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The Planetary Trust: Conservation and Intergenerational Equity

by Edith Brown Weiss†

Man inhabits two worlds. One is the natural world of plants and animals, of soils and airs and waters which preceded him by billions of years and of which he is a part. The other is the world of social institutions and artifacts he builds for himself, using his tools and engines, his science and his dreams to fashion an environment obedient to human purpose and direction.¹

INTRODUCTION

The human species passes a global natural and cultural heritage from generation to generation. The natural heritage includes the atmosphere, the oceans, plant and animal life, water, soils, and other natural resources, both renewable and exhaustible. It is a physical system, with its own set of relationships and its own stability. Our cultural heritage includes the intellectual, artistic, social, and historical record of mankind. For the last several centuries, the Western world has assumed that the future would be better than the present.² Recently,

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1. B. WARD & R. DUBOS, ONLY ONE EARTH 1 (1972).

2. The emergence in modern western societies of a generalized belief in progress reflects the influence of Judeo-Christian religious beliefs and the emergence of science as a social institution. In the seventeenth century, Galileo and Newton demonstrated that nature was governed by universal natural laws, which could be observed, measured, and ultimately utilized to domesticate and reform the physical environment. Success in the physical sciences gradually gave rise to expectations that the scientific method could be applied to the organization of human society and the perfection of human conduct. *See, e.g.*, D. DIDEROT, *ENCYCLOPEDIA* (1751-1765); ADAM SMITH, *WEALTH OF NATIONS* (1776) (containing a his-

however, we have become aware of important challenges to our stewardship of the global heritage. This awareness has led many to question and reexamine the assumption of perpetual progress and with it their responsibility to future generations.

If we place human history in spatial and temporal perspective, the fragility of our global heritage becomes apparent. The planet Earth is a small, and as far as we know, unique planet in a large universe. It is also a relatively new planet. The Earth is believed to be only 4 billion years old; multicellular life, only 1 billion years old.³ Three times in the past 570 million years, large groups of species have suddenly become extinct, for reasons which we do not understand.⁴ The most recent such change, 65 million years ago, was the extinction of the dinosaurs, which had ruled the Earth for almost 160 million years.

Compared to the tenure of the dinosaurs, the entire record of humanity is still but a brief interlude in the history of the Earth. The early human species goes back 3 million years, and cities and agricultural settlements only 10,000 years. The modern era of machines, coal and steam dates back only about 600 years, and present rapid transformation of our planet began but 40 years ago.⁵ Technological and social change on our planet continues to accelerate rapidly.

In the midst of these rapid changes there are important new challenges facing our global heritage today. These challenges include the unparalleled destructiveness of modern war, which forces us to limit the competitive nature of our societies;⁶ population growth and its at-

tory of the gradual economic progress of society and suggesting the hope of an infinite increase in wealth and well-being).

In the nineteenth century, such diverse thinkers as Karl Marx, Auguste Comte, and John Stuart Mill argued for replacement of theological and metaphysical approaches to social and economic problems with scientific or empirical modes of analysis. See generally K. MARX, *CAPITAL* (S. Engels ed., S. Moore trans. 1978 ed.); A. COMTE, *AUGUSTE COMTE AND POSITIVISM: THE ESSENTIAL WRITINGS* (1975); J.S. MILL, *UTILITARIANISM* (O. Priest ed. 1957).

In our own century, two World Wars and the problems of malnutrition, racism and environmental despoliation have shaken our belief that progress is inevitable. The concept of progress still has considerable strength as an ideal, however, prodding people to reexamine their social, political and economic institutions. For an analysis of the concept of progress and its origins, see J. BURY, *THE IDEA OF PROGRESS* (1932). See also Speth, *The Federal Role in Technology Assessment and Control* in *FEDERAL ENVIRONMENTAL LAW* 422-24 (E. Dolgin & T. Guilbert eds. 1974) (discussing the link between technology and progress).

3. Platt, *The Greatest Evolutionary Jump in History* in *THROUGH THE '80s* 10-13 (F. Feather ed. 1980).

4. Wash. Post, May 10, 1983, at A10, col. 4.

5. Platt, *supra* note 3, at 12-13.

6. Some have argued that, in general, mankind has always been competitive. T. HOBES, *LEVIATHAN* 106-07 (The Library of Liberal Arts No. 69, 1958). Wars have existed since the beginning of recorded history. In the nuclear era, however, war has taken on a new significance because the next one may destroy all the inhabitants of the planet. J. SCHELL, *THE FATE OF THE EARTH* 3-6 (1982).

tendant demands on our natural resources and our ecological heritage;⁷ scientific and technological advances, which enable us to understand our natural heritage and to alter it profoundly on a massive scale;⁸ and increasingly vocal demands for minimum standards of living and for redistribution of wealth.⁹ Moreover, we have seen a massive and steady increase in the volume of toxic chemicals released into the environment,¹⁰ widespread deforestation and degradation of soils, increasing rates of extinction of species,¹¹ and the emergence of the capacity to trigger global changes in climate¹² as inadvertent impacts of our daily activities. While the human species has always had the ability to harm its local environment, sometimes in devastating ways, we have never

7. See generally P. EHRLICH, *THE POPULATION BOMB* (rev. ed. 1971); L. BROWN, *BUILDING A SUSTAINABLE SOCIETY* (1981); R. FALK, *THIS ENDANGERED PLANET* (1972).

8. See generally H. SPROUT & M. SPROUT, *TOWARD A POLITICS OF THE PLANET EARTH* 209-43 (1972); R. FALK, *supra* note 7, at 68-75, 80-83. For a general overview of the accelerating rate of change of our environment, see *THE WORLD ENVIRONMENT 1972-1982* (M. Holdgate, M. Kassas & G. White eds. 1982) [hereinafter cited as *THE WORLD ENVIRONMENT*].

9. In response to these demands, the United Nations General Assembly's Sixth Special Session on May 1, 1974, adopted the Declaration on the Establishment of a New International Economic Order, G.A. Res. 3201(S-VI) 6th Special Session U.N. GAOR Supp. (No. 1) at 3, U.N. Doc. A/9559 (1954), and the Programme of Action on the Establishment of a New International Economic Order, G.A. Res. 3202(S-VI) 6th Special Session U.N. GAOR Supp. (No. 1) at 5, U.N. Doc. A/9559 (1954). In late 1974, the General Assembly adopted the Charter of Economic Rights and Duties of States, governing economic relations between the "haves" and the "have-nots." G.A. Res. 3281, 29 U.N. GAOR Supp. (No. 31) at 50, U.N. Doc. A/9631 (1975), reprinted in 14 I.L.M. 251 (1975); See generally *REPORT OF THE INDEPENDENT COMMISSION ON INTERNATIONAL DEVELOPMENT ISSUES, NORTH-SOUTH: A PROGRAM FOR SURVIVAL* (1980) (commonly referred to as *The Brandt Commission Report*); R. MEAGHER, *AN INTERNATIONAL REDISTRIBUTION OF WEALTH AND POWER, A STUDY OF THE CHARTER OF ECONOMIC RIGHTS AND DUTIES OF STATES* (1979) (for analyses of developing countries' demands).

10. See *THE WORLD ENVIRONMENT*, *supra* note 8, at 372-86; CONSERVATION FOUNDATION, *STATE OF THE ENVIRONMENT 1982* 145-51 (1982). See also, *WEAPONS OF MASS DESTRUCTION AND THE ENVIRONMENT*, Stockholm International Peace Research Institute (SIPRI) (1977) (documenting the increasing stockpiles of chemical weapons and the harmful latent effects of chemical weapons such as Agent Orange).

11. See U.S. DEPT. OF STATE, *1981 PROCEEDINGS OF THE U.S. STRATEGY CONFERENCE ON BIOLOGICAL DIVERSITY* (1982). See also *Problems of the Human Environment: Report of the Secretary General*, United Nations, May 26, 1969, Economic and Social Council, 47th Session, Agenda Item 10, para. 48, quoted in H. SPROUT & M. SPROUT, *TOWARD A POLITICS OF PLANET EARTH* 422 (1971) (discussing the decline of marine species such as whales and seals); *THE WORLD ENVIRONMENT*, *supra* note 8, at 73-120 (detailing the state of the marine environment).

12. See, e.g., CLIMATE RESEARCH BOARD, NATIONAL RESEARCH COUNCIL & U.S. NATIONAL ACADEMY OF SCIENCES, *CARBON DIOXIDE AND CLIMATE: A SCIENTIFIC ASSESSMENT* (1979); CLIMATE RESEARCH BOARD, NATIONAL RESEARCH COUNCIL & U.S. NATIONAL ACADEMY OF SCIENCES, *CARBON DIOXIDE AND CLIMATE: A SECOND ASSESSMENT* (1982) (discussing the "greenhouse effect" caused by increased carbon dioxide levels in the atmosphere); Weiss, *A Resource Management Approach to Carbon Dioxide During the Century of Transition*, 10 DEN. J. INT'L L. & POL'Y 487 (1981) (discussing carbon dioxide management). See generally *THE WORLD ENVIRONMENT*, *supra* note 8, at 19-67.

before had the capacity to do so on a global scale, through so many means.

Our capacity to harm the environment globally forces us for the first time to be concerned at a global level with survival of the natural and cultural heritage that we pass to future generations. We have only begun to act on this concern. To date, our responses have been limited by a lack of appropriate conceptual and institutional tools.

This article suggests a normative framework which, if adopted and internalized by our political, economic, and social institutions, might enable them to serve as vehicles for ensuring that future generations will inherit their just share of our global heritage. Its thesis is that the human species holds the natural and cultural resources of the planet in trust for all generations of the human species.¹³ The article focuses on our duty towards the human species, for it is on this fiduciary duty that law and political institutions can be brought most readily to bear.¹⁴

13. This definition of our fiduciary duty is admittedly anthropocentric. It has been criticized as calling in its most extreme form for nature to be maintained only to the extent necessary to support continued human existence. See, e.g., W. BAXTER, *PEOPLE OR PENGUINS: THE CASE FOR OPTIMAL POLLUTION* 7 (1974). Others have criticized this attitude. See, e.g., Cobb, *The Population Explosion and the Rights of the Subhuman World*, in *DIMENSIONS OF THE ENVIRONMENTAL CRISIS* 21 (1971); D. EHRENFELD, *THE ARROGANCE OF HUMANISM* 177 (1978).

A more moderate view of our fiduciary duties recognizes that since we share our environment with all other living entities, a balancing process must occur. Kiss, *Protection of the Global Heritage*, 75 AM. SOC'Y INT'L L. PROC. 39-46 (1981). Cobb has found support for this view in The Old Testament:

Nature was not reduced simply to means. In that first chapter of Genesis, so fateful for the course of human events, God declares again and again that the subhuman world is good. He declares this quite without reference to man. Its goodness is intrinsic. It shares with man the status of creaturehood. It participates with him in witnessing to God's greatness. Thus man is freed to govern the world, but the world that he governs is not thereby reduced to mere means to his end.

Cobb, *supra*, at 26. See generally, Sagoff, *We Have Met the Enemy and He is Us or Conflict and Contradiction in Environmental Law*, 12 ENVTL. L. 283 (1982).

Laurence Tribe urges that we reject the idea that natural objects exist merely to serve our needs, and embrace a broader view of our relationship to nature. "To recognize that humanity is a part of nature and the natural order a constituent part of humanity is to acknowledge that something deeper and more complex than the customary polarities must be articulated and experienced if the immanent and the transcendent are somehow to be united." Tribe, *Ways Not to Think About Plastic Trees: New Foundations for Environmental Law*, 83 YALE L.J. 1315, 1340 (1974).

14. Some people contend that there is a special fiduciary relationship which is less anthropocentric and which is part of the planetary trust: a fiduciary obligation of the human species to other species of life on the planet. Natural resources "should be conserved because they exist and because this existence is itself but the present expression of a continuing historical process of immense antiquity and majesty." D. EHRENFELD, *supra* note 13, at 207-08 (discussing C. Elton's perspective on conservation). These two relationships, between generations of the human species and between human species and other species, represent the basic philosophical underpinnings of the conservation movement. If we were to postulate a fiduciary obligation to other species, it might form the basis of a separate trust, or be accommodated by extending the scope of the planetary trust outlined here. Stone proposes that natural items be given legal standing in courts to ensure their protection. Con-

This planetary trust obligates each generation to preserve the diversity of the resource base and to pass the planet to future generations in no worse condition than it receives it. Thus, the present generation serves both as a trustee for future generations and as a beneficiary of the trust.¹⁵ In fulfilling our role as planetary trustees, we can draw on the law of trusts, a body of distilled teachings concerning intergenerational cooperation and conflict, to help resolve the challenges confronting our global heritage.

I

A FIDUCIARY OBLIGATION TO FUTURE GENERATIONS

The essence of a trust is a fiduciary relationship. This relationship imposes on trustees a duty to act for the benefit of beneficiaries with respect to trust matters.¹⁶ Our fiduciary obligation as trustees of the

cerned citizens, acting as guardians, could bring suit in the name of the natural object when that object was threatened. C. STONE, *SHOULD TREES HAVE STANDING?* 17 (1974). See also *Sierra Club v. Morton*, 405 U.S. 727, 741 (1972) (Douglas, J., dissenting).

If, as St. Francis of Assisi believed, all forms of life are equal, why don't other species have an obligation to us? There are two possible responses to this argument. First, only human beings have developed the capacity to understand fully the interrelationship of the world around us. With this understanding comes the obligation to preserve all of nature. The second argument is more persuasive. While other species can threaten human beings, they do so only on an individual basis. Because only we have developed technology that can radically alter the environment, we are the only species which has the ability to threaten the existence of other species. This inequality between humans and other species creates an obligation to preserve other species.

Sometimes the fiduciary obligations to future generations and the fiduciary obligations to other species conflict. Under a fiduciary obligation to species, for example, we may be obliged to try to preserve all species. But a fiduciary obligation between generations would perhaps require us to preserve fewer species. See, e.g., *Hill v. Tennessee Valley Authority*, 437 U.S. 153 (1978) (strictly construing the Endangered Species Act of 1973, 16 U.S.C. § 1536 (1982), to stop the construction of a dam because of possible adverse effects on the snail darter, an endangered species). Congress responded to the decision by passing a rider which removed this obstacle to the completion of the dam. See *Carter Signs Legislation Approving Completion of a Dam in Tennessee*, N.Y. Times, Sept. 26, 1979, at A17, col. 3.

