that stresses individual rights is that it fails to recognize the complex interdependencies that exist within natural ecosystems. Thus if a population of one species becomes locally over-abundant to the point that it degrades its own habitat, many other organisms may suffer as well.

So what happens in cases where conservationists recognize the need to intervene to save populations, species or ecosystems that are in danger of extinction? What if this involves harming or killing individual animals? In fact, there are many circumstances in which the "rights" of individual animals come into conflict with efforts to preserve populations, species or ecosystems (Hutchins and Wemmer 1987, Soulé 1990, Temple 1990, Hutchins 1995, Hutchins *et al.* 1995, Vrijenhoek 1995). This chapter considers those areas particularly relevant to the conservation activities of zoos.

CAPTIVE BREEDING FOR REINTRODUCTION

One form of management intervention employed by conservationists is moving endangered animals into "protective custody" for breeding and reintroduction purposes. For example, the North American black-footed ferret (*Mustela nigripes*) was nearly driven to extinction by the loss of its primary prey – the prairie dog (*Cynomys* spp.). These social rodents were the focus of a systematic control program, and as their populations declined, so did the ferrets'. Introduced diseases, such as distemper and plague, also decimated ferret populations. The species was thought to be extinct until a small population was discovered in Wyoming in the early 1980s (Miller *et al.* 1996). These animals have become the nucleus of a scientifically managed, cooperative breeding program that was intended to support the species' recovery. The cooperative effort between accredited zoos and federal and state wildlife agencies has been highly successful, and there are now more ferrets living in nature than in captivity (Lockart *et al.* 1998).

The endangered California condor (*Gymnogyps californicus*) provides another example. Only 22 wild condors remained in 1982, their numbers having been reduced by habitat loss and pollutants, such as dichlorodiphenyl-trichloroethane (DDT) and lead. The last remaining wild condors were brought into captivity in 1987. But, in this case, it was not animal rights groups that protested; it was environmental groups, such as The National Audubon Society. The breeding program has been successful and reintroduction has brought the condor back to areas in California and the American southwest (Wilcove 1999, Graham 2000). The program still faces many difficult challenges, such as power lines, lead shot used by hunters and antifreeze, all of which have caused condor deaths. However, the current population exceeds 200 and there are condors living in nature again. The Audubon Society recently apologized for its early opposition to the captive breeding program.

Conservationists do not recommend captive breeding for reintroduction as a recovery strategy in every case, and the removal of wild animals for breeding programs must be carefully considered (Koontz 1995). However, when necessary and appropriate, captive breeding for reintroduction is widely recognized as a potentially effective tool to aid in endangered species recovery (Mallinson 1995, Norton 1995, Primack 2002, Stanley Price and Soorae 2003).

However, animal rights advocates have a much different view. In fact, the animal rights ethic generally opposes the notion that wild animals may be held in captivity, even under the best of conditions. In this view, individual animals have a right to liberty and these rights are being violated when wild animals are captured and held in dedicated breeding facilities or professionally managed zoos. According to Regan (1995, p. 45), "... confining wild animals ... can be justified, according to the rights view, but only if it can be shown that it is in their best interests to do so." He further states that, "it is morally irrelevant ... to insist that captive animals serve as useful models in important scientific research or that they offer an opportunity for protecting rare and endangered species, or that they advance the interests of other individuals, whether human or non-human" (p. 46).

The reintroduction process itself appears to be a potential point of contention between conservationists and animal rights advocates. The goal of reintroduction programs is to re-establish extirpated or augment existing, though severely depleted, populations of endangered or threatened species. However, the risk to individual animals during reintroduction is considerable, and the incidence of mortality can be high, especially in a program's early stages (Beck 1995). Early in the black-footed ferret reintroduction, the mortality rate of released animals was nearly 80%. The most common cause of death was predation by coyotes (*Canis latrans*) and badgers (*Taxidea taxus*). Behavioral studies indicated that reintroduced ferrets were spending far too much time traveling above ground in daytime, thus increasing their chances of detection by predators. This problem was later solved by a combination of approaches, including pre-release conditioning of the ferrets, which were allowed to gain experience moving in and out of prairie dog burrows when confronted with danger (Miller *et al.* 1998). In order to ensure that release candidates could recognize and kill their primary food, captive-reared ferrets were also given the opportunity to hunt and kill live prairie dogs. While this experience was critical for the success of the reintroduction program, there is no doubt that it violated the "rights" of the individual prairie dogs.

