

Conservation of Biodiversity: Opportunities and Challenges

Bill Devall

**Department of Sociology
Humboldt State University
Arcata, CA¹**

Abstract

This essay includes a review of major strategies for preservation of earth's biodiversity including the biodiversity "hotspots," "Wildlands Project," and the "consensus" strategy. The essay includes a review of reasons for protecting biodiversity including the deep ecology, inherent value argument, and a review of philosophies and organizations that place low value on preservation of biodiversity. Local, national and international organizations working for protection of biodiversity are discussed. The paper concludes that preservation of significant portions of the global biodiversity is cost-effective, reasonable, and prudent. The paper calls for international organizations, national governments, and regional and local communities to focus attention and resources on preservation of biodiversity as a high priority of action because to do otherwise could cause irreversible harm to the diversity of life on the planet.

Keywords: *biodiversity, conservation, strategies for change*

Introduction

"In Wildness is the Preservation of the world."
Henry David Thoreau

More than any other ecological predicament, the modern mass extinction crisis is an indicator that life on our planet is out of synch. Species extinction is irreversible, particularly if measured on a human evolutionary time scale. Its accelerating pace ought to be considered as an environmental problem of more importance than even the depletion of the ozone layer, global warming, or pollution and contamination. The synergism and combined input of contemporary military, demographic, and socioeconomic depredations suggests that the juggernaut of late modernity has entered an increasingly eocidal phase (Brosimmer 2002, 103).

Before the Ark of the Broken Covenant is itself broken beyond repair and our chance to save the di-

versity of life vanishes forever, we must act. It is difficult to imagine another issue that is more truly a matter of life and death for the world as a whole (Kunich 2003, 202).

According to some scientists, *Homo sapiens* have been causing extinction of other species for at least 50,000 years and probably longer. Small groups of humans armed with Stone Age weapons and fire are effective killers. Small groups of humans can make extensive changes in large ecosystems in short periods of time. For example, the extinction of megafauna on the North American continent approximately 10,000 years ago has been correlated with the arrival of small numbers of *Homo sapiens* armed with spears who coordinated their hunting activities in small groups of hunters.

During the past 500 years the rate of human caused extinctions has increased exponentially. Sailors seeking spices, wood, whale blubber and other resources used in international trade, released goats, pigs, sheep, and rats, on remote islands and on Australia, which had never been home to these species before the age of global trade. These species proceeded to take over the habitats of many endemic species, causing the extinction of some native species (Crosby 1986; Bender 2003).

Near the end of the 20th century and the beginning of the 21st century many types of human activities are creating a cumulative effect that scientists call the "crisis of extinction."

While some commentators conclude that much of the biodiversity of the planet could be lost within the next two decades, there are initiatives underway for the conservation of biodiversity.

The focus of this essay is on those positive initiatives. In the following pages the major strategies that have been advanced to preserve native biodiversity are reviewed and evaluated.

Biodiversity is defined as:

all of the hereditary variation in organisms, from differences in ecosystems to the species composing each ecosystem, thence to the genetic variation in each of the species. As a term, biodiversity may be used to refer to the variety of life of all of Earth or to any part of it — hence the biodiversity of Peru or

the biodiversity of the Peruvian rainforest (Wilson 2002, 213).

Biodiversity is not only defined by scientists, it is also defined in various social contexts, including legal, social, political, and cultural contexts. For the purposes of this paper, however, the scientists' definition is the primary definition used.

Eileen Crist (2003, 63) concludes that biodiversity is a central concern of the conservation movement.

The environmental crisis is multidimensional but no facet is more urgent, nor more fundamental, than the biodiversity crisis. The idea of biodiversity has sometimes been regarded as vague and political — assessments that miss the point by a long shot. Far from being vague, 'biodiversity' is inclusive of all levels: from genes, through species (as well as sub-species, varieties, and hybrids), populations, ecosystems, and biomes, to processes of ecological interconnectivity and evolutionary speciation. All are dimensions of biodiversity: a plurality of living states and processes, biological actuality and potential that makes the concept exquisitely versatile, encompassing, and robust. The view, moreover, that 'biodiversity' and 'the biodiversity crisis' are political motifs — skillfully constructed with the aim of crystallizing problems in order to influence policy — is narrow-minded. Only those focused exclusively on human affairs, and conflicting interests therein, would mistake the intensity and mandate that infuse scientific discourse about biodiversity for politics.

In some of the literature, conservation of biodiversity is linked to protection of wildlands. In current usage, wildlands are defined as relatively large areas that can also be habitat for small groups of humans who are living primarily in relatively traditional lifestyles and are primarily sustaining themselves with local hunting, gathering native plants, or small scale gardening.² Some scientists have noted a strong correlation between indicators of high species diversity and diversity of small scale human communities, especially in Africa (Mittermeier et al. 2004).

An analysis published in the Proceedings of the National Academy of Sciences in 2004 defined 'wilderness' areas as having at least 70% or more of their original vegetation intact, covering at least 10,000 square kilometers (3,861 square miles) and containing fewer than five people per square kilometer. By this definition 24 wilderness areas were identified, representing 44% of the Earth's land surface, but occupied by 3% of the world's population. Wilderness, using this definition, however, had low correlation with diversity of species.

Only 18% of plants and 10% of terrestrial vertebrates are endemic to individual wildernesses, the majority restricted to Amazonia, Congo, New Guinea, the Miombo-Mopane woodlands, and the North American deserts. Global conservation strategy must target these five wildernesses while continuing to prioritize threatened biodiversity hotspots (Mittermeier et al. 2004).

The World Commission on Forests and Sustainable Development, for example, concluded that short-term economic growth at the expense of long-term sustainability of the resource base is counter-productive. Protection of sustainable ecosystems is the basis of sustainable logging of forests. The Commission documented numerous reasons for primary forest decline including timber concessions signed by national governments, short-term extraction of the maximum amount of timber from primary forests, conversion of primary forests into single species tree farms consisting of fast-growing trees (some of them of species of trees not native to the region) which can be harvested for profit within 20 years, government corruption, illegal trade in timber products and forest animals including international trade in endangered wildlife species, inappropriate settlement programs including large-scale efforts by Brazil and Indonesia to settle peasants in primary forest areas and conversion of forests, frequently by burning them, into pasture land for large ranching operations (Salim and Ullsten 1999). Many scientists and environmentalists agree that protection of all remaining primary forests including tropical and temperate rainforests is necessary to reduce the effects of global warming as well as to protect threatened and endangered species.

Scientists and historians are documenting the biological effects of accelerating human activities on the Earth that lead to species extinction. The negative effects of human activities are summarized by the acronym HIPPO: Habitat destruction, invasive exotic species introduced into ecosystems by humans, pollution, human population growth and resultant increase in consumption, and over-harvesting (Wilson 2002, 50).

The 2003 edition of the Red List of Threatened Species, compiled by the World Conservation Union (WCU), in Geneva, listed 12,259 plants and animal species as threatened with extinction mostly due to human activities. Scientists with the WCU believe the extinction rate for species is 1,000 to 10,000 times higher than it would be under natural conditions, that is conditions that have not been extremely modified by activities of humans in a globalizing economy.³

The British magazine, *Nature*, published an analysis by Chris Thomas, a biologist at University of Leeds (England) and Lee Hannah, a biologist at the Center for Applied Biodiversity Science at Conservation International (Washington, D.C.) concluding that if global warming continues as pre-

dicted over the next 50 years, up to one quarter of all plant and animal species currently existing on earth could become extinct because they have no where to escape from their current habitat to new habitat suitable to their requirements. Depending on the three climate assumption models used in this study, the researchers estimated that between 15 to 37% of vulnerable species in Mexico, Australia, Europe, Amazonia, the Brazilian Cerrado and South Africa, representing 20% of the Earth's landmass, are likely to become extinct because of climate change (Thomas et al. 2004, 145-148).