15. Members of the present generation also serve as trustees for each other as beneficiaries of the trust. Thus, the planetary trust engenders two basic fiduciary duties: an *intergenerational* duty owed by each generation to its successors, and an *intragenerational* duty owed to members of the same generation. This paper focuses on the former relationship; the nature of the intragenerational relationship and its impact on the use of global resources will be discussed in a later article.

In analyzing the intergenerational relationship it is helpful to regard each generation as a single entity. So considered, the role of the present generation is analogous to that of the single trustee who is one of several beneficiaries in private trust law. See Restatement (Second) of Trusts § 114, comment a (1959). Accordingly, the present generation holds legal title to the resources of the trust while future generations, together with the present generation, share the equitable title. See *id.* at § 99(2) comment b. For a discussion of the problems that may arise from the dual interest held by the present generation, see *infra* notes 61-62 and accompanying text.

16. Cf. RESTATEMENT (SECOND) OF TRUSTS § 2 comment b (1959). *Black's Law Dictionary* 453 (5th ed. 1979) defines "duty" as a "human action which is exactly conformable to the laws which require it to obey them. Legal or moral obligation. . . . Those obliga-

planetary trust can be inferred from the nearly universal recognition and acceptance among peoples of an obligation to protect the natural and cultural heritage for future generations. This obligation is deeply rooted in human behavior and in the religious and cultural norms of communities; it is expressed in basic political documents.

According to sociobiological theory, genetics and natural selection ultimately explain the entire range of human behavior, including the concern that we have for our offspring and descendants.¹⁷ Individuals, it is argued, act innately in ways which are genetically calculated to promote the survival and reproduction of their genes.¹⁸ Thus, in nurturing the young and the sick; sharing food, tools, and knowledge; and giving aid to those in distress, human beings are attempting to preserve their genetic traits.¹⁹ By linking such behavior to the survival of genes, sociobiology suggests that there is a deeply rooted basis for our fiduciary relationship to our descendants.²⁰

Alternatively, our fiduciary duty to future generations may be derived from the need of present generations to relate to future generations. Human beings appear to have a basic psychological need to transcend the self by relating to the future.²¹ They demonstrate this need by becoming part of some process, institution, or product that will have an impact beyond their own lifetimes. Examples of such behavior

tions of performance, care or observance which rest upon a person in an official or fiduciary capacity; as the 'duty' of an executor, trustee, manager, etc."

Trustees have the duty to preserve the trust corpus, RESTATEMENT (SECOND) OF TRUSTS §§ 176, 379 (1959), and to act solely in the interests of the beneficiaries. *Id.* at §§ 170, 379 comment a. Trustees cannot compete with the interests of trust beneficiaries, *Donovan v. Mazzola*, No. C-79-134, slip op. (N.D. Cal. Nov. 17, 1981), nor can they reap personal gains through their administration of the trust holdings, P. HASKELL, PREFACE TO THE LAW OF TRUSTS 106 (1975).

17. J. BALDWIN & J. BALDWIN, *BEYOND SOCIOBIOLOGY* 49-50 (1981). Sociobiologists extend Darwin's theory of evolution to cover every aspect of social behavior. *Id.* at 2-3. Environmental influences, such as socialization, are regarded as mere "multiplier effects" which alter the original genetic programming. *Id.* at 11-19, 49. See generally E. WILSON, *SOCIOBIOLOGY: THE NEW SYNTHESIS*.

18. See, e.g., Trivers, *Sociobiology and Politics*, in *SOCIOBIOLOGY AND HUMAN POLITICS* 4, 8 (E. White ed. 1981). Sociobiological theory posits four types of inherent behavior: selfish, altruistic, cooperative, and spiteful. In each of the first three behaviors, actions taken advance the possibilities of gene survival for either the actor or the recipient. *Id.* at 48.

Beckstrom has used sociobiology to analyze intestate wealth transfers. "Sociobiological theory posits that living things, including humans, are born with a basic, biological tendency to behave so that as many of the genes that they carry can get into as many bodies in succeeding generations as possible." Beckstrom, *Sociobiology and Intestate Wealth Transfers*, 76 Nw. U.L. REV. 216, 221 (1981). Beckstrom concludes that humans tend to pass on wealth because they desire to ensure the perpetuation of their own genes. Hence, individuals are more likely to aid close relatives than distant kin because there is a greater likelihood that genes similar to theirs will be aided. *Id.*

19. Trivers, *supra* note 18, at 10.

20. Beckstrom, *supra* note 18, at 225, 226; Trivers, *supra* note 18, at 2.

21. See, e.g., E. PARTRIDGE, *RAWLS AND THE DUTY TO POSTERITY* 44, 381 (1976). See also G.H. MEAD, *MIND, SELF AND SOCIETY* (A. Strauss ed. 1956).

are legion: planting trees, creating works of art, literature or music, conducting scientific research, teaching others, and participating in social causes or public service work.

This analysis extends to communities. A collective commitment to the future helps communities address present-day problems. Consider Kenneth Boulding's answer to the phrase *apres nous le deluge*:

the welfare of the individual depends on the extent to which he can identify himself with others, and . . . the most satisfactory individual identity is that which identifies not only with a community in space but also with a community extending over time from the past into the future There is a great deal of historical evidence to suggest that a society which loses its positive image of the future loses also its capacity to deal with present problems and soon falls apart.²²

Thus, a fiduciary duty to future generations is rooted in the need of present communities to relate to future communities in a positive way which can help them transcend present events.²³

The obligation to future generations can also be viewed as a primordial social value which is necessary for the reproduction and maintenance of human communities. Nearly all human communities care for their young and show concern for the welfare of their descendants. Indeed, a search for communities that do not show concern for their young indicates that such societies are very rare and that their behavior is induced by extreme conditions threatening the survival of the society itself.²⁴

The various instruments communities have devised for looking after the welfare of their descendants, such as wills and trusts,²⁵ further

22. Boulding, *The Economics of the Coming Spaceship Earth*, in *THE ENVIRONMENTAL HANDBOOK* 99-100 (G. de Bell ed. 1970).

23. O. SCHACHTER, *SHARING THE WORLD'S RESOURCES* 11-13 (1977). Schachter astutely observes that "societies regard it as necessary to transmit to their descendants the social institutions and material base which they inherited and developed. That universally felt necessity is generally regarded as a justification for the renunciation of some present consumption through social saving and other transfers for the future. Seen in this way, the question of sacrificing for posterity becomes a matter of fulfilling actual needs of the present generation" *Id.* at 13.

24. See, e.g., C. TURNBULL, *THE MOUNTAIN PEOPLE* (1972), which describes the Ik, a tribe living in an arid, resource-depleted part of Kenya-Uganda, who were fighting a losing battle of survival. They no longer showed regard for children or old people, who were "useless appendages" threatening the survival of individuals strong enough to scrounge for food and water. *Id.* at 133-40. Under such extreme circumstances, the institution of the family deteriorates, and with it the shared sense of responsibility to other generations.

25. For the common law tradition, see L. SIMES & A. SMITH, *LAW OF FUTURE INTERESTS* (2d ed. 1956); *RESTATEMENT (SECOND) OF TRUSTS* 1 (introductory note) (1959); 2 F. POLLACK & F. MAITLAND, *THE HISTORY OF ENGLISH LAW* 228-39 (2d ed. 1898). For the civil law tradition, see A. VON MEHREN & J. GORDLEY, *THE CIVIL LAW SYSTEM: AN INTRODUCTION TO THE COMPARATIVE STUDY OF LAW* (2d ed. 1977); J. DAWSON, *GIFTS AND PROMISES* (1980).

An analogue to the trust under Islamic law is the *wakf*. According to Islamic tradition, a follower asked Mohammed how to dispose of his property in a manner pleasing to Allah.

evidence our recognition of a fiduciary responsibility to future generations. Communities differ widely on whether they look after the interests of descendants by protecting transfers of individual wealth to descendants or by relying on the transfer of community wealth,²⁶ but all communities demonstrate concern for the welfare of descendants. Thus, communities have institutionalized this concern for their descendants welfare.

In managing our global heritage, we are caught increasingly in a dilemma. We may be able to maximize the welfare of a few immediate successors, but at the expense of our more remote descendants, who will inherit a despoiled environment. Experiments in the United States have suggested that when people realize that they will be locked into the same environment with each other for a long period, they begin to opt for a cooperative solution which will maximize the common welfare over time.²⁷ In recent years, we have become increasingly interdependent. Our planet is finite; its condition will have a profound impact on the welfare of our descendants. Our evident concern for our descendants must, as we extend our concerns into longer time frames and across broader geographic horizons, be translated into a broader fiduciary duty to protect the planet and the human community.

II

A PLANETARY TRUST

The corpus of the planetary trust includes both the natural heritage of the planet and the cultural heritage of the human species.²⁸ Our cultural heritage—the intellectual, artistic, social and historical rec-

Mohammed replied, "Immobilize it in such a way that it cannot be sold or made the subject of a gift or inheritance, and distribute the revenues among the poor." Fratcher, *Trust*, in 6 INTERNATIONAL ENCYCLOPEDIA OF COMPARATIVE LAW, ch. 11, § 133 (F. Lawsdon, ch. ed. 1973) [hereinafter cited as Fratcher]. Although the *wakf* must be established for charitable purposes, the creation of a *wakf* "for the benefit of the wakif's (settlor's) descendants [is] valid so long as the ultimate remainder is left to public charity." *Id.* at § 138.

26. See generally Fratcher, *supra* note 25; 15 ENCYCLOPEDIA BRITANNICA MACROPAEDIA *Law of Property* 46-56 (15th ed. 1974). 12 INTERNATIONAL ENCYCLOPEDIA OF THE SOCIAL SCIENCES (Property) 589-92 (D. Sills ed. 1968).

27. This represents the prisoner's dilemma extended over time. The term "prisoner's dilemma" is derived from the problem of two prisoners, who, during private interrogation, must decide whether to confess to a moderate crime or to accuse the other of a serious crime, with the accuser going free unless the other prisoner has also accused him of a serious crime. In the latter case, both receive a much heavier sentence than if they had confessed to a moderate crime in common. See R. LUCE & H. RAIFFA, *GAMES AND DECISIONS* (1957). For its application in games theory, see J. VON NEUMANN & O. MORGENTHAU, *THEORY OF GAMES AND ECONOMIC BEHAVIOR* (1974), T. SCHELLING, *THE STRATEGY OF CONFLICT* (1960). The experiments noted in the text were conducted by Lester Lave of the Carnegie-Mellon Institute. Lave, *Factors Affecting Co-operation in the Prisoner's Dilemma* 10 BEHAV. SCI. 26-38 (1965). See also Axelrod & Hamilton, *The Evolution of Cooperation* 211 SCI. 1390 (1981), R. AXELROD, *THE EVOLUTION OF COOPERATION* (1983).

28. The "corpus" or "res" of a trust refers to the capital or property held under the

ord—is important because it represents our contribution as a species to the planet. Moreover, it is a crucial resource for future generations to draw upon in their temporary habitation of the earth. It is the source of ideas, knowledge, and skills that future generations may use in their efforts to provide for their own well-being. As our capacity to exploit our natural heritage grows, and with it our ability to harm the global environment, our cultural heritage will become an increasingly valuable resource for managing the complex interactions between the human species and the natural environment.²⁹

In analyzing the structure of the planetary trust, it is useful to refer to Anglo-American charitable trust law as it has developed in the United States.³⁰ The law of charitable trusts offers a particularly valuable analytic framework, because many of the problems, goals, and implementation processes of the planetary trust are similar to those of the charitable trust. The charitable trust need not have ascertainable beneficiaries;³¹ under the planetary trust all human generations, born and unborn, are beneficiaries.³² The charitable trust can be of unlimited duration;³³ the planetary trust will operate for as long as humans exist. The charitable trust must be designed to accomplish objectives which are beneficial to the community;³⁴ the basic purpose of the planetary trust is to sustain the welfare of humanity. The comparison to charitable trust law is especially instructive when we attempt to define the nature of our fiduciary relationship³⁵ and to develop mechanisms for enforcing the duties imposed by that relationship.³⁶ For other pur-

trust, as distinguished from the income derived therefrom. BLACK'S LAW DICTIONARY 310, 1172 (5th ed. 1979).

29. Like the natural heritage, the cultural heritage of our species should, from its inception, be a part of the trust corpus and, therefore, part of the resources available to fulfill our obligation to future generations.

30. RESTATEMENT (SECOND) OF TRUSTS §§ 348-403 (1959). See also, 2 F. POLLACK & F. MAITLAND, *supra* note 25, at 228-39; G.G. BOGERT & G.T. BOGERT, THE LAW OF TRUSTS AND TRUSTEES § 2 (2d ed. 1965).

31. RESTATEMENT (SECOND) OF TRUSTS § 364 (1959). In fact, if the beneficiaries of a trust are not of a sufficiently large or indefinite class as to insure a community interest in its enforcement, the trust cannot be a charitable trust. *Id.* at § 375.

32. See *supra* notes 13-14 and accompanying text.

33. RESTATEMENT (SECOND) OF TRUSTS § 365 (1959). Unlike private trusts, charitable trusts are not subject to the rule against perpetuities. *Id.* The rule against perpetuities states that "[n]o interest is good unless it must vest, if at all, not later than twenty-one years after some life in being at the creation of the interest." J. GRAY, THE RULE AGAINST PERPETUITIES § 201 (4th ed. 1942).

34. RESTATEMENT (SECOND) OF TRUSTS § 368 comment a (1959). "[A] trust to beautify a city or to preserve the beauties of nature, or otherwise to add to the aesthetic enjoyment of the community, is charitable." *Id.* at § 374 comment f. However, a trust for the benefit of every member of the community is a charitable trust only if it promotes the social interest or general happiness of the community. *Id.*

35. See *infra* text accompanying notes 44-62, 137-53.

36. In a suit to enforce a charitable trust, the attorney general, a co-trustee, or a person with a special interest in the enforcement of the trust has standing to sue. RESTATEMENT

poses, such as creating the trust, traditional trust law must be substantially modified to adapt to the planetary trust's unique characteristics.