The animal rights view would clearly not have allowed the black-footed ferret or California condor breeding and reintroduction programs, but at what cost? These species and many others would surely be extinct today if it were not for human intervention. The need for captive breeding for reintroduction is expected to grow over the next few decades as more and more key species are pushed to the brink of irreversible extinction.

CONSERVATION RESEARCH

Scientific research is one means by which humans gain an understanding of the natural world. Such an understanding is essential to wildlife conservation efforts. Animal rights advocates are opposed to the use of animals as research models in human biomedical research, particularly when individuals are sacrificed or caused to suffer psychological or physical pain (Regan 1983, March 1984, Rudacille 2000).

Conservation studies generally fall under the umbrella of a relatively new scientific discipline known as conservation biology (Soulé 1985). The goal of this applied science is to conserve naturally occurring biological diversity. Conservation biology is one of the most interdisciplinary of sciences, encompassing not only the biological sciences, but also economics and the social sciences. Conservation biology is the scientific foundation of the conservation ethic. Thus, its primary goal is to ensure a future for individuals, populations, species, and ecosystems. Like any other research conducted on animals, however, conservation research has the potential to violate the rights of individual animals as defined by Regan (1983). In fact the rights view would preclude all practices that "cause intentional harm." According to Regan (1983, p. 387), "This objective will not be accomplished merely by ensuring that test animals are anesthetized, or given postoperative drugs to ease their suffering, or kept in clean cages with ample food and water, and so forth. For it is not only the suffering that matters – though it certainly matters – but it is the harm done to animals, including the diminished welfare opportunities that they endure." But what are the consequences of this view?

There are many cases in which conservation-related research could prove harmful to individual animals. For example, to collect essential data on population dynamics, behavior, individual growth rates, diseases, etc., it is often necessary to capture and handle animals or to mark them for individual identification. Despite numerous precautions by scientists, animals are sometimes harmed during capture procedures. For example, some

animals may suffer limb fractures or trauma due to falls and others may succumb to adverse reactions to immobilizing drugs or to shock. Still others may contract capture myopathy, an often-fatal muscular condition induced by the stress of capture and transport (Fowler 1995).

Harm that comes to individual animals during capture and handling could be considered accidental in that scientists are not harming animals deliberately. However, there are some cases where conservation research may involve deliberate harm. For example, Eaton (1972a, 1972b) studied the development of predatory behavior in captive-reared lions (*Panthera leo*) and cheetahs (*Acinonyx jubatus*). To observe predation, he released live domestic goats, which were subsequently killed and eaten by the cats. The rights view would certainly not condone such experiments because they violate the rights of the individual goats. However, despite the unfortunate consequences for individual goats, this work appears to be compatible with the more holistic conservation ethic. Humans have pushed many carnivorous species, including large cats, to the brink of extinction. One method by which conservationists hope to save some of these species is through captive breeding for reintroduction (Moore and Smith 1990). However, reintroducing captive-bred carnivores into their natural habitats poses many difficult problems, including the ability of the animals to recognize, catch, and kill their own prey (Miller *et al.* 1998). Thus, studies of this kind could prove to be essential for planning any serious reintroduction effort.

Conservation biologists have identified numerous research questions to be answered in order to fill gaps in our current knowledge of biodiversity and conservation methodology (Soulé and Orians 2001). However, the rights view would place heavy restrictions on conservation research. One implication is that information essential to conservation could not be collected except under very restricted conditions, and this might increase the probability of species extinctions (Hutchins and Wemmer 1987, Hutchins *et al.* 1995). By contrast, the more holistic conservation ethic does not oppose the use of animals in scientific research, especially if the knowledge gained were to help ensure the survival of a population, species or ecosystem. Animal rights proponents would consider this view to be "utilitarian," in that "whether the harm done to individual animals in the pursuit of scientific ends is justified depends on the balance of the aggregated consequences for all those affected by the outcome" (Regan 1983, p. 392). Since animal rights proponents find this utilitarian view unacceptable, most forms of conservation research could not be condoned.