Populations of marine animals are as threatened and endangered by human activities as terrestrial animals. For example, scientists concluded that the population of Pacific leatherback sea turtles has plunged 95% in the last 22 years, primarily due to the impact of inappropriate fishing activities. Scientists estimate that fewer than 5,000 nesting females remain in the Pacific. Some scientists estimate that Pacific leatherback turtles will be extinct within 10 to 30 years.

While some people deny these human-caused threats to biodiversity, others have given up hope of rescuing native biodiversity from a combination of interacting variables, including economic globalization, and over-harvesting of forests, plants and animals in an effort to increase short-term profit by applying modern technology. Unsustainable population growth in some regions of the Earth creates expanded demands for resources to serve both vital needs and increasing per capita consumption of limited resources. In many regions of the Earth there are demands on limited supplies of fresh water, pasture for domesticated animals, and arable farmlands. Some regions are experiencing massive growth of urban areas with their demands for fossil fuel drawn increasingly from remote regions of the Earth (Meadows et al. 1992; Ehrlich and Ehrlich 2004).

Visions of the Future and the Conservation of Biodiversity

With the successful landing on Mars in January 2004, of two unmanned spacecraft launched by NASA, U.S. President George Bush began promoting an expanded space program with the goal of establishing a space station on the Moon from which humans will launch a human exploration of Mars. In this scenario, a very few humans could escape to space stations from a human-devastated Earth.

In another vision of the future, the protection of the Earth's biodiversity is unnecessary because humans will merge with machines to become self-replicating cyborgs. Biotechnology, nanotechnology, and other new forms of technology will lead to a New Age. Many people welcome the coming cyborg age where humans will merge with machines and biotechnology will be the leading force of change on the

earth (Zimmerman 1994).

In contrast, another vision of the future calls for 'rewilding' the Earth. Human population growth will begin to decline during the 21st century. 'Smart' technology, including increasing use of solar power, will reduce frantic search for fossil fuels. The poorest one billion humans on Earth will increase their consumption to serve their vital needs, and they will be served by social programs emphasizing family planning, education, health care, and energy efficient technology. The wealthiest one billion humans will moderate their consumption and devote themselves to promoting social justice, conservation, and lifestyles that are simple in means but rich in ends.

While different groups advocate radically different visions of the future for the humans in the 22nd century, efforts to conserve biodiversity on the Earth during the 21st century continue at global, national, and local levels of society.

Review of Reasons for Conservation of Biodiversity

Supporters of the deep, long-range ecology movement emphasize that species have a right to exist apart from the use of these species for the benefit human beings and that humans have no right to cause the extinction of native species across their habitat. Proponents of the deep, long-range ecology movement have advocated conservation of biodiversity since the 1960s (Devall and Sessions 1985, 2002; Drengson and Inoue 1995; Sessions 1995).⁴

Philosopher Arne Naess articulated an overall norm for human behavior. Ecological sustainability! A norm that follows, more or less logically, from that norm is: Conservation of biodiversity! Other norms derived from Naess' system include, Right livelihood!, Wise action based on available information!, and When in doubt about the extent of negative consequences of direct human intervention in a more or less natural landscape (such as proposed oil and gas development on the Arctic Alaska plain in and near the Arctic Wildlife Refuge) refrain from engaging in massive human intervention in the landscape!. Extensive argumentation of these norms is found in Volume X Selected Works of Arne Naess (Glasser 2005).

Other arguments for investment in conservation of biodiversity at global, national, regional, and local levels include the possible discovery of new medicines for humans developed from native plants not yet discovered by scientists. Other benefits resulting from conservation of biodiversity in certain local regions include income derived from tourism for regional and local communities. For example, tourists are reported to pay up to \$100 USD a day to visit great apes in protected reserves in Uganda. Furthermore, some economists

argue that the “natural capital” of wild nature, including the “capital” of native biodiversity contributes to human well-being by providing clean water, clean air, soil, and genetic diversity utilized to feed humans (Alexander et al. 2000).

John Kunich (2003, 18) defines biodiversity “hotspots:”

These hotspots are pockets of nature that contain multitudinous species, including many rare and endangered species found nowhere else, that have also been threatened to a significant degree by human activities. Thus the hotspots are ‘hot’ not only because they contain so much unique biodiversity but also because they are at risk and are urgently in need of protection. They are where the action is in the current mass extinction.

Kunich summarizes many of the anthropocentric arguments for conservation of biodiversity in what he calls “the hotspots wager.” This wager explains the stakes at risk if collectively Earth’s political and economic agents bet against protecting significant portions of existing biodiversity on the Earth and what is gained if they bet on protecting significant biodiversity. Kunich concludes that there is a “grave error” if we fail to protect biodiversity. If there is a major risk that many species will go extinct due to our inaction then “...some species will die out that could have provided people or the planet with great benefits, such as cures for disease, valuable genes, ecosystem services, new sources of nutrition, and the like” (Kunich 2003, 178).

All strategies for conservation of biodiversity involve relationships between local residents who live in the critical habitat of threatened and endangered species, government agencies, international organizations, and scientists, especially conservation biologists.

Conservation of biodiversity in areas with low population density, and a relative lack of infrastructure of industrial civilization (including few or no roads, no oil and gas development projects, logging projects or mining projects) frequently involves working with local, First Nation, indigenous peoples to conserve local lifestyles and biodiversity. For example, groups such as Survival International attempt to educate politicians and other constituencies about violations of human rights of local peoples and in some cases, local people have become involved in managing their homelands as reserves, parks, or other protected areas. The outcome of these collaborations between non-governmental organizations (NGOs) and local people has been mixed. Some local tribes and communities want oil and gas development, new roads, schools and access to a variety of consumer goods. Others want to maintain, as much as possible the ‘old ways’ in their communities. Traditional tribal people when provided with rifles can effectively kill whatever animal species is sold for

cash on the market either as bushmeat, trophies, skins, animal parts for medicine and other uses. They can also capture and sell animals as pets. Tribal people, peasants, miners, army or paramilitary all seem to have a hand in killing wildlife. An example of the interactive effects of these factors has been documented in creating a Tiger reserve in Myanmar (Rabinowitz 2004).

Poverty eradication and “sustainable development” programs have undermined conservation efforts in some regions. Wild nature is debated in terms of economic value as part of “economic growth” and usually “sustainability” is defined by major donors such as the UN and World Bank as “sustainable economic growth” (Sanderson 2004).

Some reserve projects have been severely criticized by social justice advocates because reserve administrators removed peasants from their holdings inside the boundaries of reserve projects in order to provide habitat for endangered species. The tiger project in India was decried as an arrogant and culturally insensitive project designed on the American model of Wilderness (Guha 1989).

However, philosopher Arne Naess (1995) replies that developing nations need nature reserves in order to have sustainable society and enhance human experience. In dire circumstances, such as famine, wartime conditions, economic depression, and social conditions of excessive population in periods of extensive drought, many people in a local region will kill wildlife, if they can, and cut excessive amounts of firewood from local forests. There are numerous instances where international and national support agencies were unwilling or unable to provide adequate assistance to populations existing in dire circumstances. One example is the situation in the eastern Congo during the 1990s. Warfare not only killed many people and led to massive numbers of refugees moving from their war torn homelands across national borders, but also led to the deaths of endangered mountain gorillas and encroachment on their habitat.