A charitable trust is created by a settlor manifesting an intention to create it. The act of creation need not be formal.³⁷ It is sufficient for the owner of property to declare that he or she holds it upon a charitable trust.³⁸ The planetary trust is an *inter vivos* trust between generations of the human species. Its existence is implicit in the nature of the relationship between generations. It derives from an implied declaration by each generation that it holds the resources of the planet in trust for future generations. This intention is universally reflected in diverse human cultural and religious traditions.³⁹

Each generation has a deep moral obligation, which may be associated with notions of natural justice, to conserve the planet for future generations.⁴⁰ To confer the force of law upon this fiduciary relationship, however, the trust must create legally enforceable duties.⁴¹ While no affirmative action need be taken to create the planetary trust as a moral obligation, to have legal force it must be effectuated by positive law.⁴² Thus, the members of each generation must confer legal status on the trust by enacting and enforcing positive laws affirming their obligation to future generations.⁴³

A. Trustees and Beneficiaries

Under the planetary trust, each generation acts as trustee for bene-

(SECOND) OF TRUSTS § 391 (1959). Remedies for a breach of duty are exclusively equitable. *Id.* at § 392. These include specific performance, injunctive relief, and removal of a trustee. *Id.* at §§ 199, 392. The last remedy is, of course, not applicable to a planetary trust.

37. RESTATEMENT (SECOND) OF TRUSTS § 351 (1959). "No particular form of words or conduct is necessary for the manifestation of intention to create a charitable trust." *Id.* at § 351 comment b.

The settlor may cause the trust to come into existence directly, as by will or declaration, or indirectly, as by payment of a premium to a life insurance company for a policy payable to another as trustee. BOGERT & BOGERT, *supra* note 30, at § 41.

38. RESTATEMENT (SECOND) OF TRUSTS § 349(a) (1959).

39. See *supra* text accompanying notes 21-26. See, e.g., *Genesis* 1:1-31, 17:7-8: "I will maintain my Covenant between Me and you, and your offspring to come, as an everlasting covenant throughout the ages, to be God to you and to your offspring to come. I give the land you sojourn in to you and to your offspring to come, all the land of Canaan, as an everlasting possession. I will be their God." *Genesis* 17:7-8.

40. The term "moral obligation" has been defined as "[a] duty which is valid and binding in conscience and according to natural justice, but is not recognized by the law as adequate to set into motion the machinery of justice; that is, one which rests upon ethical considerations alone, and is not imposed or enforced by positive law." BLACK'S LAW DICTIONARY 969 (5th ed. 1979).

41. See RESTATEMENT (SECOND) OF TRUSTS § 2 comment e, § 348 comment b (1959).

42. For a discussion of laws needed to implement the global trust, see *infra* text accompanying notes 308-70.

43. The first generation to enact legislation necessary to implement the planetary trust would, in effect, be declaring an *inter vivos* trust of all the resources within its domain. Subsequent generations would reaffirm this declaration through the enforcement of those laws.

ficiaries in succeeding generations, just as past generations served as trustees for it.⁴⁴ In this sense, the trust is analogous to a charitable trust, in that the trustee usually does not stand in a fiduciary relationship to any specific person.⁴⁵

Each generation serves as trustee not only for adjacent generations, but for all future generations as beneficiaries under the trust.⁴⁶ Some philosophers have distinguished, explicitly or implicitly, obligations between adjacent generations from those between the present generation and posterity.⁴⁷ Charitable trust doctrine is instructive here because, unlike private trust law, it does not distinguish between different generations of trust beneficiaries.⁴⁸ Nor do religious⁴⁹ or evolution-

44. The make-up of the present generation *qua* trustee will be different from that of the present generation *qua* settlor or beneficiary. For instance, a corporation, which has no voting rights, cannot participate in the legitimization of the trust and so cannot act as a settlor. Nor can it be a beneficiary of the trust since it is not a human being. However, the corporation is necessarily bound by the common fiduciary obligation to future generations and in this sense acts as trustee. When referring to those who are bound by the duty to unborn generations, the term "present generation" includes not only all living human beings but also all artificial entities which have been granted distinct legal rights.

45. See RESTATEMENT (SECOND) OF TRUSTS §§ 348 comment a, 364 (1959). Most charitable trusts do not have specific beneficiaries. The actual beneficiary of a charitable trust is the public at large. The individuals who receive direct benefits from the operation of the trust are merely conduits through which social benefits flow to the community as a whole. BOGERT & BOGERT, *supra* note 30, at §§ 362, 414.

46. Some philosophers believe our responsibilities to far distant generations are diminished because we cannot with certainty say they will share common values. See, e.g., Golding, *Obligations to Future Generations*, in RESPONSIBILITIES TO FUTURE GENERATIONS 68 (E. Partridge ed. 1981). However, Daniel Callahan attempts to reconcile our ignorance of the values of future generations with a belief in our responsibility to posterity. He notes that the present generation's obligations to posterity comprise more than just the affirmative acts of enhancing our environment to which Golding refers; they also include refraining from denigrating the environment. Callahan, *What Obligations Do We Have to Future Generations?* in RESPONSIBILITIES TO FUTURE GENERATIONS, *supra*, at 78-79. In addition, Callahan believes that it is relatively easy to determine which present activities will harm future generations, and concludes that "we have no right to preempt their choices" by allowing environmental degradation. *Id.* at 79.

47. Posterity refers to "generations with which the possessors of the obligations cannot expect in a literal sense to share a common life." Golding, *supra* note 46, at 61-62. According to Golding's criteria, the present generation would have the highest level of obligation to immediate successors, because they would be the most likely to be members of our moral community and share the same ideas.

Callahan, by postulating the duty to refrain from causing harm to future generations, does not in theory distinguish between immediate and distant successors. He notes, however, that because the present generation has existing rights, these take precedence over rights which are not yet in existence. Such rights are limited to those that are fundamental to existence and a "life of human dignity." Callahan, *supra* note 46, at 82-83. But see Williams, *Discounting and Maximum Sustainable Yield* in OBLIGATIONS TO FUTURE GENERATIONS (R. Sikora & B. Barry eds. 1978) (under a theory of total utilitarianism, there is no basis for distinguishing between generations).

48. Under private trust law, the terms of the trust document dictate the allocation of the trust. If no division is specified, the trustee has a duty to distribute the trust impartially. RESTATEMENT (SECOND) OF TRUSTS § 232 (1959). The issue of allocation normally does not arise in charitable trusts. Charitable trusts usually have no specific beneficiaries, but

ary⁵⁰ explanations of the origin and course of life support such a distinction. Although obligations to posterity are the same as those to adjacent generations, implementation of obligations to adjacent and to distant generations may raise different concerns.⁵¹

Do future generations, then, have rights and potential claims against present generations?⁵² Normally, to become obligated, one must undertake some act of assumption or acquiescence. Obligations are voluntary, mutually-acknowledged commitments to, or between, identifiable persons.⁵³ This definition could be construed to exclude unborn persons, thus barring the assertion of claims on behalf of future generations. Charitable trust law, however, suggests an answer to this problem. A central feature of the charitable trust is that it does not require clearly defined, identifiable individuals as beneficiaries.⁵⁴ Yet the obligation of the trustee to administer a charitable trust according to its purposes is as binding as with a private trust.⁵⁵ By analogy, if the resources of the planet are held in trust, future generations have equitable rights, and hence the right to have claims against the present generation made on their behalf.⁵⁶

rather a large, unidentified number of beneficiaries. See *supra* note 45 and accompanying text. The very nature of a charitable trust, which provides benefit to the community, would seem to preclude favoring one generation over another. See also BOGERT & BOGERT, *supra* note 30, at § 541 (trustee who holds for successive generations owes duty to administer trust impartially).

49. See *supra* note 39.

50. See, e.g., C. DARWIN, *THE ORIGIN OF THE SPECIES BY MEANS OF NATURAL SELECTION* (1859) (New Amer. Library ed. 1958); E. MAYS, *POPULATIONS, SPECIES AND EVOLUTION* (1970); G.G. SIMPSON, *MAJOR FEATURES OF EVOLUTION* (1967).

51. For example, if we have an obligation to refrain from degrading the environment with contaminating nuclear wastes, we may be able to fulfill this obligation to adjacent generations by increasing the capacity of waste storage ponds, but we will need impervious geological storage sites to fulfill this obligation to distant generations.

52. For philosophical analyses of whether future generations have rights, see RESPONSIBILITIES TO FUTURE GENERATIONS, *supra* note 46; OBLIGATIONS TO FUTURE GENERATIONS, *supra* note 47.

53. J. RAWLS, *A THEORY OF JUSTICE* 111-13 (1971); RESPONSIBILITIES TO FUTURE GENERATIONS, *supra* note 46, at 5 (introduction). See H.L.A. Hart, *Are There Any Natural Rights?*, 64 *PHIL. REV.* 185 (1955).

54. RESTATEMENT (SECOND) OF TRUSTS §§ 348, 364 comment a (1959).

55. *Id.* at § 379 comment a. Rights arise from the imposition of enforceable duties upon the trustee. *Id.* at § 25 comments a, b. Once duties have been established, a beneficiary may bring suit to enforce trust provisions and to seek redress for a trustee's breach of obligations. *Id.* at §§ 197-99, 201, 391-92.

56. See Golding, *supra* note 46, at 63-64. Once beneficiaries have rights, suits can be initiated to enforce the trust provisions. The plaintiff (either an individual or group) must show that he has a special interest in the enforcement of the trust. RESTATEMENT (SECOND) OF TRUSTS § 391 (1959). Usually the Attorney General has standing to sue for equitable enforcement of charitable trust provisions because of the community interest involved. *Id.* at § 391, comment d. In addition, co-trustees can maintain suits to compel a trustee to perform duties. *Id.* at § 391. A specific beneficiary to the the trust may have standing to sue for the enforcement of the trust, *id.*, but the mere fact that an individual is a possible beneficiary is not enough to invoke standing. *Id.* at § 391 comment c (1959). It appears that class

Under the terms of the planetary trust, each generation is both a beneficiary and a trustee. Although the present generation is a beneficiary of the trust, it has a duty, as a trustee for future generations, to manage the corpus so as to fulfill the planetary trust's purposes.⁵⁷ Under Anglo-American law, trustees have a duty to preserve trust assets and not to compete with the interests of the trust beneficiaries or to profit at their expense.⁵⁸ The standard of behavior generally imposed upon trustees in preserving the corpus is that of prudent persons dealing with their own property.⁵⁹ Speculative actions are not allowed.⁶⁰

action suits may also be maintained in some jurisdictions. *See, e.g.,* German Evangelical St. Marcus Congregation v. Archambault, 404 S.W.2d 705 (Mo. 1966), *citing* Dickey v. Volker, 321 Mo. 235, 11 S.W.2d 278 (1929), *cert. denied*, 279 U.S. 839 (1929). If an individual does bring suit, the Attorney General should be joined as a party to ensure that the public interest will be adequately represented. RESTATEMENT (SECOND) OF TRUSTS § 391 comment c (1959).

57. *Cf.* RESTATEMENT (SECOND) OF TRUSTS §§ 169, 170 (1959).

58. *Id.* §§ 170, 176, 379; *See also* Donovan v. Mazzola, No. C-79-134, slip op. (N.D. Cal. Nov. 17, 1981), *aff'd*, 716 F.2d 1226 (9th Cir. 1983), *cert. denied*, 104 S. Ct. 704 (1984). Additional duties of Anglo-American trust law pertinent to those of planetary trustees include the duties of loyalty, provision of necessary information, enforcement of claims, impartiality between beneficiaries and the exercise of reasonable care and skill in administering the trust. RESTATEMENT (SECOND) OF TRUSTS §§ 170, 173, 174, 177, 183 (1959). Some of the characteristics of traditional trustees do not apply, however. For example, planetary trustees need not fulfill any capacity requirements, *cf. id.* §§ 89, 378, and they cannot resign or be removed, *cf. id.* at §§ 106, 107, 387.

59. RESTATEMENT (SECOND) OF TRUSTS § 227(a) (1959). Most states have adopted the so called "Prudent Man Rule" regarding trust investment. For example, in the landmark case, Harvard College v. Armory, 26 Mass. (9 Pick.) 443 (1830), the Massachusetts Supreme Court established the duties of the trustee with regard to management of trust properties:

All that can be required of a trustee to invest is that he shall conduct himself faithfully and exercise sound discretion. He is to observe how men of prudence, discretion and intelligence manage their own affairs, not in regard to speculation, but in regard to the permanent disposition of their funds, considering the probable income, as well as the probable safety of the capital to be invested.

Id. at 461.

The standard for investment is a conservative one; the primary duty of the trustee is to preserve the corpus. 2 A. SCOTT, THE LAW OF TRUSTS § 176 (3d ed. 1967) [hereinafter cited as SCOTT]; RESTATEMENT (SECOND) OF TRUSTS § 176 (1959). Prudence must be directed towards preservation rather than augmentation of the corpus. *Cf.* Miller v. Pender, 93 N.H. 1, 3, 34 A.2d 663, 665 (1943) (provision in will that trustee was to invest in securities "which he shall deem proper" interpreted to mean conservation of assets, not profits). Factors to be considered in investing trust assets include the probable income, safety of the capital, and the amount and regularity of the income to be derived. Harvard College, 26 Mass. at 461; Moose v. United States, 674 F.2d 1277, 1283 n.18 (9th Cir. 1982) (quoting 3 SCOTT, *supra*, at § 227). Some states have developed "legal lists of investments" to guide trustees in managing the corpus. *See, e.g., In re Carnell's Will*, 260 A.D. 287, 21 N.Y.S.2d 376 (N.Y. App. Div. 3d Dept. 1940) (impropriety of investments not contained in New York's list).