Animal welfare advocates might argue that wildlife scientists should develop more benign methods of study. In fact, scientists themselves have

taken some initiative in this regard, as few people want to inflict needless harm. For example, there has been interest in using less invasive methods to assess physical condition and diets. Physical condition can sometimes be assessed by measurements of weight, girth, blood chemistry, and other physical parameters (Franzmann *et al.* 1995). Similarly, rather than studying stomach contents, dietary preferences can sometimes be determined by watching what animals eat, by analyzing feces, or by measuring the nutritional quality and abundance of the food resources themselves (Blankenship and Satakopan 1995, Stromberg 1995). The humane treatment of animals is therefore a continuing goal. However, it may not be possible to totally avoid suffering, pain or loss of life in all instances. Conservationists seek to balance harm to individual animals against the potential gain in knowledge that may positively impact the lives of many more animals and species survival.

ANIMAL RIGHTS AND CONSERVATION REALITIES

There have been many attempts to find common ground between animal rights and conservation (e.g., Warren 1983, Ehrenfeld 1991, Callicott 1989, Varner 1998, Beckoff 2002). While both ethical viewpoints clearly share a reverence for life, they can lead to vastly different policies and practices and these differences are affecting the way that we manage and conserve wildlife, sometimes to its detriment. It is therefore particularly important that laypersons, experts, and key decision-makers fully understand the differences between these views and their implications for wildlife conservation and management policy and practice. At least with regard to some decisions affecting wildlife, it *is* important whether we classify ourselves as "animal rights advocates" or "conservationists." The two viewpoints are not always compatible, nor should they be perceived as such.

Given the fact that the animal rights ethic is often incompatible with conservation goals, is there an alternative for those of us who care about both the future of life on this planet *and* the welfare of individual animals? I believe there is, but it is not going to be easy. To accomplish this goal, we must first make conservation our highest moral imperative. And, secondarily, conservationists must also embrace the concept of animal welfare.

Animal rights proponents apparently believe that we can achieve conservation goals by focusing our attention solely on individual animals (see Regan 1983). Thus, animal rights is a highly reductionist view of nature, which seems to imply that species and ecosystems can be saved simply by preserving their component parts. In contrast, ecological science has

shown us that complex interdependencies exist between various species in a biotic community, and that the whole is actually greater than the sum if its parts (Rodman 1977, Callicott 1989, 2000, Regan 2000). If so, then there is a strong justification for giving preference to endangered over common species and native species over introduced species when it comes to conservation policy.

Animal rights proponents also believe that if we simply leave nature alone, it will heal itself (see Regan 1983). However, ecologists have noted that even the largest of national parks will lose much of their biological diversity in the absence of careful management (Soulé *et al.* 1979). In fact, given the rate at which humans are altering natural ecosystems, unprecedented levels of human intervention are going to be necessary to prevent the widespread loss of biological diversity (Younghusband and Myers 1986, Coblentz 1990, Kenny 1990, Soulé 1990, Diamond 1992, Bowles and Whelan 1994, Hutchins 1995). Whether we like it or not, there are many cases in which wildlife is going to have to be managed if it is to survive.

In weighing the costs and benefits of our decisions, we must consider not only the fate of individuals, but also the fate of populations, species, and ecosystems. These "collectives" have inherent value and must be considered in our decision-making processes (Rodman 1977, Gunn 1980, Norton 1987, Callicott 1989, 2000, Rolston 1994). We must consider the fact that the extinction of a species means the "end of birth" – that is, that the potential for future individual lives will be lost forever. These future lives have value too and their potential loss is deserving of our moral consideration (Attfield 1983). And, perhaps even more importantly, because various life forms can be highly interdependent, it means that the loss of one species could mean the loss of others.