The optimistic hope and goal is that local populations will sustain their vital needs using primarily local resources to serve their needs for food, shelter, water, and clothing without over-exploiting the local resource base. In situations of dire emergencies for human populations including severe drought, flooding, warfare, tsunamis and earthquakes, the international community will develop institutional responses to provide for the vital needs of local populations of humans.

Statements Urging International Cooperation to Conserve Biodiversity since the 1960s

In 1968, David Brower, then Executive Director of the Sierra Club and one of the leading conservationists in America, proposed that the Galapagos Islands be designated as the

first Earth International Park. "Man needs an Earth International Park, to protect on this planet what he has not destroyed and what need not be destroyed. In this action, all the nations could unite against the one real common enemy — Rampart Technology" (Brower 1968, 23).⁵

The strongest statement approved by the UN General Assembly stating principles of conservation of biodiversity is the World Charter for Nature, approved by the UN General Assembly in 1982 and supported by all nations voting in the UN General Assembly, except the United States. The World Charter states "Nature shall be respected and its essential processes shall not be disrupted."⁶

Leaders of all of the world's religions have issued numerous pleas based on the doctrines and principles of their specific religious traditions, for the protection of earth's biodiversity (Oelschlaeger 1994). Numerous conferences and reports sponsored by the UN, including the Rio Conference on Environment and Sustainable Development, held in Brazil in 1992, have issued reports and nations have pledged to goals and timetables for conservation of resources including conservation of biodiversity. However, destruction of habitat in many regions of the Earth continues with few restraints. The Convention on Biological Diversity, which followed the 1992 Rio conference, developed into a mass of documents but not a social movement of sustained international efforts to implement effective protection of the Earth's biodiversity because the documents and the Convention contain so many statements prefaced with "when feasible" and other loose formation of rules.⁷

International organizations continue to sponsor conferences during which participants attempt to develop strategies to conserve biodiversity. UNESCO and UNEP sponsored a meeting in Paris in November, 2003, at which 18 nations, mostly African, developed a strategy to protect great apes and their habitat. Organizers suggest that several hundred million USD are required to control poaching, protect habitat, and discourage illegal trade in apes. Organizers of the conference concluded that apes help forest health by pruning branches and spreading seeds and thus some scientists call them the "gardeners of the forests" (Doland 2003). Implementing the findings of this conference, however, depends on the willingness of various nations to proclaim and enforce regulations protecting habitat of primates, availability of funding for management of reserves, enforcement of anti-poaching regulations, scientific studies, and corruption of officials that remains endemic (Doland 2003).

Protection of native biodiversity is dependent not only on relatively large, self-willed land and water areas but also on changing cultural practices in industrialized nations and developing nations. For example, in the United States, California condors hatched and reared in captivity are returned to

the 'wild' where they must forage over a landscape where industrial pollutants that are in the air and water are ingested by the condors and where some humans still shoot California condors when they see them roosting on power lines or gliding in thermals over the cities, oil fields, and farms that proliferate in the human dominated landscapes of condor habitat in California (Snyder and Snyder 2000).⁸

Even though falcons have been nesting on the ledges of skyscrapers in New York City and feasting on pigeons, and black bears live quite well on the household wastes of vast suburbs in New Jersey, many species of plants and wildlife are not comfortable living in close proximity with humans or with human activities. As more humans move into habitat of carnivores especially, the boundaries between humans and wildlife need to be more clearly defined by social customs (Baron 2004). For example, sensational news coverage of a few attacks by mountain lions on humans, fueled fears in some California suburban communities that mountain lions are a menace to humans. However, an on-going study by University of California-Davis, provided greater insights. Twenty mountain lions around Cuyamaca Rancho State Park in San Diego County were fitted with \$5,000 USD Global Positioning System (GPS) collars allowing researchers to track them for the last three years. Researchers discovered that mountain lions kept away from humans during the day but at night used the extensive trail system in the park and crossed interstate highways many times. Bob Turner, a game warden with California Department of Fish and Game, concluded that "Close to 50% of the lions killed (near California suburbs) could be avoided if people could be responsible. Most people are just plain stupid." (Associated Press 2004)

Extensive research shows that some mammals, such as wolves, coyotes, bears, deer, and mountain lions are changing their habits as they survive and thrive in the urban/rural interface of vast suburbs in the megacities of North America. For example, the state of New Jersey allowed a bear hunt in 2003 in the suburbs of New York because the population of bears was proliferating and bears were rapidly adapting to suburban habitat (Seibert 2003).

The philosopher Arne Naess suggests some principles for successful coexistence in rural areas of Norway by farmers who share habitat with wolves and bears. Naess does not say that these specific principles can be applied to rural communities anywhere on the Earth. However, they are suggestive of the type of norms that communities can develop that can result in practice of mutual co-existence (Naess 1979). Naess and Myrsterud (1987, 24) suggests three tentative norms for human relationships with wolves in Norway.

The Well-being of the species wolf as part of human and nonhuman life on Earth has value in itself (in-

trinsic value, inherent value)! This value is independent of the narrow usefulness of the nonhuman world for human purposes!

Richness and diversity of wolf races and their habitats as part of the general richness and diversity of life forms contribute to the realization of these values and are also values in themselves!

Humans have no right to reduce this richness and diversity, including wolf habitats except to satisfy vital needs!

Strategies for Protection of Biodiversity at the Landscape Level

Two major strategies for conservation of biodiversity at the landscape level of analysis have emerged over the last 20 years. One strategy promoted by Conservation International, International Union for the Conservation of Nature and some other international conservation organizations, is to focus on “world hotspots of biodiversity” defined as areas with larger numbers of species and high species diversity. Kunich calls these the “black boxes” of biodiversity which account for 60% of the Earth’s biodiversity but only 1.44% of the Earth’s land surface.

The preservation task (of the Earth’s “hotspots”) is made somewhat easier by the fact that credible scientific evidence exists that a relatively small number of nations (17 countries out of more than 200 total) are home to a disproportionately large share of the world’s biodiversity. Some estimates indicate that these 17 countries account for about 60 to 70% of the total global biodiversity, including terrestrial, freshwater, and marine species (when 200 mile zones are considered) (Kunich 2003, 149).

The other strategy focuses on areas large enough to support free-roaming and self-managed large carnivores, grazing animals, and omnivores such as jaguars, grizzly bears, bison, and wolves. This strategy is based on the principle that if healthy populations of large carnivores or herbivores, such as bison, perpetuate themselves on a large landscape then other species will also have habitat for their needs and will more likely maintain themselves with less intensive human management or at least without expensive propagation of “poster species” by humans. For example, by focusing on protection of spawning rivers and streams along the Pacific coast of North America, which provides habitat for self-perpetuating runs of wild salmon, habitat for many other species is also protected.

This strategy is based on principles of conservation biology articulated by Michael Soule and Reed Noss for The Wildlands Project. The mission statement of The Wildlands Project, which seeks to implement this strategy in North America, states this strategy is designed

...to help protect and restore the ecological richness and native biodiversity of North America through the establishment of a connected system of reserves. The idea is simple. To stem the disappearance of wildlife and wilderness we must allow the recovery of whole ecosystems and landscapes in every region of North America (www.wildlandsproject.org).

Conservation biologists working with The Wildlands Project conclude that the existing Wilderness Areas, Parks, and Wildlife Refuges do not adequately protect biodiversity in North America because they are too small, too isolated and represent too few types of ecosystems to perpetuate biodiversity. Soule and Noss base their strategy on “rewilding,” by which they mean reintroduction, in landscapes where they have been extirpated, carnivores such as wolves, jaguars, mountain lions, as well as grizzly bears. They conclude that large predators have regulatory roles in large core area wildlands in North America (Soule and Noss 1998; Foreman 2004).