60. RESTATEMENT (SECOND) OF TRUSTS § 227 comment f (1959). *See, e.g.,* King v. Talbot, 40 N.Y. 76, 85-86 (1869) ("[T]he trustee is bound to employ such diligence and prudence in the care and management, as in general, prudent men of discretion and intelligence in such matters, employ in their own like affairs. This necessarily excludes all speculation, all investments for an uncertain and doubtful rise in the market, and, of course, everything that does not take into view the nature and object of the trust . . ."). Speculation is prohibited under trust doctrine because beneficiaries are presumed to be highly risk adverse, pre-

This dual role of trustee and beneficiary create conflicts. If the present generation best fulfills its obligation to future generations by maximizing its own consumption, so it will pass more wealth to future generations, there is theoretically no conflict for the present generation. If, however, the present generation is forced to forego some consumption to fulfill its obligations as a trustee to future generations, the roles conflict. The trustees, who constitute only a small part of the class of beneficiaries (i.e., the present beneficiaries), will have a strong interest in maximizing present consumption of trust resources.⁶¹ If they do so, they will violate the cardinal purposes of a common law trust: to protect and maintain assets until the reasons for establishing the trust have been fulfilled.⁶²

B. *Purposes of the Trust*

Before addressing our obligations as trustees in administering the planetary trust, the purposes for which we hold the earth's resources in trust must be identified. The basic purpose of the trust is to sustain the welfare of future generations. This purpose can be broken down into three sub-purposes: to sustain the life-support systems of the planet; to

ferring lower income and greater stability to high risks. R. POSNER, *ECONOMIC ANALYSIS OF LAW* 328 (2d ed. 1977) [hereinafter cited as POSNER]. While the prudent man rule was adopted because it provided flexibility for trustees in administering trusts, the prohibition against speculation can severely restrict trustees. It has been used to restrict investment focused on capital gains, which reduces the ability of trustees to protect trust assets against inflation. W.H. Cooper, *Problems with the Prudent Man Rule*, *TRUSTS AND ESTATES*, March 1982, at 68.

61. Private trust law is instructive on this point. The trustee for a private trust has the duty of balancing what is seen as the inherent competing interests between holders of a life interest and those entitled to the remainder of the estate. 3 SCOTT, *supra* note 59, at § 232. While beneficiaries might look to short term investment yielding high interest, a trustee is under the duty of preserving the corpus while receiving "reasonable" and regular income. *See id.* at § 227; *TRUSTS AND TRUSTEES*, *supra* note 30, at § 611. As beneficiaries, the current generation might be more inclined to take long run risks in the hopes of high short term yield. However, the prudent man standard applicable to trustees prevents such speculation, preferring cautious preservation of the corpus. *See* RESTATEMENT (SECOND) OF TRUSTS §§ 176, 227 comment f (1959).

62. *See generally* RESTATEMENT (SECOND) OF TRUSTS §§ 169-85, 379 (1959); 2 SCOTT, *supra* note 59, at §§ 164, 169-85; BOGERT AND BOGERT, *supra* note 30 at § 582.

Before the modern trust, landowners who were forbidden to pass property to their children by will and who wished to avoid paying taxes on it at the time of death, established the device of vesting legal title in several parties and equitable title in the intended heir. P. HASKELL, *PREFACE TO THE LAW OF TRUSTS* 106 (1975). In 1535, Henry VIII enacted the Statute of Uses, 27 Hen. 8, ch. 10 (1535), which voided this device by vesting the legal and equitable titles to land in the same person; however, if the party that held legal title had to perform duties, then the legal and equitable titles would not merge and the land would escape the Statute of Uses. This led to the creation of a trust in which the trustee was charged with protecting the trust assets for the benefit of the equitable titleholder. J. CRIBBET, *PRINCIPLES OF THE LAW OF PROPERTY* 73 (2d ed. 1975). In our planetary trust, the present generation, as trustee, has a fiduciary obligation to future generations, who may be regarded as sharing an equitable title to the corpus.

sustain the ecological processes and environmental conditions necessary for the survival of the human species; and to sustain a healthy and decent environment.⁶³ These in turn imply the creation or maintenance of social, economic and political conditions which will allow members of the community to direct their attention to fulfilling the trust's purposes.⁶⁴

These purposes are consistent with those permitted under domestic charitable trust law.⁶⁵ Charitable trusts can be established for any of the following purposes: the relief of poverty,⁶⁶ the advancement of education,⁶⁷ the advancement of religion,⁶⁸ the promotion of health,⁶⁹ governmental or municipal purposes,⁷⁰ and other purposes beneficial to the community,⁷¹ including prevention of suffering of animals,⁷² promotion of national security,⁷³ and promotion of happiness or well-being of the members of the community.⁷⁴ Thus, a trust to preserve the beauties of nature or to add to the aesthetic enjoyment of the community would be charitable.⁷⁵

Nevertheless, even a trust for the benefit of every member of the community is not a charitable trust unless it promotes the social interest of the community.⁷⁶ A global trust to ensure the welfare of future generations satisfies this requirement, since it promotes the community interest in its broadest sense. It does not, however, postulate a set of values to be pursued in the use of the trust resources, but rather preserves the corpus of the trust for eventual valuation by future genera-

63. See INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES (IUCN), UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP), & WORLD WILDLIFE FUND (WWF), WORLD CONSERVATION STRATEGY, LIVING RESOURCE CONSERVATION FOR SUSTAINABLE DEVELOPMENT, sec. 1, para. 7, (1980). [hereinafter cited as WORLD CONSERVATION STRATEGY]. The WORLD CONSERVATION STRATEGY points out that resource conservation has three specific objectives: to maintain essential ecological processes and life-support systems; to preserve genetic diversity; and to ensure the sustainable utilization of species and ecosystems. *Id.* at pt. 1, para. 7. The WORLD CONSERVATION STRATEGY calls for each country to develop its own implementation plan, but only a few countries have yet done so.

64. *Id.* at sec. 1, para. 10. Since members of the present generation serve as trustees both for future generations and for each other as beneficiaries of the trust, there is an obligation of intragenerational equity implicit in the planetary trust. See *supra* note 15.

65. See RESTATEMENT (SECOND) OF TRUSTS §§ 368-74 (1959).

66. *Id.* at § 369.

67. *Id.* at § 370 comment b.

68. *Id.* at § 371 comment b.

69. *Id.* at § 372 comment a.

70. *Id.* at § 372 comments a, b. Examples of acceptable governmental or municipal purposes include public buildings, streets, hospitals, parks and schools. *Id.*

71. *Id.* at § 374.

72. *Id.* at § 374 comment c.

73. *Id.* at § 374 comment d.

74. *Id.* at § 374 comment f.

75. *Id.*

76. *Id.*

tions according to their own values, which will vary over time.⁷⁷ It follows that the principles for administering the trust should not depend upon prediction of the values of future generations.

C. Administration of the Trust

This section first analyzes three approaches to considering the interests of future generations in the management of natural resources: preservation, prohibition against waste, and economic efficiency. These approaches are found in both the common law and international law. They have different philosophical underpinnings and frequently produce conflicting results. This section then analyzes two other approaches found in Anglo-American trust law: diversification against risk and preservation of quality. The results of this analysis of methods for protecting interests of future generations are then used to derive principles for administering the planetary trust.

1. Alternative Approaches to Managing Trust Resources for Future Generations

a. Preservation of Resources

The doctrine of preservation requires parties to maintain a resource in approximately the same condition it was in when they assumed responsibility. The object is to preserve features of the natural or cultural heritage which people now value or may come to value in the future. A decision to preserve a natural or cultural resource is not necessarily an economic choice; rather, it represents a value choice by society that the resource is worth preserving in its existing form for present and future generations.

The doctrine is usually applied to unique resources, such as wilderness areas⁷⁸ and certain historical and cultural monuments.⁷⁹ The

77. Moreover, the values of members within the present generation vary, and, in trying to realize certain values, people are necessarily linked together in complicated ways. M. McDougal has identified eight value processes for the world community: power, wealth, respect, well-being (health), enlightenment, skill, affection (loyalties) and rectitude. McDougal, *International Law and The Future*, 50 Miss. L.J. 259, 271-73 (1979). How one values each of these factors domestically affects these value processes in other countries. The different processes in turn have interdependencies on a global scale which link members of the international community together in complex ways in trying to achieve their demanded values. The human species is beginning to understand "that the different peoples of the world do in fact constitute a single community, bound in an irretrievable interdetermination not merely for simple survival but also in the achievement of all demanded values." *Id.* at 265 (point made by Mendlovitz in General Introduction).

78. See, e.g., Wilderness Act, 16 U.S.C. §§ 1131-36 (1982).

79. See, e.g., National Historic Preservation Act of 1966, 16 U.S.C. §§ 470-470a, 470b, 470c-470w-6 (1982). In *Penn Central Transp. v. New York City*, 438 U.S. 104 (1978), the Supreme Court, affirming the validity of New York City's Landmarks Preservation Law, observed that "all 50 States and over 500 municipalities have enacted laws to encourage or

United States' National Environmental Policy Act proclaims that it is the country's responsibility to "preserve important historic, cultural and natural aspects of our national heritage. . . ." ⁸⁰ Similarly, the Convention Concerning the Protection of the World Cultural and Natural Heritage calls for world-wide efforts to preserve unique natural and cultural resources for present and future generations. ⁸¹

Preservation is not necessarily inconsistent with use of a resource. It is possible to devise plans to use resources while preserving those features which people value. Indeed the ability to devise such plans may be critical for enlisting the agreement of countries and local communities to preserve the resource at all. ⁸² Moreover, it has been argued forcefully, particularly in the United States, that the existence of wilderness areas and national parks has value not only to those who use the areas but also to those who derive psychic value from knowing that these areas are available for their use. ⁸³

require the preservation of buildings and areas with historic or aesthetic importance." *Id.* at 107. This nation-wide concern reflects the "widely shared belief that structures with special historic, cultural, or architectural significance enhance the quality of life for all." *Id.* at 108.

80. National Environmental Policy Act of 1969, 42 U.S.C. § 4331(b)(4) (1976).

81. Convention Concerning the Protection of the World Cultural and Natural Heritage, Nov. 23, 1972, 27 U.S.T.S. 37, T.I.A.S. No. 8226. [hereinafter cited as the World Heritage Convention]

82. Agreement is also needed from people living in the immediate area of the cultural or ecological treasure to be preserved—people whose relation with national authorities may or may not be cordial. In Kenya, for example, the government has attempted to forestall an increase in cattle-herding among Masai and other tribesmen living near the game parks by channeling to local tribal councils part of the revenues derived from tourist safaris. The Moroccan government, with the technical assistance of the United Nations Educational, Scientific and Cultural Organization (UNESCO), has developed a plan which would at the same time preserve the cultural and historic value of the ancient Arab market (Medina) in Fez and provide low cost shelter for the poor people who now overcrowd it. See W. LUSIGI & J. CRAMER, *PLANNING HUMAN ACTIVITIES ON PROTECTED NATURAL ECOSYSTEMS* 185 (1978).

83. See generally J. SAX, *MOUNTAINS WITHOUT HANDRAILS* (1980). Economist Burton Weisbrod coined the term "option value" to represent the amount which consumers, acting as economic persons, would be willing to pay for the future option to consume a non-storable public good (e.g., a visit to Sequoia National Park). Weisbrod, *Collective-Consumption Services of Individual-Consumption Goods*, 78 O.J. ECON. 471, 472 (1964). Because the commodity (the option) is a public good, available to all if available to one, each consumer will be unwilling to pay for the option in the private market. *Id.* at 472-73. Since the value to society of continuing the operation of the park is thus not fully reflected in the market, there may be a deviation of optimal private behavior from optimal social behavior; stated differently, it may be economically unwise to continue the operation of the park, although it is socially desirable to do so. *Id.* at 472. Weisbrod advocates public subsidization of such areas when the option value exceeds the economic loss incurred by operating the area. *Id.* at 476-77. If the option demand of future generations is taken into account as well, the requisite level of economic loss incurred by maintaining a wilderness area (instead of exploiting its mineral resources) would be increased, and so such exploitation would be reasonable less often. See also J. KRUTILLA & A. FISHER, *THE ECONOMICS OF NATURAL ENVIRONMENTS* 3-36 (1975).

b. Responsible Use: The Prohibition of Waste

The concept of "waste" has figured prominently in environmental literature. *Beyond the Age of Waste*,⁸⁴ a report to the Club of Rome, defines waste as irresponsibly large consumption of natural resources per unit of production.⁸⁵ The report concludes that "waste appears to be an inherent product of the social, economic and cultural characteristics of our time. For further progress, mankind must . . . advance beyond the age of waste."⁸⁶ International conventions,⁸⁷ domestic case law,⁸⁸ and national directives⁸⁹ also posit an obligation not to waste natural resources. In particular, the World Charter for Nature,⁹⁰ recently adopted by the United Nations General Assembly, provides that "[n]atural resources shall not be wasted."⁹¹

The law against waste emerged in the common law system to limit the power of the life tenant over property, in order to protect the re-

84. D. GABOR, U. COLOMBO, A. KING & R. GALLI, *BEYOND THE AGE OF WASTE*, A REPORT TO THE CLUB OF ROME (2d ed. 1981) [hereinafter cited as *BEYOND THE AGE OF WASTE*].

85. *Id.* at 212-14.

86. *Id.* at 214.

87. See Stockholm Declaration of the United Nations Conference on the Human Environment, U.N. Doc. A/CONF. 48/14 (1972), *reprinted in* 11 I.L.M. 1416 (1972) [hereinafter cited as Stockholm Declaration]. See also the *Nairobi Declaration*, adopted by governments meeting in Nairobi, May 10-18, 1982.

Four multilateral conventions are specifically concerned with the protection of the natural heritage located within national borders: 1) the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Feb. 3, 1971, *reprinted in* 11 I.L.M. 969 (1972) [hereinafter cited as Wetlands Convention]; 2) the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Mar. 3, 1973, 27 U.S.T. 1087, T.I.A.S. No. 8249 [hereinafter cited as Endangered Species Convention]; 3) the Convention on the Conservation of Migratory Species of Wild Animals, June 23, 1979, *reprinted in* 19 I.L.M. 15 (1980) [hereinafter cited as Migratory Species Convention]; 4) the World Heritage Convention, *supra* note 81.