Context is also important in ethical decision making. Clearly we are in a desperate situation as far as biological diversity is concerned. The current global trends that are in play will likely mean that many species are lost in the coming decades (Wilson 2002, Rosenweig 2003). In the long-term, saving species, habitats, and ecosystems will mean finding remedies to the many human-caused problems that lead to species endangerment (Redford and Richter 2001). However, as a conservationist, I believe that we should take necessary short-term actions to conserve and/or restore as many species and habitats as possible, while at the same time trying to move toward a more sustainable society. A conservationist's work is analogous to that of an emergency room doctor's, and emergency room ethics apply. Sometimes desperate acts are going to be necessary to preserve life, even if it means causing the patient short-term harm. Of course, in the case

of conservation, the "patients" are endangered populations, species, and ecosystems, and the immediate harm is being done to a subset of individual animals.

In order to preserve some semblance of nature in a human-dominated world, we are going to have to make some hard choices. However, this does not mean that conservationists should act callously and without empathy and compassion (Schmidt 1981, Hutchins and Wemmer 1987, Rolston 1992, Beckoff 2002). Conservationists and wildlife managers should recognize that individual sentient animals *are* morally considerable and we should not make these decisions lightly. When the need to control animal populations or otherwise manage wild animals becomes necessary, it should be accomplished in the most humane manner possible (Hutchins and Wemmer 1987). One problem is the current lack of effective humane alternatives. Conservation scientists must confront this issue directly and seek to refine existing methods or develop new ones.

Some conservationists argue that one reason for preserving natural processes is to protect human interests (e.g., to maintain ecosystem services, preserve aesthetic values and utility for future generations, etc.). However, others value wildlife and nature for its own sake (Callicott 2000, Regan 2000). This makes it even more difficult to gauge the rightness or wrongness of actions that simultaneously sacrifice the life of, or cause suffering in some, sentient beings, while they preserve or enhance the lives of many others. In fact, it is increasingly clear that ethical philosophy faces a severe test when it comes to the conservation problem. Wilson (1984, p. 123) said, "in ecological and evolutionary time, good does not automatically flow from good and evil from evil. To choose what is best for the near future is easy. To choose what is best for the distant future is also easy. But to choose what is best for both the near future and distant future is a hard task, often internally contradictory, and requiring ethical codes yet to be formulated."

IS THERE A ROLE FOR ZOOLOGICAL PARKS AND AQUARIUMS IN THE ANIMAL RIGHTS-CONSERVATION DEBATE?

Modern zoos and aquariums are playing an increasingly important role in educating the public about current conservation issues. In North America alone, some 140 million people visit accredited zoological institutions annually, providing a tremendous opportunity for public outreach and education (Delapa 1994). Many zoos and aquariums have structured as well as informal educational programs that cater to both children and adults. Zoo

and aquarium professionals also produce many publications and frequently interact with the media and key decision-makers. In addition, these institutions are science based, share a conservation mission and have practical experience in managing wildlife on a day-to-day basis (Hutchins 2003).

Clearly, zoos and aquariums can play a critical educational role in the animal rights-conservation debate. We must do a better job of not only building an appreciation for wildlife, but in promoting a deeper understanding of the many complex challenges faced by conservationists today. It is not enough to teach people to care about animals or to be concerned about their future. In fact, building a purely emotional connection to wildlife can often backfire on conservationists. We have taught people to love animals and nature unconditionally; in fact, they love it so much that the thought of having to take a life to save others is often not acceptable. That is why zoos and aquariums need to find a way to promote what I refer to as "informed concern." If we are to save wildlife for the future, then people must begin to understand the many challenges and complexities of modern conservation, including the need to actively manage wildlife and wildlife habitats (Bowles and Whelan 1994).

Over a decade ago, conservation biologist Michael Soulé posed an important challenge to the conservation community. He said, "Conflicts between animal rights groups and management agencies are increasing in frequency and cost – the cost is being borne by endangered species and ecosystems as well as by the public that pays for expensive rescue operations and time consuming court battles. The minimization of such conflicts will require both public education and courageous leadership." (Soulé 1990).