This strategy has recently been extended to include mesoamerica and South America featuring a system of jaguar reserves large enough to sustain free-roaming jaguars. It is also being utilized by the Wilderness Society of Australia to design a system of core reserves, buffer zones, and corridors between core reserves for the continent of Australia.

Human habitation in core reserves is light. Humans living in buffer zones are asked to practice wise relationships with wild creatures, including carnivores such as wolves, mountain lions and omnivores such as grizzly bears.

Based on principles of conservation biology, proposals have also been made for marine reserves from Baja to Alaska along the Pacific coast of North America (Jessen and Ban 2002). One of the largest marine reserves managed by a single nation is the Great Barrier Reef reserve off the northeast coast of continental Australia. Although the Great Barrier Reef is protected under Australian federal law, a recently released study on the effects of global warming on the Reef concludes “only if global average temperature change is kept to below two degrees Celsius can the Reef have any chance of recovering from the predicted damage” due to global warming. (Hoegh-Guldberg and Hoegh-Guldberg 2004, 1)

Incorporating local communities of humans, especially local communities of people living more or less traditional lifestyles, into conservation of biodiversity frequently presents many challenges. For example, Monarch butterflies mi-

grate from northern regions of North America to a very small area in Mexico for the winter season. When local people living in and near the forest where Monarch butterflies spend the winter season appreciate the Monarch butterflies as “our” butterflies, they help protect the butterflies and their habitat. Also along the butterfly migration route, many stop in one grove of trees in Santa Cruz, California. That grove is inside the boundaries of a state park, but the butterflies are very vulnerable when they stay in the grove and residents of Santa Cruz consider “our” butterflies important enough to help protect them, even from too many tourists. However, reports by one scientist, Lincoln Brower, an expert on the Monarch butterfly migration to Mexico, conclude that illegal logging in the winter habitat of these butterflies indicates that deforestation is accelerating. He concludes that only the consistent presence of an incorruptible police force will slow the increasingly rapid rate of illegal logging (Lee 2004).

One success story of cross-national efforts and local, community based conservation of biodiversity is the community-based conservation in the Mexico/U.S. Borderlands (Curtin 2002).⁹ When some local communities consider the wildlife in local wildlife preserves “their” wildlife, they might engage in poaching wildlife and selling it for cash. In some cases, local hunters have been recruited to become park rangers. They are paid to cull wildlife when necessary but also to protect wildlife from poachers. In other words, when a group of people who might resist a state bureaucracy feel a sense of ownership in the landscape near their homes and have cultural values that include some of the “norms” discussed above, including respect for wild creatures, they can be effective managers and advocates for protection of threatened and endangered species if they are provided with sufficient economic and cultural incentives.

When a small community in Belize saw “their monkeys” killed by vehicles on the highway going through their community, they built a monkey walkway across the highway that monkeys quickly learned to use and the death rate of killing monkeys by vehicles declined.

Another example of community based efforts at protection of biodiversity and natural ecosystem processes is found in the Klamath-Siskiyou bioregion located in southwestern Oregon and northern California. Many groups are involved in advancing the philosophy and practice of conservation of biodiversity. This effort includes conservation groups, the U.S. Forest Service, Bureau of Land Management and local communities whose economies were traditionally based on logging old-growth forests in the region.

Promoters of a conservation biology based approach to conservation in this region envision a self-organizing, less human-managed approach which, over the next hundred years, would allow a system-wide natural regime of wildfires

and forest growth to occur. Indeed, during the 2002 wildfire season virtually the entire core Wilderness Area in the southwestern Oregon portion of the Klamath-Siskiyou region, burned during the ‘Biscuit’ wildfire sequence. Some biologists concluded that is exactly what the region needed after a hundred years of extensive fire suppression by the U.S. Forest Service.¹⁰

Arne Naess suggests that successful coexistence of humans and wildlife requires strong support by local communities of specific ethical principles. Naess studied the relationship between farmers in rural areas of Norway, which is habitat for wolves and bears. Naess does not say that the specific principles he proposes can be applied to rural communities anywhere on the Earth, they are suggestive of the type of process that communities can work through that can result in the practice of coexistence.

These norms require specification in specific situations, as do all norms, but they can be applied to human actions regarding many threatened and endangered species including great apes, Asian tigers, jaguars, California condors, Pacific leatherback sea turtles, and Minke whales. For example, although these norms are not explicitly stated, they are implicit in requests by conservationists to restrict long-line fishing in the Pacific Ocean to protect Pacific leatherback sea turtles (Clem 2003).

Advocates of The Wildlands Project strategy to conservation of biodiversity recognize the obstacles to implementing such a vision. These include difficulties in acquiring necessary information, quality of data, data management, perceptions by some people of the impracticality of this approach, time frames, making decisions based on available data, funding, and deliberate lies and misunderstanding propagated by opponents of this type of strategy (Trombulak et al. 1995). However, to do nothing to protect biodiversity on a large scale is to condone destruction of irreplaceable value.

Another strategy for conservation of biodiversity at the landscape level is frequently called the ‘common ground’ or ‘sustainable development’ strategy. Under the guidelines of this strategy a portion of remaining primarily undeveloped landscape is ‘protected’ and the remainder is ‘developed.’ This is sometimes called the ‘compromised’ strategy because the larger landscape has already been extremely disrupted by human activities and what remains is divided among various interest groups. This strategy was used in the Canadian Boreal Forest Initiative. This initiative, announced in 2003, developed from discussions between representatives of First Nations, industry, and conservation organizations. Canadian government decisions are required to implement the initiative but neither provincial nor federal cabinet officials have developed policy or strategy to implement the initiative.

The Canadian Boreal forest ecosystem is defined in this initiative to include all subdivisions of the coniferous forest, including mixed forest/agricultural conversion areas in the south and taiga/barren ground transition areas to the North, encompassing in total approximately 530 million hectares (1.3 billion acres). Key values in designing protected areas will include: intactness, old growth/late seral state forest, connectivity, water and wetlands values, rare ecosystem types, and focal species' core habitat).

The Canadian Forest Conservation Goal is:

...to conserve the cultural, sustainable economic and national values of the entire Canadian boreal region by employing the principles of conservation biology to protect at least 50% of the region in a network of large interconnected protected areas, and support sustainable communities, world-leading ecosystem-based resource management practices and state-of-the-art stewardship practices in the remaining landscape. The Framework represents a national vision and goal for the region as a whole, rather than a formula to be applied on a unit-by-unit basis in a particular part of the boreal. In promoting a conservation approach to the entire boreal, the Framework recognizes that conservation challenges and opportunities will vary (www.borealcanada.ca/reports/boreal-at-risk/).

In other words, the details are what will be most important in conserving biodiversity in the Canadian boreal forest. The problem with linking "sustainable development" with conservation is the contested meanings of "sustainable." Without sympathetic government participation, funding, and enforcement of regulations, it is most probable that this boreal forest initiative will be diluted by corporations and remain rhetoric rather than program. The initiative is in response to a study in 1999 by the Canadian Senate Committee on Agriculture and Forestry subcommittee on Boreal Forests. The Committee published a report "Boreal Forests at Risk." Four years later the Committee commissioned research on the issues addressed in the original report. The researchers concluded that "little progress" had been made by 2003 on sustainable economic development or wildlife and habitat conservation.¹¹

Given the conflicting definitions of "sustainable development" and the unwillingness of many governments and private landowners to commit large areas for wildlife conservation, a consensus initiative by all stakeholders is unlikely to protect biodiversity at the landscape level over the long-term, the next hundred years.