For an example of a regional convention concerned with environmental protection, see The Convention on the Protection of the Environment, Feb. 19, 1974, *reprinted in* 13 I.L.M. 591 (1974) [hereinafter cited as Nordic Convention].

88. For United States case law recognizing the propriety of governmental regulations against waste of natural resources, see *Cities Serv. Gas Co. v. Peerless Oil & Gas Co.*, 340 U.S. 179, 185-86 (1950) (natural gas); *State Corp. Comm. v. Wall*, 113 F.2d 877, 881 (10th Cir. 1940) (oil); *State ex rel. Cary v. Cochran*, 138 Neb. 163, 292 N.W. 239, 244 (1940) (water).

89. For United States legislation concerning protection of the natural heritage, see the National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321, 4331-35, 4341-47 (1976). Section 4331(b)(4) of NEPA authorizes the Federal Government to use all means necessary to "preserve important historic, cultural and natural aspects of our natural heritage . . ." For national legislation in European countries concerning conservation of nature, see S. ERCMAN, *EUROPEAN ENVIRONMENTAL LAW, LEGAL AND ECONOMIC APPRAISAL* (1977).

90. The World Charter for Nature, *adopted by* the United Nations General Assembly, Nov. 9, 1982, G.A. Res. 37/7, 37 U.N. GAOR Supp. (no. 51) at 17, U.N. Doc. A/37/51 (1982).

91. *Id.* at 18.

mainderman.⁹² Under this view, the preservation and waste doctrines were essentially equivalent. In modern times,⁹³ however, the term "waste," as applied to natural resources, has been used to condemn one of two conceptually distinct kinds of inefficiency: 1) systems inefficiency in the development and use of a resource for a given end-use; and 2) comparative use inefficiency. The former is primarily a physical or engineering concept. The latter is economic.

i. Systems Waste in Development and Use. At least four forms of inefficiency in the exploitation and use of resources have been condemned by law as "waste": 1) exploitation in excess of sustainable yields; 2) exploitation at levels less than the optimal sustainable yield; 3) physical or engineering inefficiency in the extraction of resources; and 4) systems inefficiency in the use of resources for a particular purpose.

The first form of waste, exploitation in excess of the maximum sustainable yields, has been cited in the exploitation of fisheries, forests, and other living resources. Thus, the Law of the Sea Convention obligates coastal states to limit their harvest of fish to the maximum sustainable yield.⁹⁴ This rule can be difficult to implement, for it depends upon adequate scientific information as to what constitutes the maximum sustainable yield, ongoing monitoring efforts, and political or economic incentives to respect the limit. Moreover, where species are

92. See POSNER, *supra* note 60, at 53. Waste was defined as "an act by a present holder of less than a fee-simple absolute which injures the value of the future inheritance." 3 W. HOLDSWORTH, A HISTORY OF ENGLISH LAW 121-23 (7th ed. rev. 1956).

93. Since the 1878 House of Lords decision in *Doherty v. Alman*, 3 App. Cas. 709 (H.L. 1878), English courts have held that the act must injure the value of the future inheritance to be actionable waste. In more recent times, the trust has supplanted the law of waste as a means of protecting remaindermen from present exploitation by life tenants. POSNER, *supra* note 60, at 53.

94. United Nations Convention on the Law of the Sea, Dec. 10, 1982, U.N. Doc. A/CONF. 62/122 (1982), reprinted in 21 I.L.M. 1261 (1982) [hereinafter cited as the Law of the Sea Convention]. Chapter V, Art. 61, sec. 2-4 provides as follows:

2. The coastal State, taking into account the best scientific evidence available to it, shall ensure through proper conservation and management measures that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation. As appropriate, the coastal State and competent international organizations, whether subregional, regional or global, shall co-operate to this end.

3. Such measures shall also be designed to maintain or restore populations of harvested species at levels which can produce the maximum sustainable yield, as qualified by relevant environmental and economic factors, including the economic needs of coastal fishing communities and the special requirements of developing States, and taking into account fishing patterns, the interdependence of stocks and any generally recommended international minimum standards, whether subregional, regional or global.

4. In taking such measures the coastal State shall take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations of such associated or dependent species above levels which their reproduction may become seriously threatened.

interdependent, as in fisheries, a determination of the maximum sustainable yield for one species must take into account the dependence of that species upon other species and of other species upon it.⁹⁵

The second form of waste is the converse of the first, namely failing to exploit renewable resources up to the optimal sustainable yield. The Law of the Sea Convention, for example, provides that coastal states must give other states access to harvest any surplus of their fisheries up to the maximum sustainable yield.⁹⁶ One could similarly regard the failure to use ground water supplies up to the amount of yearly recharge as waste in this sense.⁹⁷

A third form of waste, one of the most frequently encountered, is physical or engineering inefficiency in the extraction of resources, whether renewable or nonrenewable. Under this concept it is wasteful, for example, to extract oil from a deposit at such a rapid rate that it reduces the amount of oil that can ultimately be recovered from the pool.⁹⁸ Similar inefficiencies are evident in methods of delivering surface water to prior appropriators that entail loss rates of 75% en route,⁹⁹ in fishing technologies which catch fish without regard to the species and size desired,¹⁰⁰ and in "highgrade" or "clearcut" forests which support multiple species in order to obtain the wood of only one or two species.¹⁰¹

95. See F. CHRISTY & A. SCOTT, *THE COMMONWEALTH IN OCEAN FISHERIES* 80-86, 233-34 (1965).

96. The Law of the Sea Convention, *supra* note 94, at Chapter V, Article 62(2) provides:

The coastal State shall determine its capacity to harvest the living resources of the exclusive economic zone. Where the coastal State does not have the capacity to harvest the entire allowable catch, it shall, through agreements or other arrangements and pursuant to the terms, conditions, laws and regulations . . . give other States access to the surplus of the allowable catch . . .

97. See, e.g., *Los Angeles v. San Fernando*, 14 Cal. 3d 199, 279-81, 123 Cal. Rptr. 1, 59-61, 537 P.2d 1250, 1307-10 (1975) (owner of prior water rights may not enjoin appropriation of water from ground water basin for beneficial use when amount being extracted is less than maximum that could be withdrawn without adverse effects on long term supply).

98. Another example of inefficient use of resources is the flooding of copper mines in Butte, Montana. See *Wall St. J.*, July 13, 1982, at 1, col. 1. [hereinafter cited as *Butte Economy*]. Because copper prices have dropped drastically, the mines in Butte are being closed. Anaconda will stop pumping the mines and, as a result, they will flood. Flooding the mines may be deemed inefficient because, as one town resident explains, "they are robbing us of the one natural resource that Butte has." *Id.* The flooding will be done without substantial information on whether the mines will be useful in the future. *Id.*

99. See *State ex rel. Cary v. Cochran*, 138 Neb. 163, 292 N.W. 239, 245 (1940) (loss of 77% of water in transit from North Platte to Kearney Canal to satisfy prior appropriator's non-beneficial use of water).

100. See generally S. BROWN, N. CORNELL, L. FABIAN AND E. WEISS, *REGIMES FOR THE OCEAN, OUTER SPACE AND WEATHER* 52-54 (1977) [hereinafter cited as *REGIMES*] (for a concise analysis of fishing technology).

101. Highgrading a mixed ecological system consists of harvesting only those species of highest economic value. This practice usually lowers the long-run value of the remaining stand, since the species removed do not usually return to their previous abundance.

Some domestic cases regard physical inefficiency in the extraction of resources as legally prohibited waste,¹⁰² while others have upheld property rights to extract the resource by whatever method the property owner desires.¹⁰³ The Law of the Sea Convention provides that coastal states may enact whatever measures they deem necessary to ensure physical efficiency in the extraction of their fisheries.¹⁰⁴

The fourth form of waste, the one which has figured the most prominently in recent policy debates, is inefficiency in the way renewable or nonrenewable resources are used to achieve a given purpose. If consumers use more of a resource than necessary for a particular purpose—for example, by burning fossil fuel in a furnace of low thermal efficiency—they are wasting it.¹⁰⁵ This concept of waste underlies many energy and water conservation programs.¹⁰⁶ Energy conservation promotes greater output of a given good or service per unit of energy used; water conservation promotes a higher ratio of output per unit of water used. While such savings may have significant economic consequences, depending on the price of the given resource,¹⁰⁷ the focus is on saving water or energy as physical resources.

These different forms of waste are largely independent. Physical efficiency in the extraction of a resource such as oil does not affect the ratio of product output to unit of energy input. Physical efficiency in the extraction of a species of fish (*e.g.*, avoiding loss from spoilage) does not ensure that a specie will not be overexploited or, conversely, that it will be exploited up to the maximum sustainable yield. Indeed, the pursuit of one form of efficiency may in practice be inconsistent with the pursuit of another.

ii. Comparative Inefficiency in Use. The term “waste” is also used to condemn comparative inefficiency in use, which is defined as the

102. See, *e.g.*, *Elliff v. Texon Drilling Co.*, 146 Tex. 575, 582-83, 210 S.W.2d 558, 562-63 (1948) (adjoining owner of common pool has cause of action for wasted oil and gas against neighbor who, while drilling in the well, negligently causes it to blow out and dissipates large quantities of oil and gas).

103. See, *e.g.*, *Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist.*, 3 Cal. 2d 489, 45 P.2d 972 (1935) (“prior appropriators cannot be compelled to construct impervious conduits such that seepage water may be made available to subsequent appropriators”).

104. Law of the Sea Convention, *supra* note 94, at Pt. V, art. 61-62.

105. See BEYOND THE AGE OF WASTE, *supra* note 84, at 110-18, 212-14.

106. See generally ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, ENERGY POLICIES AND PROGRAMMES OF IEA COUNTRIES, 1977 REVIEW 29-34, 229-45 (1978) (for a general discussion of energy conservation programs).

For a discussion of the federal government's supporting role in state and local conservation programs, see Reisner, *The Federal Government's Supporting Role in State and Local Conservation Programs*, in ENERGY CONSERVATION AND PUBLIC POLICY 229-45 (1979).

107. See generally Yergin, *Conservation: The Key Energy Source*, in ENERGY FUTURE, REPORT OF THE ENERGY PROJECT AT THE HARVARD BUSINESS SCHOOL 136-82 (1979); THE FORD FOUNDATION, ENERGY: THE NEXT TWENTY YEARS 115-53 (H. Landsberg ed. 1979).

exploitation of a resource for an inferior use. This concept is analytically distinct from the previous examples, which do not question the propriety of the end use but only the efficiency with which it is achieved.¹⁰⁸ The notion that comparative inefficiency in use constitutes waste is used to impose an obligation to use a resource for beneficial purposes. Thus, in western states in the United States, water must be put to a beneficial use, which is defined to exclude wasteful uses,¹⁰⁹ such as irrigating fields heavily in winter to kill gophers.¹¹⁰ Similarly, the United States Congress indicated that it can be wasteful to use natural gas for boiler fuel.¹¹¹ This concept of waste, in contrast to the previous one, is primarily economic. It counsels us to choose the more economically efficient of any two proposed uses. This concept of waste is therefore similar to the next standard examined: the economically efficient use.

c. The Economically Efficient Use

The economic efficiency approach to the development and use of resources has dominated Western thought for the last few centuries and is widely reflected in the common law.¹¹² It counsels that we maximize, for present consumers, the present value of consumption over time. According to this theory, we best fulfill our obligation to future generations by maximizing consumption, the fruits of which can then be passed on to future generations in the form of knowledge, technology, capital instruments and institutions. This economic heritage is therefore of greater value to future generations than the reservation of specific natural resources for their use.¹¹³

108. The concept of comparative inefficiency in use is closely linked to the common law doctrine of nuisance. "Nuisance" involves the unreasonable use of land to the detriment of another. R. CHUSED, *A MODERN APPROACH TO PROPERTY* 189 (1978). Chused suggests that waste is simply a specialized area of nuisance law; reasonable efforts must be made to accommodate the rights of all owners. *Id.*

109. 5 R. BECK & E. CLYDE, *WATERS AND WATER RIGHTS* 66-67 (1972). *See generally* C. MYERS & D. TARLOCK, *WATER RESOURCES MANAGEMENT* (1980).

110. *See, e.g.*, *Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist.*, 3 Cal. 2d 489, 45 P.2d 972 (1935) (the "use of an appreciable quantity of water for such a purpose [to flush gophers from agricultural fields] cannot be held to be a reasonable beneficial use"). *Id.* at 568, 45 P.2d at 1007.

111. Natural Gas Policy Act of 1978, 15 U.S.C. §§ 3301-432 (1982). Congress adopted various provisions in the Natural Gas Policy Act in order to discourage the use of natural gas as boiler fuel. In Subchapter IV, the section on curtailment, the use of natural gas for industrial boiler fuel use is given low priority and would be among the first uses to be curtailed in the event of a gas shortage. By contrast, high priority uses, the last to be curtailed, consist of agricultural, residential, commercial, and institutional uses. *Id.* at § 3391.

112. *See generally* POSNER, *supra* note 60, at 179.

113. H. BARNETT & C. MORSE, *SCARCITY AND GROWTH: THE ECONOMICS OF NATURAL RESOURCE AVAILABILITY* (1963). The authors contend that "the social heritage consists far more of knowledge, equipment and institutions and far less of natural resources than it once did. Resource reservation, by limiting output, and thereby research, education, and

Economists use the discount method to decide whether or not a natural resource should be exploited at a given time. The discount rate is defined as the opportunity cost of capital—the rate of return that could be earned by investing money in alternative investments of the same risk.¹¹⁴ A potential investor takes the current money value of the natural resource and applies the formula for compound interest, using the discount rate as the interest rate, to calculate the value that the investment would achieve by some future date if it were invested in an alternative opportunity. The investor compares this value to the value the natural resource is anticipated to have achieved by the same future date if it is reserved for development. To determine this anticipated value, the investor estimates the return from the future sales of the resource, less the costs of extraction, to yield a net price.