Zoos and aquariums have a tremendous opportunity to seize this leadership role, but courage will be necessary. Zoos and aquariums, like many conservation-oriented organizations, have probably been reluctant to address these difficult issues for several reasons, including fear of the "negative public reaction that almost inevitably accompanies eradication efforts, especially for animals" (Temple 1990). However, it should be recognized that much of the research, captive breeding, reintroduction, and field conservation work done by the zoological community is also not compatible with animal rights philosophy. Indeed, if zoos and aquariums want to continue to pursue their conservation mission, they need to take the animal rights challenge very seriously (see Hutchins *et al.* 2003).

Animal rights groups have been very active in schools and in indoctrinating an entire generation of young people. They raise millions of dollars annually from concerned individuals, which they spend primarily on influencing public opinion and key decision-makers in government. Zoos, aquariums, mainstream conservation, and animal welfare organizations must join forces to help counter their inflexible, anti-conservationist views. At the same time, modern zoos and aquariums need to evolve into conservation and animal welfare organizations, doing their best to both provide quality animal care *and* contribute directly to wildlife and habitat conservation in nature (Maple *et al.* 1995, Hutchins 2003, Hutchins and Smith 2003, Hutchins *et al.* 2003).

Modern zoos and aquariums need to help the public, media, and key decision makers in government understand the hard choices that lie ahead. This can only be accomplished if people appreciate what is going to be lost if no action is taken. Zoos and aquariums provide a unique opportunity to drive home the conservation message – a message based on science and commonsense, rather than on misguided logic and pure emotion. What better time is there to impress upon people the importance of conservation ethics than when they are standing face to face with living examples of critically endangered species? While individual animals are important, a failure to act on behalf of populations, species, and ecosystems will render the debate moot – there will be no future individuals on which to focus our concerns. Like many other species before them, they will be relegated to the dustbin of extinction – victims of well-meaning, but misguided efforts to preserve individual life, liberty, and welfare at all costs.

SUMMARY AND CONCLUSIONS

1. The animal rights ethic is a poor foundation for conserving wildlife and their habitats in an increasingly complex world. Its primary weaknesses when applied to wildlife conservation are as follows. It focuses exclusively on what is good for individuals rather than on what is good for populations, species or ecosystems. It fails to recognize the complex interrelationships between species in functioning ecosystems. Species and ecosystems are morally considerable because they are necessary to sustain life. Specifically with regard to wildlife, the rights view emphasizes a hands-off approach, which in the current global context, means that virtually all forms of wildlife management would be unacceptable.
2. If we care about the future of life on this planet, then we *must* make conservation our highest moral imperative. Because conservationists are compassionate about individual animals, they should also embrace the animal welfare ethic and investigate more humane methods of population control and captive animal management.

3. Professionally managed zoos and aquariums have a role to play in the animal rights-conservation debate by educating the public about both the differences between these two worldviews and the challenges, complexities, and realities of conservation in human-dominated landscapes. When the public understands the differences between the two perspectives, it is hoped that more people will embrace the conservation ethic and understand the difficult, but crucial choices that will be necessary to secure a biologically diverse future.

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References

Aitken, G. M. (1998). Extinction. *Biology and Philosophy*, **13**, 393–411.

Attfield, R. (1983). *The Ethics of Environmental Concern*. New York: Columbia University Press.

Beck, B. B. (1995). Reintroduction, zoos, conservation and animal welfare. In *Ethics on the Ark: Zoos, Animal Welfare and Wildlife Conservation*, eds. B. Norton, M. Hutchins, E. F. Stevens, & T. L. Maple. Washington, D.C.: Smithsonian Institution Press, pp. 155–163.

Beckoff, M., ed. (1998). *Encyclopedia of Animal Rights and Welfare*. Westport, CT: Greenwood Press.

Beckoff, M. (2002). The importance of ethics in conservation biology: let's be ethicists not ostriches. *Endangered Species Update*, **19(2)**, 23–26.