Legislative Proposals for Protection of Biodiversity "Hotspots"

After reviewing current international conventions on biodiversity and national laws protecting biodiversity, Kunich concludes that none of the existing legislation or treaties are adequate to deal with protecting biodiversity during the current mass extinction because the laws and conventions include mostly rhetoric and discretionary statements, such as "where feasible" and "if decided by the nation" and lack enforcement powers or incentives to protect biodiversity.

Kunich proposes that the United States enact a Vital Ecosystems Preservation Act (VEPA) under which a U.S. agency such as the EPA, would be the lead agency in providing incentives to players in the 17 nations where biodiversity "hotspots" are at the greatest risk.

Why the U.S. and not the UN? The U.S. is the world's superpower whose wealth has been, to a large extent, derived from exploiting natural resources around the world. It is a nation that has the institutional and financial capacity, if not currently the political will, to engage in this worldwide task. Bilateral agreements between the U.S. and specific nations containing some or all of the "black boxes" we are calling biodiversity "hotspots" could function much like bilateral agreements on airline access, free trade, and military with incentives and punishments to enforce provisions of VEPA (Kunich 2003, 190).

Efforts to conserve biodiversity are encouraged in areas where rapid social change is occurring. For example, California is experiencing rapid growth in population and consumption and strategies for conservation of biodiversity in that state must fit the social trends. The social trend in the central Great Plains region of North America provides opportunities for rewilding the 'buffalo commons,' short and long-grass prairies from southern Alberta to northern Texas. Farmers and ranchers are leaving the land. Depopulation is occurring because unsuitable settlement patterns during the 19th century led to one of the most degraded ecosystems in North America. Changing economics of cattle grazing, changing values, and new perspectives on the grasslands based on principles of conservation biology as well as federal regulations protecting 'potholes,' which are areas in the prairies that attract migrating birds, are changing large parts of the long and short grass prairies. Ted Turner, land owner, has turned large portions of his nearly one million acres in Montana, Wyoming, Colorado, and New Mexico, into buffalo grazing lands. In the "buffalo commons" fences are coming down and some Indian tribes, based on their historic economic and spiritual connection with buffalo have taken the lead in rewilding

areas of the 'buffalo commons' (*New York Times* 2003; Popper 1999; Moore 2003; Callenbach 1996). Courage, investment, optimism, hope, and belief in the future are requirements for this and other rewilding projects.

Even when areas are protected by law or international treaties, they need sensitive management. They require strongly stated regulations and enforcement of regulations to reduce poaching and encroachment by settlers, loggers, and other extractive enterprises. Marine reserves, including reserves of coral reefs, need protection from eager ecotourists as well as industrial fishing. Adequate financial support for management of reserves is essential. Local support by citizens for the reserves will reduce conflicts over management of reserves. Ethics of respect for wildlife and preservation of wildlands and wildlife by local and national communities must be preached by religious leaders and taught in schools. Mass media must also make the case for a land ethic more regularly, more broadly, and more deeply. At present, for example, 'wildlife' stories appearing on TV in the U.S. are relegated to the Discovery channel, Animal channel, and National Geographic cable channel. When a major conservation group publishes a report or when massive wildfires consume forests near major urban areas (such as the southern California wildfires during the summer of 2003) then the story will appear briefly as a major news story but rarely do news media follow through with continuing coverage nor do they explore deeper questions of new visions of humans dwelling in specific landscapes.

Frequently, national governments, and sometimes state governments, within certain nations, find it easier and more productive to work on conservation projects with non-governmental organizations such as Conservation International and the World Wildlife Fund, than to work on such projects on a government to government basis. Sometimes governments have a political agenda that is very different from the primary conservation objective of a specific project. For example the Bush administration has consistently linked foreign aid given to certain national governments with those governments' commitment to the Bush administration agenda of free trade, on terms dictated by the Bush administration, or support by specific national governments for Bush's "coalition of the willing" who seek "regime change" for specific nations as specified by the Bush administration.

An example of direct contractual agreements between a national government and an NGO is Guyana, where Conservation International (CI) bought timber leases for the purpose of preservation of rainforests. The process and outcome is described by E.O. Wilson (2002, 173):

The first conservation concession was obtained in 2000 by Conservation International (CI) from

Guyana, a small former British colony on the north coast of South America. Guyana's chief asset, and a source of national pride, is its interior wilderness of mostly pristine rainforest. For an application fee of \$20,000 USD and fifteen cents an acre annually, CI leased a 200,000 acre tract in the remote southeastern corner of the country. CI put up additional funds for management of the property as a nature reserve. The period is for three years, during which both parties will negotiate the rate for a subsequent twenty-five-year period. Amerindians in the area will be allowed to continue hunting, fishing, and conducting small-scale agriculture at the level they have practiced for thousands of years.

Guyana draws multiple benefits from the arrangement. It makes at least as much money as it would from a timber lease. It does so while holding on to its beautiful natural environment. And it has time to find noninvasive ways to produce still more income, including tourism, prospecting for useful plant products, and sustainable harvesting of plant material for medicinal use. With intact forests it may also someday enjoy the opportunity to sell carbon sequestration credits, an arrangement set forth by the Kyoto Climate Protocol as one device to reduce carbon dioxide and other greenhouse gases in the planet's atmosphere. In the arrangement, poor countries can receive money for merely saving their forests.

Another example of agreements between a national government and NGOs is Gabon, a country in equatorial Africa. Maps reveal that most of the land area in that nation is devoted to concessions for logging. However in the early 1990s, National Geographic Society sponsored a team to document remaining wildlands. Based on this documentation, a coalition led by Wildlife Conservation society proposed a system of 13 new parks protecting 11,294 square miles, representing the ecosystems of the nation from coastal-marine to upland-interior forests.

The government accepted the proposal and proclaimed the park system. Funding for administration, scientific research, buffer zones where some traditional bushmeat collecting and other traditional activities are permitted, and demarcation of boundaries is required (*National Geographic* 1995; Romero and Andrade 2004).

A transnational example of conservation in Africa is the agreement between Zimbabwe, South Africa and Mozambique to incorporate three national parks into the world's largest wildlife park — the Great Limpopo Transfrontier Park. The park is financed by a \$42 million USD grant from Germany, South Africa, the U.S. and the World Bank. The

park will cover 13,500 square miles. However, Mozambique must decide how to approach the estimated 26,000 people living in the Mozambique portion of the park. Most of the current residents, mostly corn farmers, can probably continue to live within the park boundaries (LaFraniere 2003).

Some nations have developed a conservation ethic, a culture of conservation that continues generation after generation regardless of the political regime in power at any given period. Costa Rica is one such nation. It disbanded its' army during the 1940s and invested in conservation, education, and public service. During the past 50 years Costa Rica has continued to expand its system of national parks and nature reserves (Evans 1999).

Conservation projects initiated by individuals have continued for at least a century in the United States. The Rockefeller family, for example, bought land that was incorporated into Arcadia National Park and Grand Teton National Park. More recently, the David and Lucile Packard Foundation, the Weeden Foundation, Ted Turner, Paul Allen and Doug Tompkins have been major American contributors to wildlands philanthropy.

Doug Tompkins turned most of his fortune from selling the Esprit Corporation into foundations dedicated to conserving landscapes in Chile and Argentina. One of these projects, Parque Pumalin, in southern Chile, cost Tompkins approximately \$30 million USD and covers 738,000 acres of forest and snowfields stretching from the ocean to the crest of the Andes. In 2003, it was officially declared a nature sanctuary and handed over to a seven-member Chilean directorate (Porteous 2003).