At the point of equilibrium, when the net price is expected to increase at the same rate as the value of the alternative investment (that is, at the compound interest rate) the investor is, in theory, indifferent to holding or extracting the resource. If the net price rise exceeds that yielded by the compounded rate of interest, the investor will hold the resource for later development; if the net price rises more slowly than that rate, he will choose to extract it and thus exhaust it sooner.

From the point of view of public policy, the private discount rate can be used to determine the wisdom of exploiting or holding natural resources only if we assume that each individual unit, acting separately, inherently works in the best interests of the whole, extended over time. Hotelling,¹¹⁵ Pigou,¹¹⁶ Solow,¹¹⁷ and others, challenge this assumption, pointing out that the long-term interests of society may not be identical to the interests of individuals.

If the private discount rate derived from the market is too high natural resources will be exploited too soon. There are several reasons to suspect that private discount rates are too high. Individuals may discount for some risks, such as wealth transfers, that society as a whole does not share.¹¹⁸ Equally important, private time preferences may favor the present generation at the expense of future generations, because future generations cannot bid in the market place.¹¹⁹

investment, might even diminish the value of the social heritage." *Id.* at 11-12. For a more recent assessment of the long-run importance and availability of natural resources for economic growth and well-being, see SCARCITY AND GROWTH RECONSIDERED (V.K. Smith ed. 1979).

114. For a particularly clear explanation of the discount rate, see Solow, *The Economics of Resources or the Resources of Economics*, 64 AM. ECON. REV. PAP. & PROC. 1 (1974).

115. Hotelling, *The Economics of Exhaustible Resources*, 39 J. POLIT. ECON. 137 (1931).

116. A. PIGOU, *ECONOMICS OF WELFARE* 23-30 (1950).

117. Solow, *supra* note 114.

118. *See id.*

119. Strictly speaking, the interests of future generations may enter present market calculations in the following way: An investor may recognize that the resource will be more

To allow quantitative analysis of the gap between societal preferences and the individual's interest, economists have developed the conceptual tool of a social discount rate.¹²⁰ The social discount rate is usually lower than the private discount rate. Thus, even if the anticipated increase in value of resources held in the ground is not so high as to encourage private investors to forego immediate development, public decisionmakers may determine, by applying a lower social discount rate, that preservation is warranted. In effect, the choice of a social discount rate is a policy decision about the intertemporal distribution of income.¹²¹

The major problem with using social discount rates to make investment or policy decisions is that the decisions rendered are still likely to favor the present generation over future ones. Traditionally, the discount rate has been applied over a period of 10 years or, sometimes, 20 years. Some agricultural investments, such as forestry, however, require thirty to fifty years or more to reach maturity for commercial harvest.¹²² Hardwoods, like white oak, may require 200 years to reach maturity. Moreover, in analyzing certain investments, like nuclear power plants, economists often ignore substantial long-term costs by discounting them, in effect, to zero;¹²³ but they may not be zero.¹²⁴ Thus, while the discount rate may be a suitable tool for

valuable to future generations than to an immediate exploiter, even taking into account the effect of compound interest as explained above. He will then hold the resource for a long time, anticipating that if he waits long enough, investors will come to the same realization, and their new appreciation of the value of the resource will be reflected in the price and profit he realizes. Such recognition, however, is far from certain, and may happen long after most investors have lost their willingness to wait. See Stiglitz, *A Neoclassical Analysis of the Economics of Natural Resources*, in SCARCITY AND GROWTH RECONSIDERED, *supra* note 113, 36, 49-61.

120. Solow, *supra* note 114; Baumol, *On the Discount Rate for Public Projects*, in PUBLIC EXPENDITURES AND PUBLIC ANALYSIS 273 (1970).

121. The above critique of discount rates as a tool for economic decisionmaking should not be confused with the different criticism of methodologies used to evaluate investments which questions the accuracy of the projected economic rate of return. According to the latter critique, the economic rate of return does not take into account important externalities such as environmental or public health effects. The remedy for this defect is to quantify these effects to the extent possible (e.g., by estimating the economic costs of dam siltation due to soil erosion which was caused by deforestation) and to include nonquantifiable effects by qualitative consideration. See generally F. ANDERSON, A. KNEESE, P. REED, S. TAYLOR, & R. STEVENSON, ENVIRONMENTAL IMPROVEMENT THROUGH ECONOMIC INCENTIVES 21-38 (1977). Intergenerational issues arising from such "externalities" can be acute.

122. See Helliwell, *Discount Rates in Land-use Planning*, 47 FORESTRY 147 (1974) (proposing a much lower discount rate for forest planning).

123. See *Baltimore Gas and Electric v. Natural Resources Defense Council*, 103 S. Ct. 2246 (1983) (upholding an NRC rule allowing licensing boards to assume that permanent storage of nuclear waste would have no significant environmental impact ("zero-release" assumption)).

124. See Routley & Routley, *Nuclear Energy and Obligations to the Future*, in RESPONSIBILITIES TO FUTURE GENERATIONS, *supra* note 46, at 277-301. For an analysis of a social

analyzing the relative merits of short-term investments, it is not particularly useful for taking account of posterity.¹²⁵

Solow has responded to this problem by proposing a standard under which per capita consumption would be held constant over time, so that no generation would be favored over others.¹²⁶ Under this proposal, the discount rate would vary with time to yield the largest sustainable per capita consumption. Like other social discount rates, however, Solow's runs into the practical difficulty that it would require unattainable accuracy in technological forecasting.

i. Economic Efficiency and the Prohibition of Waste Compared.

The policy of prohibiting waste and that of encouraging economic efficiency stem from different philosophical premises. The prohibition of waste is premised on the belief that resources are physically scarce, either in absolute terms or in terms of diminishing returns from their exploitation. This notion of physical scarcity was developed by Malthus and Ricardo in the early nineteenth century and later elaborated by John Stuart Mill.

Malthus assumed that natural resources, particularly agricultural land, were limited. Projecting a 3% growth in population, he predicted that society would eventually run out of resources to support the population. His *Essay on Population* popularized the idea that natural resource scarcity would eventually impair economic growth.¹²⁷

Ricardo modified Malthus' views, arguing that from the outset producers received diminishing returns from exploitation of a resource because they used the best resources first. The declining quality of remaining resources would lead to scarcity.¹²⁸

Mill accepted Ricardo's view of scarcity, but contended that the law of diminishing returns could be suspended by technical advances.¹²⁹ He also added to conservation literature the idea that per-

rate discount for nuclear waste storage, see Schulze, Brockshire & Sandler, *The Social Rate of Discount for Nuclear Waste Storage: Economics or Ethics?*, 21 NAT. RES. J. 811 (1981).

125. The application of discounting to renewable resources is inconsistent with utilitarian philosophy, which requires that we maximize the total utility over all people (past, present, and future). See Williams, *supra* note 47, at 169. Under certain conditions, the use of discounting to maximize the present value of harvesting renewable resources will cause the species to become extinct. This may be in the economic interests of the harvester, but it deprives future generations of a continuing supply of the resource. Williams argues that utilitarianism implies "an obligation for each generation to consume no more of renewable resources than their maximum sustainable yield." *Id.* at 170.

126. Solow, *supra* note 114, at 10.

127. T. MALTHUS, *AN ESSAY ON POPULATION* (6th ed. reprint 1969). For analysis of the contributions to the Malthusian doctrine of resource scarcity, see H. BARRETT & C. MORSE, *supra* note 113, at 52-58.

128. See generally D. RICARDO, *PRINCIPLES OF POLITICAL ECONOMY AND TAXATION* (1926).

129. J. MILL, *PRINCIPLES OF POLITICAL ECONOMY* 183 (1929).

sonal solitude and natural beauty are natural resources that can become scarce.¹³⁰ The United States' conservation movement, which was at its height between 1890 and 1920, was influenced by these theories.¹³¹

A second premise underlying the prohibition of waste is that the present generation has a self-interest in consuming "natural capital" which future generations would otherwise possess. This premise has led some to assert that government has a duty on behalf of present and future generations to watch over and defend exhaustible natural resources from reckless exploitation.¹³²

Finally, the waste doctrine assumes that there are important limits to the human species' ability to control the future. Complex ecological processes and feedback mechanisms in the global physical system impose significant constraints on our ability to control the environment.

In contrast, the underlying premise of the economic efficiency approach is that real economic growth will continue to be possible even though particular resource scarcities occur.¹³³ The economists argue that advances in science and technology have allowed us to escape the quantitative restraints of nature by developing substitutes for resources as they become scarce.¹³⁴ According to this view, man can harness nature to his ends and progress can be infinite. If the market is allowed to operate efficiently, it will maximize the economic well-being of the present generation and thereby of future generations as well. As Barnett and Morse assert, "By devoting itself to improving the lot of the living, therefore, each generation, whether recognizing a future-oriented obligation to do so or not, transmits a more productive world to

130. *Id.* at 475, 750.

131. See S. FOX, JOHN MUIR AND HIS LEGACY, THE AMERICAN CONSERVATION MOVEMENT (1981); S. HAYS, CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT 1890-1920 (1959); FRANKLIN D. ROOSEVELT & CONSERVATION 1911-1945 (E. Nixon ed. 1957).

132. A. PIGOU, *supra* note 116. Pigou argues that

there is wide agreement that the State should protect the interests of the future *in some degree* against the effects of our irrational discounting and of our preference for ourselves over our descendants. The whole movement for 'conservation' in the United States is based on this conviction. It is the clear duty of Government, which is the trustee for unborn generations as well as for its present citizens, to watch over, and, if need be, by legislative enactment, to defend, the exhaustible natural resources of the country from rash and reckless spoilation.

Id. at 29-30.

133. H. BARNETT & C. MORSE, *supra* note 113 at 244-45. The authors acknowledge that there may be some finite limits, but none that they are able to define.

134. It can be argued, though, that we have no right to assume that technical advances will clean up any mess we make. There are many examples of people with abundant land resources, who reduced a region to desert by misuse and excessive cultivation and then moved on. See Pearce, *Resource Conservation and the Market Mechanism*, in THE ECONOMICS OF NATURAL RESOURCES DEPLETION 191-203 (D. Pearce ed. 1975).

those who follow."¹³⁵

In specific cases, the economic efficiency approach and the prohibition against waste may collide and produce opposite results. The prohibition of waste would bar the exploitation of living resources in excess of maximum sustainable yield; yet the discount rate analysis may indicate that it is economically efficient to exceed this yield, "mine" the resource and invest the resulting income to obtain higher returns elsewhere, for example, by developing the industrial sector. Similarly, it may be physically wasteful not to exploit a renewable living resource, such as fish, up to the optimal sustainable yield, but the market for the fish may be so depressed that the benefits of exploitation would exceed the costs of extraction and marketing. Conversely, it may be physically wasteful to extract a nonrenewable resource, such as oil at a rate that will not maximize total output from the pool over time, but it may be economically efficient to extract the oil more rapidly, albeit at a loss to total eventual output, in order to provide income needed for other investments. Thus, the economic efficiency approach and the waste approach coincide only with respect to comparative use efficiency.¹³⁶

5. *Diversification Against Risk*

Before proposing principles for administering the planetary trust, we should consider the two approaches found in the American law of trust administration: diversification against risk and preservation of the quality of trust assets.

Many jurisdictions in the United States impose on trustees a duty to diversify trust holdings. The theory behind this duty is that if a particular investment were to decline in value, a diversified trust fund would not suffer as serious a loss as would a non-diversified fund, because that particular investment would represent only a small fraction of the diversified fund's total value.¹³⁷ The *Restatement (Second) of*

135. H. BARNETT & C. MORSE, *supra* note 113, at 249.

136. Posner contends that many of the rules and outcomes of the common law system are best understood and explained as efforts to promote efficient allocation of resources. POSNER, *supra* note 60, at 17-19. See also text accompanying notes 109-13 for a discussion of comparative inefficiency in use.

137. See *In re Ward*, 121 N.J. Eq. 555, 562, 192 A. 68, 72 (Prerog. Ct. 1936), *aff'd*, 121 N.J. Eq. 606, 191 A. 772 (1937) (trustee who invested holding all in one county, with almost one half of assets in one bank, breached the trustee's duty). See Note, *Trust Fund Investment in New York: The Prudent Man Rule and Diversification of Investments*, 47 N.Y.U. L.REV. 527 (1972). While failure to diversify is not a *per se* violation of a trustee's duty in New York, many courts there have held that "the investment of a large portion of trust funds in a single security coupled with other elements of hazard may be the basis of a finding of imprudence." *In re Will of Newoff*, 107 Misc. 2d 589, 594, 435 N.Y.S.2d 632, 637 (Sup. Ct. 1980) *citing* *Durnat v. Crowley*, 197 App. Div. 540, 189 N.Y.S. 385 (1921) *aff'd*, 234 N.Y. 581, 138 N.E. 455 (1922). See also *Butte Economy*, *supra* note 98.

Trusts provides that: "Except as otherwise provided by the terms of the trust, the trustee is under a duty to the beneficiary to distribute the risk of loss by reasonable diversification of investments, unless under the circumstances it is prudent not to do so."¹³⁸ This duty to diversify mandates that trustees place no more than "a reasonable proportion of the trust estate" in any given investment.¹³⁹ The *Restatement* lists a number of factors that trustees should consider in developing investment portfolios: 1) the purpose of the trust, 2) the aggregate total of the trust, 3) economic conditions, 4) the type of investment, 5) distribution of both the types of investment and the geographical location of the investments and 6) dates of maturity.¹⁴⁰ At least ten jurisdictions have adopted the *Restatement* rule requiring diversification.¹⁴¹ Investment statutes in North Dakota, New Hampshire, Ohio and Wisconsin also require diversification.¹⁴²

Some courts have been reluctant, however, to impose a duty to diversify trust assets because it holds trustees to a higher level of care than has been required in the past.¹⁴³ Common law decisions generally hold that trust investments are to be examined individually, not as a whole.¹⁴⁴ Once courts have imposed a duty to diversify, the entire portfolio must be examined to determine whether a trustee has invested prudently.¹⁴⁵

This approach is analytically sound because it focuses attention on the impact of changes in economic conditions upon trust investments. Thus, the duty to diversify might be construed to require a trustee to preserve the real worth of the corpus by taking inflation into account in

138. RESTATEMENT (SECOND) OF TRUSTS § 228 (1959). At least one English court, in *Astbury v. Beasley*, has recognized a duty to diversify trust investments. 17 W.R. 638 (1869), noted in 3 SCOTT, *supra* note 59, at § 228. The trustee was found liable for the loss resulting from the overconcentration of investment. *Id.*

Diversification of trust investments is not required if the trust instrument waives this necessity or if prudence dictates that the trustee invest in a limited number of very secure holdings. RESTATEMENT (SECOND) OF TRUSTS § 228 comment c (1959). The latter condition is most likely to occur during times of severe economic insecurity. *Id.* § 228.