Blankenship, L. & Satakopan, S. (1995). Food habits and nutrition. In *Wildlife Research and Management: Asian and American Approaches*, eds. S. H. Berwick & V. B. Saharia. Delhi, India: Oxford University Press, pp. 329–362.

Bowles, M. L. & Whelan, C. J. (1994). *Restoration of Endangered Species*. Cambridge: Cambridge University Press.

Callicott, J. B. (1989). *In Defense of the Land Ethic: Essays in Environmental Philosophy*. Albany, NY: State University of New York Press.

Callicott, J. B. (2000). On the intrinsic value of nonhuman species. In *The Preservation of Species*, eds. B. G. Norton *et al.* Princeton, NJ: The Princeton University Press, pp. 138–172.

Coblentz, B. E. (1990). Exotic organisms: a dilemma for conservation biology. *Conservation Biology*, **4(5)**, 261–265.

Delapa, M. (1994). Interpreting hope, selling conservation: 2005, aquariums and environmental education. *Museum News*, May/June, 48–49.

Diamond, J. (1992). Must we shoot deer to save nature. *Natural History*, **8**, 2–8.

Duncan, I. J. H. & Fraser, D. (1997). Understanding animal welfare. In *Animal Welfare*, eds. M. C. Appleby & B. O. Hughes. Wallingford, UK: CAB International, pp. 19–31.

Eaton, R. L. (1972a). An experimental study of predatory and feeding behavior in the cheetah (*Acinonyx jubatus*). *Zeitschrift für Tierpsychologie*, **31**, 270–280.

Eaton, R. L. (1972b). Predatory and feeding behavior in adult lions: the deprivation experiment. *Zeitschrift für Tierpsychologie*, **31**, 461–473.

Ehrenfeld, D. (1991). Conservation and the rights of animals. *Conservation Biology*, **5(1)**, 1–3.

Ehrlich, P. & Ehrlich, A. (1981). *Extinction*. New York: Random House.

Feinberg, J. (1978). Human duties and animal rights. In *On the Fifth Day: Animal Rights and Human Ethics*, eds. R. K. Morris & M. W. Fox. Washington, D.C.: The Humane Society of the United States.

Fowler, M. (1995). *Restraint and Handling of Wild and Domestic Animals*, Second Edition. Ames, IA: Iowa State University Press.

Franzmann, A. W., Cook, R., Singh, C. M., & Cheeran, J. V. (1995). Health and condition evaluation of wild animal populations. In *Wildlife Research and Management: Asian and American Approaches*, eds. S. H. Berwick & V. B. Saharia. Delhi, India: Oxford University Press, pp. 367–399.

Graham, F. (2000). The day of the condor. *Audubon*, **102(1)**, 46–53.

Gunn, A. S. (1980). Why should we care about rare species? *Environmental Ethics*, **2**, 17–37.

Hutchins, M. (1995). What do "wild" and "captive" mean for large ungulates and carnivores now and into the twenty-first century? In *Wildlife Conservation, Zoos and Animal Protection: A Strategic Analysis*, ed. A. Rowan. Grafton, MA: Tufts Center for Animals and Public Policy, pp. 1–18.

Hutchins, M. (2003). Zoo and aquarium animal management and conservation: current trends and future challenges. *International Zoo Yearbook*, **38**, 14–28.

Hutchins, M. & Smith, B. (2003). Characteristics of a world class zoo or aquarium in the 21st century. *International Zoo Yearbook*, **38**, 130–141.

Hutchins, M. & Wemmer, C. (1987). Wildlife conservation and animal rights; are they compatible? In *Advances in Animal Welfare Science 1986/87*, eds. M. Fox & L. D. Mickley. Boston, MA: Martinus Nijhoff Publishers, pp. 111–137.

Hutchins, M., Dresser, B., & Wemmer, C. (1995). Ethical considerations in zoo and aquarium research. In *Ethics on the Ark: Zoos, Animal Welfare and Wildlife Conservation*, eds. B. Norton, M. Hutchins, E. F. Stevens, & T. L. Maple. Washington, D.C.: Smithsonian Institution Press, 253–276.