Writing about the value, to the philanthropist, of conserving lands from industrial development, Tompkins (1998, 18) concluded,

Wildlands philanthropists can at least see something positive for their efforts essentially immediately — they can see a particular place, maybe a place they know and love, saved from destruction. And such efforts, if for no other reason than they may alleviate our own sorrows over the extinction crisis, give reason to feel hopeful. It may be a sorry excuse for socially righteous gestures to redress the ills of our culture, but that shows us truly how far we have fallen. Perhaps, human culture may someday, by chance or by force of disaster, come around to a new way of viewing the world in which abundance and diversity, love and compassion, equity and reverence for all life become the guiding principles of human society and evolution may flourish again; when our efforts in wildlands philanthropy will have prescient and valuable. It seems like it's a

smart enough and safe course, conservative and not irreversible. I hope this growth in wildlands philanthropy will increase — let's encourage it at every turn.

Tompkins and his wife, Kris McDivitt Tompkins, through the organization that Kris Tompkins established in 2000, Conservacion Patagonica, have 11 projects, totaling several million hectares, in Patagonia and other regions of Argentina. Tompkins' intent in buying large properties in Argentina, is to transform former sheep and cattle ranches into wildlife habitat. Some of the projects they have developed in Chile and Argentina have been transferred to the administration of the national government in those nations as national parks or nature reserves.¹²

How much will it cost to protect the world's biodiversity "hotspots"? E.O. Wilson (2002, 182) suggests about \$28 billion. However, that figure is small in comparison to other expenditures. For example the U.S. Congress appropriated over \$80 billion in 2003 for the reconstruction of infrastructure of Iraq, which was destroyed during the U.S. invasion of Iraq. The Bush administration energy bill proposes over \$20 billion USD just in subsidies and tax breaks to energy corporations if they agree to develop oil, gas and coal in wildlands of the U.S. The U.S. 2004 Federal budget appropriations bill includes \$50 million USD to build an indoor 'rainforest' in Iowa. For \$50 million USD we could buy a rainforest in South America or Indonesia.¹³

One report on wilderness and biodiversity conservation concludes that conservation of high-biodiversity wilderness areas will be relatively inexpensive, maybe \$10 USD per hectare. "Conservation of the remaining wild half of the planet, through an integrated strategy of protection, zoning, and carefully implemented best practices in industry and agriculture, would be a strikingly good bargain" (Mittermeier et al. 2003).

The Role of Corporations in Conservation Projects

Some economists have tried to estimate in monetary terms the free services that nature provides to humans. Such exercises are thought experiments, but economists conclude that nature provides somewhere in the trillions of dollars a year in clean air, water supply, soil, reproduction of forests and other services (Wilson 2002, 103-128).

Corporations are, and most likely will continue to be major players in conservation projects. Multinational corporations, such as ChevronMobil, operate in over a hundred nations. Many corporations listed in the Fortune 500 have greater wealth than most of the national governments who are

members of the UN. Corporations, with blessings and subsidies from governments, are actively drilling oil and gas and mining coal in unprotected wildlands in many regions of the earth and extracting timber from primary forests around the world.

Corporations who seek to promote a 'green' image sometimes engage in public relations campaigns projecting their conservation efforts. Environmentalists have called these campaigns 'green washing.' If, as some critics assert, corporations rule the world, then other players in conservation must negotiate directly with corporations on specific conservation issues. Some proponents of 'sustainable' corporations argue that corporations can follow the 'natural way' and internalize the pollution and destruction of habitat of native species. Others argue that by their very structure and legal organization corporations cannot promote the general welfare or promote significant protection of the earth's remaining wild place or promote restoration of areas damaged by activities of corporations including mining sites, forests that have been clearcut, areas polluted by oil and gas and coal development projects (Mander 1992).

Instead of investing in protection of biodiversity, many corporations invest in greenwashing. Greenwashing is defined as "...the phenomenon of socially and environmentally destructive corporations attempting to preserve and expand their markets by posing as friends of the environment and leaders in the struggle to eradicate poverty..." (Bruno and Karlner 2002, 14). Public relations departments of major energy corporations can "greenwash" both their products and their policies.

Furthermore, large corporations spend millions of dollars lobbying for their economic interests in state and federal agencies and legislatures and at international conferences. For example, in the U.S., representatives of major energy corporations met with Vice President Cheney in private meetings to develop the Bush administration energy policies. As of January, 2004, the Bush administration, under the guise of "executive privilege" has refused to release both the names of the corporations and the substance of discussions, which excluded conservation groups and led to the Bush administration energy policies. These corporate designed policies provide access to millions of acres of undeveloped Federal lands, including wildlands and protected reserves such as the Arctic Wildlife Refuge. Provisions favoring energy development corporations were incorporated in an energy development Act, passed by the U.S. House of Representatives in 2003. Many observers concluded that this legislation is basically a subsidy to huge energy corporations.

The power of the World Trade Organization (WTO) to override national and international conservation laws and regulations as impediments to free trade shows that local gov-

ernments, including states in the U.S., as well as national governments, are losing their authority to protect not only conservation areas and endangered species, but also the health and safety of their own citizens.

The 'common ground' strategy, discussed previously in this paper, allows participants to find common values and agreements and argue over points of difference. When participating in 'common grounds' negotiations, conservation groups frequently accept what they can get from corporations and government, hoping for better solutions in the future. However, compromises made by conservation groups are frequently irreversible. That is, endangered species can become extinct under the compromise agreement and the landscape under discussion can be dramatically altered by human activities for a minimum of 100 years. Examples of political compromises and their consequences are found in the history of the Sierra Club. John Muir, leader of the Sierra Club when it was established in 1892, had to go outside the Sierra Club to find supporters in his no compromise stance against building a dam at Hetch Hetchy in Yosemite National Park. His disciple, David Brower, executive director of the Sierra Club during the 1950s, claims that he could have stopped the building of the Glen Canyon dam on the Colorado River, when Congress was voting on the Colorado River compact during the 1950s, but the Executive Committee of the Sierra Club, according to Brower, was willing to compromise and allow one big dam on the lower Colorado River even when they had the political power to stop the dam at that time. During the 1960s, the Sierra Club was embroiled in the battle over building nuclear fueled power generating facilities along the California coast. Instead of taking an uncompromising position, the Board of the Sierra Club compromised by agreeing that one proposed site for a nuclear reactor, the Nipomo Dunes, should be established as a state park and another site, Diablo Canyon, could be the site for a nuclear reactor on the coast. It was later revealed that the nuclear reactor on that site was built on an earthquake fault and the costs of decommissioning the nuclear reactor could be more than the costs of building the reactor and the electricity generated from the site over the projected lifetime of the reactor. Indeed, ratepayers are not only paying for electricity generated from the reactor but also paying for decommissioning the reactor.¹⁴

More recently, from 1999 to 2004, the California Wilderness Coalition began with a seven million acre inventory of unprotected roadless areas, wildlands, on Federal lands in California. Before any legislation was introduced protecting these areas as federally designated wilderness, the groups decided to compromise on an approximately three million acre bill. These conservationists argued that asking Congress to include all inventoried roadless areas in the National Wilderness Preservation System was 'unrealistic.'