139. 3 SCOTT, *supra* note 59, at § 228 n.37.

140. RESTATEMENT (SECOND) OF TRUSTS § 228 comment w (1959). Randol, *Duty to Diversify*, TRUST AND ESTATES, Jan. 1969, at 35.

141. Massachusetts, California, Hawaii, Illinois, Kentucky, Missouri, New Jersey, Tennessee, Wisconsin and Minnesota. 3 A. SCOTT, THE LAW OF TRUSTS § 228 (3d ed. 1967 & Supp. 1982). Most courts do not use arbitrary standards to determine whether sufficient diversity of investments exists. Note, *supra* note 137, at 532.

142. TRUSTS AND TRUSTEES, *supra* note 30, at § 612.

143. See Note, *supra* note 137, at 542. The prudent man is the standard normally applied to determine what level of care is required in any given situation. If the trustee is known to possess greater skill than the average prudent man, the higher level of care will be applied. RESTATEMENT (SECOND) OF TRUSTS § 176 comment a (1959).

144. See Note, *supra* note 137, at 532.

145. This means that the trustee must act prudently both in making individual investments and in balancing his investment package as a whole.

making investments.¹⁴⁶

e. Preservation of Quality

The Anglo-American law of trust administration also obligates trustees to use reasonable care and skill to preserve the quality of trust assets.¹⁴⁷ This duty, in turn, obligates trustees to attempt to prevent loss or damage to the corpus.¹⁴⁸ Trustees are also obligated to make trust property productive.¹⁴⁹ Trustees may be liable for negligent administration if they fail to maintain the quality of investments.¹⁵⁰

In preserving trust assets, trustees are required to maintain the quality of each individual investment.¹⁵¹ Courts have been rigorous in administering this requirement, which prohibits trade-offs and balancing.¹⁵² This doctrine assumes that by examining individual investments under the prudent person rule, trustees can maintain the quality of the entire portfolio. This assumption is questionable. It may cause trustees to behave inefficiently and may encourage them to hold undiversified portfolios.¹⁵³ Thus, while each investment may individually satisfy quality standards, the portfolio may lack diversity, compromising the overall security of the corpus.

2. Proposed Principles for Trustees of the Planetary Trust.

Trustees have a duty to administer the planetary trust so as to fulfill its purpose: to sustain the welfare of future generations. As noted

146. See Note, *supra* note 137, at 541-42. The doctrine of diversity is oriented toward the future, as a means of preserving the actual worth of the trust body. While it is prudent for a trustee to take inflation into account, inflation can often be unpredictable. The duty to diversity might require the trustee to "forego maximum current income and protect against possible inflation with some investments while providing for a regular fixed income with other investments." *Id.*

147. At common law, the holder of a future interest could bring suit against the holder of the present possessory interest for actions which changed or damaged the nature of the property. 3 W. HOLDSWORTH, *supra* note 92, at 121-23; STEPHEN'S COMMENTARY ON THE LAWS OF ENGLAND 172-73 (L.C. Warmington ed. 21st ed. 1950).

148. Public trust doctrine provides a useful analogy. No significant deterioration of a natural resource is allowed unless the degradation will enhance the benefits of future generations. W. RODGERS, *ENERGY AND NATURAL RESOURCE LAW* 182 (1979). The public trust doctrine has been narrowly applied to navigable waters, coastlands and nonrenewable resources. It could be extended to other natural resources. See Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 471 (1970) (leading analysis of the public trust doctrine).

149. RESTATEMENT (SECOND) OF TRUSTS § 181 (1959).

150. *Id.* at §§ 199, 201, 205 (1959).

151. *Withers v. Teachers' Retirement System of the City of New York*, 447 F. Supp. 1248, 1255 (S.D.N.Y. 1978), *aff'd*, 555 F.2d 1210 (2d Cir. 1979) ("[i]n evaluating a trustee's investment decision under the prudent man rule, the focus of the court's inquiry is the individual investment itself rather than the performance of the portfolio as a whole").

152. See, e.g., *In Re Bank of New York*, 35 N.Y.2d 512, 517, 364 N.Y.S.2d 164, 168, 323 N.E.2d 700, 703 (1974).

153. See POSNER, *supra* note 60, at 329-30.

above, this primary purpose encompasses three subpurposes: sustaining life-support systems of the planet, sustaining ecological processes, and sustaining a healthy and decent environment.¹⁵⁴ These purposes should inform our choice of specific duties for planetary trustees.

No single approach to managing property for future generations is adequate for all situations. The preservation approach calls for keeping intact valued characteristics of given resources. While this approach may be appropriate for unique resources (assuming that we can identify them), it will not necessarily lead to a decent and healthy environment for all people, nor even to the maintenance of important ecological processes.

The reasonable use approach, which prohibits waste, is, by and large, consistent with the purposes of the planetary trust. The duty not to exploit renewable resources beyond the maximum sustainable yield, for example, is essential to the fulfillment of the subpurposes of maintaining the integrity of ecological processes and sustaining a healthy and decent environment. Many other duties implied by the prohibition of waste, however, are not essential to the achievement of trust purposes.¹⁵⁵

Similarly, planetary trustees' duties cannot be derived solely from the standard of economic efficiency. Although the standard would help maximize consumption for present generations, who might then have more to pass on to future generations, it is not a good tool for taking account of long-term costs and benefits. In practice economic efficiency favors the present generation at the expense of future ones. Moreover, the standard of economic efficiency, with its reliance on markets and individual preferences, is fundamentally Western in outlook and conflicts with the world views of many cultures.¹⁵⁶

The standards of diversification against risk and preservation of the quality of trust assets are useful principles for planetary trustees, but they can be used only as general guidelines. Certainly it would be inappropriate to carry the minutiae of American trust law into that governing our planetary trust. Moreover, to insist literally on preserv-

154. See *supra* text accompanying note 63.

155. Examples include the failure to exploit renewable resources up to the optimal sustainable yield or to cause systems inefficiency in the extraction of resources. Certainly systems efficiency in extracting resources increases the quantity of resources which are potentially available for consumption, and in this sense contributes to maintaining the diversity of the resource base. While such efficiency may be highly desirable, it would not normally be essential to fulfilling the purposes of the trust.

156. See generally, POSNER, *supra* note 60, for a discussion of the role of economic efficiency in the western legal system. Compare, A. NOVE, *THE SOVIET ECONOMIC SYSTEM* (2nd ed. 1980) with A. DOAK BARNETT, *CHINA'S ECONOMY IN A GLOBAL PERSPECTIVE* (1981).

ing the quality of every investment would conflict with the goal of achieving a decent human environment.

What criteria then should we use to select principles for administering the planetary trust? First, the guiding principles should encourage equity among generations, neither giving the present generation license to exploit resources to the exclusion of its descendants, nor imposing unreasonable burdens on the present generation to meet indeterminate future needs. Second, the principles should not require one generation to predict the values of future generations. Rather, they must allow future generations flexibility to achieve their goals according to their own values. Third, the principles should be reasonably clear in application to foreseeable situations. Fourth, since the planetary trust imposes an obligation upon all of humanity, the principles governing trustees should be shared generally by different cultural traditions and be consistent with different economic and political systems.

Trustees should be required to respect two equitable duties in administering the planetary trust. First, they should be required to conserve the diversity of the resource base, so that the present generation does not unduly restrict the options available to future generations in solving their problems and satisfying their own values. I call this obligation "conservation of options." Second, trustees should be required to pass the planet to the next generation in no worse condition than the present generation received it. I call this obligation "conservation of quality." Both duties stem from the fiduciary obligation, in Anglo-American law, to preserve the corpus of the trust, but have been adapted for application to the planetary trust.

These proposed principles constrain trustees' actions in administering the planetary trust. They do not, however, dictate the details of how trustees manage the trust. Thus, so long as the two general principles are respected, members of the present generation are free to discourage systems inefficiency in the extraction and use of natural resources, or to promote the most economically efficient use of resources.

These principles provide for reasonable equity between generations, are reasonably clear in application, and should, if respected, ensure the sustainability of the living environment. Moreover, they appear to be shared generally by the world's major cultural traditions, and are consistent with differing political and economic systems.¹⁵⁷

157. This is based on interviews by the author with scholars and public officials in six countries representative of different political systems, economic conditions and cultural traditions. The author has also benefited greatly from discussions at the Hague Academy of International Law Workshop on the Resolution of Disputes of the New Natural Resources, November 8-10, 1982.

We must still ask, however, whether the proposed principles require that we predict the values of future generations. Some argue that we can never predict the preferences of future generations, either because technological change may alter the available options upon which they base their preferences or because their values, and hence their preferences, will change over time. The principles proposed assume only that future generations want, as a minimum, a reasonably secure and flexible resource base and a reasonably decent natural environment in which to pursue their goals according to their own values.

a. Conservation of Options

Future generations are more likely to survive and attain their goals if they have a variety of options for coping with the challenges they confront. We can maximize the number of options available to them by conserving biological diversity, nonrenewable natural resources, and cultural resources.

i. Biological Diversity. Biological diversity offers many benefits. Foremost, it gives future generations a variety of options for meeting societal needs. Plant and animal species have been the major source of new medicines, foods, and industrial processes.¹⁵⁸ Genetic diversity is essential if we are to harvest the benefits of recent advances in biological technology.¹⁵⁹ Diversity is also necessary to the maintenance of ecological balances, and gives us aesthetic pleasure.

Industrialization and population pressures are now destroying much of the Earth's biological diversity. The recent Conference on Biological Diversity sponsored by the U.S. Department of State and Agency for International Development warned that the accelerating disappearance of species and the resulting shrinkage in biological richness and diversity may be the crucial environmental issue for the rest of the century.¹⁶⁰ It is estimated that at least 20,000 species are becoming extinct each year.¹⁶¹

How much biological diversity do we need to preserve and how do we preserve it? Since the purpose of the planetary trust is to sustain the

158. See E. ECKHOLM, *DOWN TO EARTH* 179-96 (1982); U.S. DEPT. OF STATE, 1981 PROCEEDINGS OF THE U.S. STRATEGY CONFERENCE ON BIOLOGICAL DIVERSITY (1982) [hereinafter cited as DIVERSITY CONFERENCE]; THE WORLD ENVIRONMENT, *supra* note 8.

159. See Brill, *Agriculture Microbiology*, 245 SCI. AM. 199 (Sept. 1981).

160. DIVERSITY CONFERENCE, *supra* note 158. See also N.Y. Times, Nov. 22, 1981, at 8, col. 1.

161. D. Pimentel, *Biological Diversity and Environmental Quality*, 2 (July 2, 1982) (published paper available from author, Cornell University). New species are also evolving, but it is believed that the rate is less than half the annual extinction rate. See generally, N. MEYERS, *THE SINKING ARK* (1979).

welfare of future generations of human beings,¹⁶² we need to maintain at least such diversity as is ecologically essential to human culture. We may call this "reasonable diversity." While no one would claim that all existing species are ecologically essential to human culture, scientists do not yet know the critical threshold at which the extermination of species will seriously disrupt our ecosystem. We do know, however, that it takes thousands of years for species to evolve and that extinction is final. Thus, until we have more information, we should give species conservation as much benefit of the doubt as is feasible.

Even if we knew which species we wished to preserve, we would still have to decide how we should go about preserving them. There are three primary strategies for conserving biological diversity: 1) the zoo or gene-bank approach of preserving species by isolating and protecting them; 2) the species-by-species approach of protecting individual species as the need is felt to arise; and 3) the ecosystem approach.

The first approach, employed by zoos and botanical gardens, is viewed as a "last ditch strategy" to be used only when the loss of species and ecosystems is unavoidable. When put into captive places, many organisms do not fare well, and they lose genetic variability.¹⁶³ Increasingly gene-banks are used to store plant species for later use in agriculture and medicine, but this creates significant storage and maintenance problems.¹⁶⁴ Moreover, it is advisable to keep duplicate storage banks for every species deposited. Finally, this approach is very expensive.

In the past, most protection efforts have proceeded on a species-by-species basis. This approach, taken alone, is inadequate to preserve our planet's biological diversity. While public attention has been riveted on the protection of such glamorous endangered species as tigers, bald eagles, and whales, science has shown that smaller, less well-known life forms are more vital to the ecosystem.¹⁶⁵ Worldwide, too many species are threatened to rely on this species-by-species approach; we simply cannot individually identify and protect every valuable species. Moreover, the main threat to most species is the

162. See *supra* notes 16-27 and accompanying text. If the human and other species are inhabitants with an equal claim to existence, then we have no right to extinguish any species. This would, of course, be impossible to implement in practice, so we still need to decide what species to preserve and how.

163. COUNCIL ON ENVIRONMENTAL QUALITY, 11TH ANNUAL REPORT OF THE COUNCIL ON ENVIRONMENTAL QUALITY at 65 (December 1980).

164. *Id.* at 64-65. See generally Plucknett, Smith, Williams, & Murthi Anishetty, *Crop Germplasm Conservation and Developing Countries*, 220 SCI. 163 (1983) (for an overview and analysis of the global network of gene banks).

165. See generally DIVERSITY CONFERENCE, *supra* note 158; D. Pimentel, *supra* note 161.

destruction of habitats which support numerous interdependent species.

Focusing on the destruction of habitats suggests a third strategy for preserving biological diversity: the protection of a representative cross section of the world's ecosystems.¹⁶⁶ This approach is being pursued through the global network of Biological Reserves that has been created under the auspices of the United Nations Educational, Scientific, and Cultural Organization (UNESCO). As of late 1981, UNESCO had recognized 210 areas in 55 countries as belonging to this network.¹⁶⁷ Helliwell advocates a variant approach under which every country would devote about 20% of its territory to nature conservation.¹⁶⁸ Countries could either set aside 20% of their land to be used exclusively for this purpose, or could set aside 10% and ensure that a variety of wildlife survives outside the reserved area. While this proposal may be appealing to some, it is unlikely to be politically accepted.