Hutchins, M., Smith, B., & Allard, R. (2003). In defense of zoos and aquariums: the ethical basis for keeping wild animals in captivity. *Journal of the American Veterinary Medical Association*, **223(7)**, 958–966.

Kenny, J. (1990). Control of the wild. *National Parks*, **65**, 9–10.

Koontz, F. (1995). Wild animal acquisition ethics for zoo biologists. In *Ethics on the Ark: Zoos, Animal Welfare and Wildlife Conservation*, eds. B. Norton, M. Hutchins, E. F. Stevens, & T. L. Maple. Washington, D.C.: Smithsonian Institution Press, pp. 127–145.

Leopold, A. (1949). *A Sand County Almanac*. New York: Oxford University Press.

Lockart, M., Vargas, A., Marinari, P., & Grober, P. (1998). Black-footed ferret (*Mustela nigripes*) recovery update. *Endangered Species Update*, **15(6)**, 92–93.

Mallinson, J. (1995). Conservation breeding programmes: an important ingredient for species survival. *Biodiversity and Conservation*, **4**, 617–635.
Maple, T. L., McManamon, R., & Stevens, E. (1995). Defining the good zoo: animal care, maintenance and welfare. In *Ethics on the Ark: Zoos, Animal Welfare and Wildlife Conservation*, eds. B. G. Norton, M. Hutchins, E. F. Stevens, & T. L. Maple. Washington, D.C.: Smithsonian Institution Press, pp. 219–234.
March, B. E. (1984). Bioethical problems: animal welfare, animal rights. *BioScience*, **34(1)**, 615–620.
Mellen, J. (2003). U.S. perceptions about animal welfare, conservation, zoos, aquariums and AZA: a survey. Preliminary results. Paper presented at the 2003 AZA Annual Conference, Columbus, OH.
Midgley, M. (1983). *Animals and Why they Matter*. Athens, GA: University of Georgia Press.
Miller, B., Reading, R. P., & Forrest, S. (1996). *Prairie Night: Black-Footed Ferrets and the Recovery of Endangered Species*. Washington, D.C.: Smithsonian University Press.
Miller, B., Biggins, D., Vargasa, A., Hutchins, M., Hanebury, L., Godbey, J., Anderson, S., Wemmer, C., & Oldemeier, J. (1998). The captive environment and reintroduction: the black-footed ferret as a case study with comments on other taxa. In *Second Nature: Environmental Enrichment for Captive Animals*, eds. D. Shepherdson, J. D. Mellen, & M. Hutchins. Washington, D.C.: Smithsonian Institution Press, pp. 97–112.
Moore, D. & Smith, R. (1990). The red wolf as a model for carnivore re-introductions. In *Beyond Captive Breeding: Re-introducing Endangered Mammals to the Wild*, ed. J. Gipps. Oxford, UK: Clarendon Press, pp. 263–278.
Norton, B. G. (1987). *Why Preserve Natural Variety?* Princeton, NJ: Princeton University Press.
Norton, B. G. (1995). Caring for nature: a broader look at animal stewardship. In *Ethics on the Ark: Zoos, Animal Welfare and Wildlife Conservation*, eds. B. G. Norton, M. Hutchins, E. F. Stevens, & T. L. Maple. Washington, D.C.: Smithsonian Institution Press, pp. 102–121.
Primack, R. B. (2002). *Essentials of Conservation Biology*, Third Edition. Sunderland, MA: Sinauer.
Redford, K. & Richter, B. (2001). Conservation of biodiversity in a world of use. *Endangered Species Update*, **18(1)**, 2, 4.
Regan, D. H. (2000). Duties of preservation. In *The Preservation of Species*, eds. B. G. Norton *et al.* Princeton, NJ: The Princeton University Press, pp. 195–220.
Regan, T. (1983). *The Case for Animal Rights*. Berkeley, CA: The University of California Press.
Regan, T. (1995). Are zoos morally defensible? In *Ethics on the Ark: Zoos, Animal Welfare and Wildlife Conservation*, eds. B. Norton, M. Hutchins, E. F. Stevens, & T. L. Maple. Washington, D.C.: Smithsonian Institution Press, pp. 38–51.
Regan, T. & Francione, G. (1992). The animal "welfare" vs. "rights" debate. *The Animal's Agenda*, **12(1)**, 40–45.
Ricklefs, R. E. (1973). *Ecology*. Portland, OR: Chiron Press.
Rodman, J. (1977). The liberation of nature? *Inquiry*, **20**, 83–131.
Rolston, H. (1992). Ethical responsibilities toward wildlife. *Journal of the American Veterinary Medical Association*, **200**, 618–622.