These same conservationists then compromised the three million acre bill before it was even introduced in Congress because, they argued, a specific Senator would not support a 'large' bill. Major conservation groups in California lobbied their members to support the 'small' Wilderness bill even though the original 'small' bill had been further reduced to smaller bills by the end of 2003. The small Wilderness bill is currently being further diluted by conservationists working with specific Senators and Representatives.¹⁵

The campaigns, during the 1960s and 1970s, to create a Redwood National Park from privately owned lands located in Humboldt and Del Norte counties, California, also are examples of political compromise based on 'political realism' rather than ecological integrity. The original Redwood National Park idea included a ridge to ridge or watershed approach to conservation. The 1968 compromise bill approved by the U.S. Congress created a coastal park with a narrow corridor to the spectacular 'Tall Trees' grove eight miles from the mouth of Redwood Creek. A new coalition of conservationists worked for a decade to obtain Congress's approval for an enlarged national park in Redwood Creek ridge to ridge. In 1979, the second Redwood Park Act included within park boundaries massive clearcuts, eroding logging roads and silted streams. The healing of Redwood Creek required millions of dollars of 'restoration' work and a national park that contains mostly regrowth forest.

In many regions of the earth, after the battle is over, conservationists are left with plantations of tree farms. For example, the World Wildlife Federation (WWF) was a lead partner in buying, at an auction for \$7.5 million USD, 147,500 acres of temperate rainforest in the Valdivian Coastal Range in southern Chile. The land was acquired from a bank holding the debt of a bankrupt logging corporation. While the purchase included primary, non-logged temperate rainforest,

The property contains 3,600ha of non-native eucalyptus trees and 1,600ha of land that was previously clear-cut for another eucalyptus plantation. The (Nature) Conservancy, WWF, and local partners in Chile will harvest the eucalyptus in an environmentally responsible manner and restore the entire 5,200ha to native forest (WWF 2003).

The positive view of Redwood National Park is that private, corporate timberlands were transferred to protected status under the administration of the National Park Service and that the Federal government will be responsible for 'rewilding' lands damaged by corporate greed. The positive view of the WWF land acquisition of the land in Valdivian Coastal Range is that the land will be eventually transferred to Chilean conservation groups who will be responsible for preservation and rewilding the Valdivian Coastal Range.

However, rewilding of deforested areas may take longer than 100 years, and we have few examples of conservation groups that have maintained themselves and their management role in specific areas for that period of time.

Conclusion

The basic intent of this paper is to urge us citizens of all nations, private conservation organizations, conservation agencies of state and national governments, and politicians, to put conservation of biodiversity on the radar screen for immediate attention. We know, from other issues such the AIDS pandemic, that patterns of behavior can change within a few years. During the first stage of the AIDS pandemic, during the 1980s, many people, including government officials, blamed the victims and engaged in denial. In the second stage, scientists mobilized to find the cause of AIDS. In the third stage, organizations began to help some of the victims. By 2004, the AIDS pandemic was an official priority of most governments of nations where AIDS had reached pandemic proportions. Even the Bush administration, after several years of denial and victim-blaming, funded an AIDS initiative for some nations in Africa and the Caribbean, even though the Bush administration placed its own political agenda as a burden on victims and governments receiving U.S. aid to fight AIDS.

When governments and citizens and voluntary groups get out of the denial and victim-blaming stage ("all species become extinct anyway so why worry?") then we can have a rational discussion about the allocation of scarce dollars and best option strategies in specific situations in specific biodiversity hotspots. As philosopher Arne Naess concludes, if we work diligently and wisely on the long front of conservation during the 21st century, we can be hopeful and optimistic for conditions on Earth during the 22nd century.

Endnotes

1. Author to whom correspondence should be directed:
E-mail: bdevall@northcoast.com
2. The scientific, social, ethical and legal definitions of wildlands and Wilderness have expanded beyond the American roots of Wilderness protection. Historian Roderick Nash (1982) provides an extensive history of American ideas of Wilderness. Some intellectuals in developing nations place a higher priority on social justice than on preservation of species diversity and protection of habitat of threatened or endangered species. For critical evaluation of Americans concepts of designated Wilderness areas see Rothenberg and Ulvaeus 2001.
3. See www.redlist.org.
4. Appendices to this article include various 'platforms' of deep ecology that form the philosophical and activist basis of the argument presented in this article. A recent Manifesto for Earth based on princi-

ples of ecocentrism was published in the quarterly journal, *Biodiversity* 5, 1, 3-9, January/March 2004. This Manifesto can be downloaded from www.ecospheric.net/pages/EarthManifesto.pdf.

5. Brower's concern with the impacts of human population growth and growth in consumption was also included in his plea for CPR for the planet, Conservation, Preservation, Restoration. The Galapagos Islands themselves, the poster children of evolution, natural history, and conservation of biodiversity, are more threatened by human invasion in 2004 than they were in 1968 when Brower pled for their preservation. In an e-mail to his supporters, sent on February 25, 2004, Captain Paul Watson of the Sea Shepherd Society, documented the plight of the Galapagos National Park.

My ship, the Farley Mowat, has now completed drydocking work and we must head to the Galapagos where angry fishermen are at this moment obstructing entrance to the National Park offices and the offices of the Darwin Research Center demanding to be allowed to set long lines in the Galapagos National Park Reserve. My prediction is that they will be allowed to do so because the population is doubling on the Galapagos every 11 years and the original allotment of 2.5% of the Park land for human settlement has already been illegally ignored. The wonderfully pristine, diverse and profoundly unique ecological system of the Galapagos is being destroyed by out of control human migration from mainland Ecuador and this is a microcosmic example of what is happening to the planet as a whole. During the last 10 years, the human population has exceeded the tortoise population and these wonderful animals are now less than 15,000, diminished from the original estimated 250,000 tortoises at the time of Charles Darwin's arrival. All of the debate in the world cannot deny the very real impact that migration is contributing to the death of the Galapagos ecosystem. I am watching it die before my eyes and that is what motivates my passion for this issue and no human politicking is going to change my opinion about this.

The World Wildlife Fund responded to this crisis by pleading with the Ecuadorian government to find a peaceful solution but not to weaken any regulations protecting the marine reserve surrounding the Galapagos Islands National Park. www.worldwildlife.org/galapagos/ February 27, 2004).

The Darwin Research Station is responding to the crisis of rapidly increasing human population on the Galapagos by encouraging environmental education in the schools on the islands. However, with the current rate of human population growth on the islands and the rate of decline of rare and endangered species, much of the native biodiversity will be lost forever by the time children are ready to become stewards of the Galapagos. The Charles Darwin Foundation and the World Wildlife Fund also published *A Biodiversity Vision for the Galapagos Islands*. This is considered the most comprehensive, current biological assessment of the islands.

6. For analysis of the World Charter see Wood 1985. The United Nations World Charter for Nature emphasizes utility for humanity as the chief reason for Earth care. <http://www.oceanlaw.net/texts/wcharter.htm>. A citizens' initiative, the Earth Charter, was released in March, 2000. Ecocentric goals, "Respect and Care for the Communi-

ty of Life" and "Ecological Integrity" are placed before explicit humanistic goals. <http://www.earthcharter.org>.

7. For PDF files and website see <http://www.biodiv.org/>. For extensive critique of the Convention on Biological Diversity, see Kunich 2003, 45-50. For extensive documentation on the inter-governmental meetings on implementing the Convention on Biodiversity based on the slogan "sustainable ecosystems," held in Malaysia, February 2004, see www.iucn.org.
8. The late David Brower, a great conservationist, once wrote, "Condors are 5% feather and bone, and 95% place." Brower opposed the capture and recovery program for condors because he said the program failed to address the underlying causes of decline of population of condors, namely industrial practices in California, rapid population growth in California, and rapid consumption increases, including massive suburban housing developments, to serve the rapidly growing population of humans.