Rolston, H. (1994). *Conserving Natural Values*. New York: Columbia University Press.
Rosenweig, M. L. (2003). *Win-Win Ecology. How the Earth's Species Can Survive in the Midst of Human Enterprise*. Oxford, UK: Oxford University Press.
Rudacille, D. (2000). *The Scalpel and the Butterfly. The Conflict Between Animal Research and Animal Protection*. Berkeley, CA: University of California Press.
Schmidt, R. H. (1981). A professional attitude toward humaneness. *Wildlife Society Bulletin*, **9(4)**, 289–291.
Singer, P. (1975). *Animal Liberation*. New York: Avon Books.
Soulé, M. E. (1985). What is conservation biology? *BioScience*, **35**, 717–734.
Soulé, M. E. (1990). The onslaught of alien species, and other challenges in the coming decades. *Conservation Biology*, **4(5)**, 233–239.
Soulé, M. E. & Orians, G. H., eds. (2001). *Conservation Biology: Research Priorities for the Next Decade*. Washington, D.C.: Island Press.
Soulé, M. E., Wilcox, B. A., & Holtby, C. (1979). Benign neglect: a model of faunal collapse in the game reserves of East Africa. *Biological Conservation*, **15**, 259–272.
Stanley Price, M. R. & Soorae, P. S. (2003). Reintroductions: whence and whither? *International Zoo Yearbook*, **38**, 61–75.
Street, B., ed. (2004). *Conservation Directory: The Guide to Worldwide Conservation Organizations*. Washington, D.C.: Island Press.
Stromberg, L. P. (1995). Vegetation sampling methods for use in wildlife habitat evaluation. In *Wildlife Research and Management: Asian and American Approaches*, eds. S. H. Berwick & V. B. Saharia. Delhi, India: Oxford University Press, pp. 135–174.
Temple, S. A. (1990). The nasty necessity: eradicating exotics. *Conservation Biology*, **4(2)**, 113–115.
Varner, G. E. (1998). *In Nature's Interests? Interests, Animal Rights and Environmental Ethics*. New York: Oxford University Press.
Vrijenhoek, R. (1995). Natural processes, individuals and units of conservation. In *Ethics on the Ark: Zoos, Animal Welfare and Wildlife Conservation*, eds. B. Norton, M. Hutchins, E. F. Stevens, & T. L. Maple. Washington, D.C.: Smithsonian Institution Press, pp. 74–92.
Warren, M. A. (1983). The rights of the non-human world. In *Environmental Philosophy: A Collection of Readings*, eds. R. Elliott & A. Gare. University Park, PA: The Pennsylvania State University Press, pp. 109–131.
White, M. (1981). *What Is and What Ought to Be Done: An Essay on Ethics and Epistemology*. New York: Oxford University Press.
Wilcove, D. (1999). *The Condor's Shadow: The Loss and Recovery of Wildlife in America*. New York: W. H. Freeman and Company.
Wilson, E. O. (1984). *Biophilia: The Human Bond With Other Species*. Cambridge, MA: Harvard University Press.
Wilson, E. O. (2002). *The Future of Life*. New York: Alfred A. Knopf.
Younghusband, P. & Myers, N. (1986). Playing God with nature. *International Wildlife*, **16(4)**, 4–13.

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