Heroic efforts to save the California condor and return it to its natural habitat began in California in 1984 when all condors, less than 30, were captured and placed in a captive breeding program at the San Diego zoo. Twenty years later, condors have been released, and successfully reproduced, in California and Arizona. However, released condors continue to die after drinking industrial waste water and to be killed deliberately by humans (Glater 2003; McHugh 2003).

In 2003, The California Department of Fish and Game published an Atlas of the Biodiversity of California. On the three criteria of biodiversity, richness, rarity, and endemism, California ranks number one among all U.S. states on richness and endemism and number two on rarity. The authors of the Atlas conclude that:

Because California is also a great place for human life, it is home to the largest population of people in the country with the highest projected growth rates into the future. The human demands for the land, water, and natural resources that make life so abundant in California present the greatest threats to its unique plants and animals. California leads the nation in number of rare species within a state, and nearly one third of its species are identified as at risk in the United States. Our challenge is to meet the needs of society while maintaining the state's remarkable biodiversity for future generations (California Department of Fish and Game 2003, 2).

Although population growth and thus growing use of land for cities, drawing water from limited water supplies, and rising energy needs, are the driving forces of the decline of endemic species, no recommendations are made in this document concerning population and immigration although immigration, much of it illegal, is the leading cause of rapid population growth in California.

Massive wildfires in the urban/wildlands interface areas of southern California during the Fall, 2003, have been extensively documented as well as wildfires in urban/wildlands interface regions in Australia and in the Brazilian and Indonesia forests. Wildfire is one of the most dynamic factors in forest and prairie ecosystems. In many of the biodiversity "hotspot" regions of the Earth, return to natural, historic wildfire regimes and ending massive deforestation caused by clearcutting primary forests are twin goals of long-range conservation of biodiversity.

- Only one of the biodiversity “hotspots” identified by Kunich (2003) is located in North America, the “California Floristic Province,” comprising the Sierra mountains of California and sonoran desert region of California, Arizona, and northern Mexico.
9. Other case studies of community based conservation of biodiversity are summarized on the Community Conservation, Inc. website (www.communityconservation.org).
 10. Extensive articles and proposals for regional conservation in the Klamath-Siskiyou were published in a special issue of *Natural Areas Journal* 19, 4 October, 1999. This special issue was published before the Biscuit wildfire, which was the largest wildfire in 100 years in southwestern Oregon. After that wildfire, debate focused on logging “salvage sales” of partly burned trees in the forest. The U.S. Forest Service intends to log what they call “salvage” timber before scientists have time to evaluate the impact of the Biscuit fire on the whole region. Professional papers have been written but not yet published, for example an overview of wildfire in the burned region by Odion et al., *Patterns of Fire Severity and Forest Conditions in the Western Klamath Mountains, Northwestern California, USA*, is available from Odion Consulting, 670 Morton St. Ashland, OR 97520.
 11. See www.borealcanada.ca/reports/boreal-at-risk/.
 12. See www.conservacionpatagonica.org.
 13. U.S. Congress appropriations fact from Senator John McCain, in a speech on the floor of US Senate.
 14. Oral history accounts of the internal struggle in the Sierra Club over nuclear reactors can be found in the University of California oral history library. For example, see David Brower’s oral history. He was executive director of the Sierra Club during the early 1960s and led the opposition to siting massive nuclear reactors along the California coast.
 15. Documentation in notes and memos from California Wilderness Coalition.
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Appendix

'Platform' of Deep Ecology by Arne Naess and George Sessions (1985)

1. The well-being and flourishing of human and nonhuman Life on Earth have value in themselves (synonyms: intrinsic value, inherent value). These values are independent of the usefulness of the non-human world for human purposes.
2. Richness and diversity of life forms contribute to the realization of these values and are also values in themselves.
3. Humans have no right to reduce this richness and diversity except to satisfy vital needs.
4. The flourishing of human life and cultures is compatible with a substantial decrease of the human population. The flourishing of nonhuman life requires such a decrease.
5. Present human interference with the nonhuman world is excessive, and the situation is rapidly worsening.
6. Policies must therefore be changed. Those policies affect basic economic, technological, and ideological structures. The resulting state of affairs will be deeply different from the present.
7. The ideological change is mainly that of appreciating life quality (dwelling in situations of inherent value) rather than adhering to an increasingly higher standard of living. There will be a profound awareness of the difference between big and great.
8. Those who subscribe to the foregoing points have an obligation directly or indirectly to try to implement the necessary changes (Devall and Sessions 1985, 70).

'Platform' of Deep Ecology articulated by Alan Drengson (2000)

1. Each living creature has its own intrinsic worth.
2. The diversity and richness of life has intrinsic value.
3. Except to satisfy vital human needs, humans have no right to reduce this diversity and richness.
4. It would be better for humans if there were fewer of them, and much better for other living creatures.
5. Today the extent and nature of human interference in the various ecosystems is not sustainable, and unsustainability is rising.

6. Decisive improvement requires considerable change: social, economic, technological and ideological.
7. An ideological change entails seeking a better quality of life rather than a raised standard of living.
8. Those who accept these points are responsible for trying to contribute directly or indirectly to the necessary changes (The Ecostery Foundation of North America).

Propositions Proposed by Kunich that are Supported by Credible Scientific Evidence

1. The world is in the midst of an extinction crisis comparable to the most devastating epochs in the history of the planet.
2. Millions, perhaps many millions, of species currently live or die, thrive or go extinct, without ever being identified or named, let alone studied and understood, by human beings.
3. People — especially, in modern times, Americans — have derived enormous benefits, both tangible and intangible, from many of the species known to exist, and those species may yield more benefits in the future.
4. The species still unknown to humankind very probably hold the potential for similarly immense value.
5. Many species, known and unknown to humans, have great ecological significance to other species and to their ecosystems, apart from their direct utility for people (Kunich 2003, 198-199).

‘Platform’ of the Deep, Long-Range Ecology Movement as revised by Fredric Bender (2003)

1. Everything on earth is both interdependent and transcendent.
2. Each species’ self-realization requires and contributes to that of all others.
3. Nonhumans do not exist for humans’ sake.
4. Continued evolution without catastrophic setback requires the preservation of biodiversity, especially at the

genetic and ecosystemic levels.

5. Other things being equal, human action is justifiable when it tends to preserve the integrity, stability, and complexity of the biotic community; it is wrong when it tends otherwise.
6. Present human interference with the nonhuman world is excessive and rapidly worsening.
7. Significant reduction of human impact requires first doing no further harm, then protecting and restoring biodiversity, wildness, and evolution.
8. Deep ecology supporters encourage the deep questioning of human happiness, progress, and technology as commonly defined. The necessary changes include deliberately and humanely lowering the human population, re-designing the global economy, adopting low-impact technology, and changing personal lifestyles as required for ecological sustainability.
9. Ecological sustainability also requires peace and justice throughout the world, and recognition that quality-of-life is about more than material standard of living. Especially in the poorest countries, social justice and long-term ecological sustainability are equally necessary, if people’s material, self-preservation, rootedness, and spiritual-growth needs are to be met.
10. Those who subscribe to these points have an obligation directly or indirectly to try to carry out the necessary changes. Though the platform’s applications vary considerably, in general deep ecology supporters work for local self-sufficiency and autonomous cooperation, and against centralization of power, exploitation of the weak, and corporate-controlled economic globalization.

“The platform, in short, poses a counteroffer to the culture of extinction, outlining numerous possibilities for engagement for those who take nondualism, ecology, ecocide, or overshoot seriously. Thus, deep ecology is potentially a solution, not only to ecocide, but to nihilism” (Bender 2003, 448-449).