Even if we agree upon a method of conserving biological diversity, two important political problems remain. First, we must convince the present generation that conservation contributes to its own well-being and to the well-being of future generations to whom they owe an obligation. Although numerous studies have estimated the economic benefits of species diversity,¹⁶⁹ it has been more difficult to assess future risks imposed by the loss of species and to make these risks comprehensible to the present generation. Further studies and public education will be necessary to create a consensus that conserving biological diversity is urgent and worthwhile.

The second major political obstacle to the adoption of a program for conserving diversity is deciding who should pay the immediate costs of conservation efforts. Since the resource base is the heritage of all countries, theoretically each country should share the costs of conservation, but to date they have rarely been willing to do so. Those who create the situations that threaten resource diversity should contribute proportionately to the costs of conserving it. Thus, industrialized countries should bear a larger portion of the cost.

ii. Nonrenewable Resources. The principle of conserving a di-

166. Many biologists and ecologists have recommended preservation of habitats as the most promising approach to preserving biological diversity. See, e.g., E. ECKHOLM, *supra* note 158, at 194.

167. See B. LAUSCHE, GUIDELINES FOR PROTECTED AREAS LEGISLATION, International Union for the Conservation of Nature (IUCN) (Environmental Policy and Law Paper No. 16 1980).

168. Helliwell, *The Concept of 'Waste' and the Conservation of Nature*, 2 ENVIRONMENTAL CONSERVATION 271 (1975).

169. See *inter alia*, E. ECKHOLM, *supra* note 158, at 176-96; DIVERSITY CONFERENCE, *supra* note 158; THE WORLD ENVIRONMENT, *supra* note 8, at 209-45. See generally, N. MEYERS, *supra* note 161.

verse resource base will also affect our management of nonrenewable resources, such as fossil fuels. Certainly trustees should be forbidden to use up all known reserves of a given resource when no substitutes are available. This prohibition could be construed to enjoin a country from exhausting its groundwater supplies or rendering them useless, when no other sources of fresh water are readily available. Alternatively, we might require countries to diversify their use of existing resources to prevent the depletion of any particular resource. This approach would, for example, discourage countries from relying exclusively on one or two energy sources, such as coal and oil. By drawing on a diverse pool of energy sources, long-term diversity could be maintained.

The principle of diversification suggests a second rule for managing nonrenewable resources: exploitation of one resource should be offset by investment in research and development of substitute resources.¹⁷⁰ Developing substitutes increases the number of resources available, which offsets the depletion of others, and thus preserves the diversity of our resource base. This strategy has been employed successfully in the past. In the nineteenth century, Englishmen feared we would exhaust coal supplies, but investment led to the development of alternative energy sources; hence, the predicted shortage never arrived.¹⁷¹

We often do not recognize the economic importance of natural resources for many years, or even centuries. For example, uranium and titanium have only recently been recognized to be valuable resources. Similarly, oil companies used to flare most natural gas produced as a byproduct of oil extraction because the cost of delivering the gas exceeded the price it could command. Today, we usually exploit this gas because its value as an energy resource has risen sharply. Nevertheless, we still ignore the presence in some natural gas reserves of rich supplies of helium, allowing great amounts to escape into the atmosphere de-

170. See B. ACKERMAN, *SOCIAL JUSTICE IN THE LIBERAL STATE* 214 (1980).

171. President Carter summarized the energy transition in the last two centuries in his address of April 18, 1977:

We must look back into history to understand our energy problem. Twice in the last several hundred years, there has been a transition in the way people use energy.

The first was about 200 years ago, when we changed away from wood—which had provided about 90 percent of all fuel—to coal, which was much more efficient. This change became the basis of the Industrial Revolution.

The second change took place in this century, with the growing use of oil and natural gas. They were more convenient and cheaper than coal, and the supply seemed to be almost without limit. They made possible the age of automobile and airplane travel. . . .

Because we are now running out of gas and oil, we must prepare quickly for a third change—to strict conservation and to the renewed use of coal and to permanent renewable energy sources like solar power.

1 PUB. PAPERS 657 (1977).

spite its potential as a valuable resource for energy related uses in the future.¹⁷²

These examples illustrate a general problem in conserving options: recognizing what substances will be valuable resources to future generations, and assessing adequately their value. Even if we proceed cautiously, however, we will continue to exhaust nonrenewable resources which could provide a more diverse resource base to future generations. Thus, even conservative resource exploitation should be accompanied by a search for substitutes.

iii. Cultural Resources. As applied to our cultural heritage, the duty to conserve options implies, at a minimum, that we, as trustees, pass a reasonably diverse package of cultural resources to future generations. Cultural diversity provides each generation with the range of experiences, ideas, knowledge, and instruments needed for managing its problems and fulfilling its goals. The duty to preserve cultural diversity does not require that every piece of cultural material be preserved, but it does bar the transmission of a homogeneous cultural package. There are, of course, many practices, such as slavery, that we do not wish to preserve as living practices. But we should preserve a written or oral history of cultural practices, including those we now deem unacceptable, so that future generations may learn from mistakes made in the past.¹⁷³

As we enter the information era,¹⁷⁴ we will need to make new efforts to conserve the heterogeneity of our world cultural heritage. We can conserve cultural diversity by maintaining historical records, by preserving representative cultural objects and edifices, and by conserving living cultural and social practices. To some extent, these approaches are analogous to those outlined for conserving biological

172. For example, helium may be used in long-distant cryogenic (very low temperature) transmission of large quantities of electric power. See U.S. NATIONAL RESEARCH COUNCIL, NATIONAL ACADEMY OF SCIENCES, *HELIUM: A PUBLIC POLICY PROBLEM* (1978). See also E. Cook, *The Helium Question*, 206 SCI. 1141 (1979); D. Eppele and L. Lave, *The Helium Storage Controversy—Modeling Natural Resource Supply*, 70 AM. SCIENTIST 283 (1982). But see, R. POLLACK, *HELIUM, THE DISAPPEARING ELEMENT* (1979).

173. For example, countries in Europe have preserved the remains of several concentration camps as a reminder of the atrocities committed under Hitler. In the United States there are now plans to build a National Museum of the Holocaust. By preserving a record of such practices, people hope to deter future generations from repeating them.

174. For a summary and analysis of the rapid developments in information technology and the implications for society, see Oettinger, *Information Resources: Knowledge and Power in the 21st Century*, 209 SCI. 191 (1980); Gottlieb, Dalfen & Katz, *The Transborder Transfer of Information by Communications and Computer Systems: Issues and Approaches to Guiding Principles*, 68 AM. J. INT'L LAW 227 (1974); House Comm. on Government Operation, *International Information Flow: Forging a New Framework*, H.R. Rep. No. 1535, 96th Cong., 2d Sess. (1980); and 16 STAN. J. OF INT'L STUD. (1980), in which an entire issue is devoted to articles concerned with transborder data flows.

diversity. We must adopt the approach that is most appropriate to the particular aspect of the heritage we are trying to conserve.¹⁷⁵

b. Conservation of Quality

The principle of conservation of quality requires that when we use natural resources, we leave the quality of the natural environment in no worse condition than we received it.¹⁷⁶ Recent generations have used common resources such as air and water as free resources in which to dump their wastes, thereby passing some of the costs of their activities to their descendants in the form of a decline in environmental quality

175. It has been difficult to respect tribal cultures and retain tribal knowledge in the face of economic development in a country. See generally ECONOMIC DEVELOPMENT AND TRIBAL PEOPLES: HUMAN ECOLOGIC CONSIDERATIONS (World Bank, 1981) (for a summary of measures required to mitigate the destructive effects of economic development projects on tribal peoples). The report recommends measures for the

observance and protection of tribal areas, resources and economic potential; provision of adequate social services which take into account specific tribal norms, particularly in health protection against introduced disease; ensuring their cultural integrity and the maintenance of their cultures to the extent they so desire; and providing a forum giving the tribal society an adequate voice in decisions affecting them.

Id. at 3. Tribal knowledge has considerable contemporary value for us in understanding and managing our natural resources. Ethnobiology and ethnopharmacology are sources of knowledge on the identity, location, and mode of use of abortifacients, arrow poisons and fishstunning substances, many of which are unknown to scientists. Tribal people are also a repository of accumulated experience on the sustainable management of marginal environments. *Id.* at 14. Preservation of this knowledge conserves options for ourselves and for future generations in using our natural cultural traditions and cultural knowledge. At the same time, however, it could be costly. Detailed analysis of the conservation of our cultural heritage is reserved for a separate article by the author, *Conservation of the Cultural Heritage of Our Planet* (manuscript in progress).

176. It may be asked whether the duty to leave the quality of the planet no worse than when received is really the same as the duty to maintain the diversity of the resource base. They are complementary, but not the same. To illustrate the difference, we can use a hypothetical from private trust law. Suppose that the trust corpus consists of investments in two different mining companies and two hydroelectric companies. In the first scenario, the trustee shifts the investments into other mining and hydroelectric companies, some of which turn out to be lower quality investments. The value of the trust holdings declines sharply, but the diversity of the holdings does not change. In the second scenario, the trustee combines all the investments into one hydroelectric company, thereby compromising the diversity of the holdings. But the value of the corpus remains the same or improves, because the hydroelectric company maintains its quality as an investment.

In our planetary trust, the quality of the planetary resources may decline, as by pollution of air and water, but this does not necessarily reduce the diversity of the resource base. Similarly, it may be possible for a generation to sustain the inherited quality of the planet but at a high cost to the diversity of its resource base, as by significant loss of genetic diversity. Certainly, the two duties interact. It is easier to maintain the quality of the planet if there are many options available to citizens in doing so. Similarly, it is easier to conserve options, when there is concern about maintaining or improving the quality of the planet. If one generation receives the planet in relatively poor condition, then the obligation to preserve the diversity of the resource base may pose a much more significant constraint than will the obligation to pass it on in no worse condition than that generation received it.

and attendant harm to particular individuals. Such behavior violates the principle of conserving quality.

This is not to say that the environment must remain unchanged; some tradeoffs are inevitable. Theoretically, we may exhaust certain natural resources and cause modest levels of pollution, but pass on a sufficiently increased level of income, capital, and knowledge to enable future generations to develop substitutes for the exhausted resources and methods for abating or managing pollution. Although such tradeoffs are implicitly acceptable, the framework within which such balancing takes place must be carefully articulated.

Under the principle of conservation of quality, there is no basis for distinguishing between different generations; each generation has an equitable claim to the planet's natural resources.¹⁷⁷ At a minimum, this principle obligates each generation to provide succeeding generations with at least the level of resources that the initial generation of human beings enjoyed. The principle does not, however, require that each generation receive an equal amount of resources. One generation may greatly improve the resource base.¹⁷⁸ If so, future generations will receive more than the bare initial minimum; correspondingly, they will have an equitable obligation to pass on intact the enhanced inheritance that they have received.¹⁷⁹

177. No one has shown that the present generation has a right to "the good things in life" superior to the rights of other generations. Personal communicate, Richard B. Brandt, Professor of Philosophy, University of Michigan, January 24, 1983. *See generally*, Williams, *supra* note 47; Kavka, *The Futurity Problem*, in RESPONSIBILITIES TO FUTURE GENERATIONS, *supra* note 46, at 112-23; Callahan, *supra* note 46, at 80-83.

178. Rawls addresses the issue of justice between generations and proposes a principle of "just savings" which is rooted in contract doctrine. J. RAWLS, *supra* note 53, at 284-93. "The just savings principle can be regarded as an understanding between generations to carry their fair share of the burden of realizing and preserving a just society." *Id.* at 289. The just savings principle is intended to improve the welfare of the least advantaged group extending over future generations. *See generally id.* at 289-93. Rawls assumes that each generation is ignorant as to where it is located on the spectrum of generations. Because of the contractual basis of his theory, he does not include the natural heritage within the "just savings" principle. For a detailed analysis of Rawls and the duty to future generations, see E. PARTRIDGE, *supra* note 21. *But see* B. ACKERMANN, *supra* note 170, at 112, arguing that "all citizens are at least as good as one another regardless of their date of birth." Thus, each generation should start with at least the one piece of manna that the initial generation had. *Id.*

179. Under Rawls' "just savings" principle, each generation must make the worst-off individuals better off in succeeding generations. Ackermann rejects this approach because it requires each generation to make sacrifices for succeeding generations. *See* B. ACKERMANN, *supra* note 170, at 224, (diagraming the two different approaches to intergenerational equity). The author's proposed principle, that the present generation must leave the planet in no worse condition than received, would differ from both in that each generation would contribute to determining the precise slope of the curve. It may rise rapidly and then level off, may, in theory, remain level from the beginning, or may continue to rise at varying rates. While each generation must leave the planet in no worse condition than received, it may leave it in better condition.

The imposition of this obligation is just, even if it requires greater efforts than would have been necessary had the corpus not been enhanced. As beneficiary of the planetary trust, each generation benefits from the endeavors of past generations, and the fruits of those endeavors become trust property. Thus, in maintaining the enhanced corpus, each generation merely pays for the benefits it has received.

Alternatively, the duty to maintain the enhanced corpus may be derived from each generation's obligation as planetary trustee. Under Anglo-American trust law trustees have an overriding obligation to preserve the corpus, not to enhance it. But if they do enhance the value of the trust, they cannot profit from the transactions at the expense of the trust. Rather, they are obligated to preserve the enhanced corpus for the trust's beneficiaries.¹⁸⁰

Suppose, however, that one generation does not fulfill its trusteeship obligation and instead passes the heritage on in worse condition than received. Indeed, what if one generation were to pass the planet on in worse condition than it had been for several generations, or even worse than the minimum standard set by the initial generation? Under these circumstances, does the inheriting generation have an obligation to do more than just pass the planet on in no worse condition than received?

If circumstances are sufficiently grave to undermine the basic purposes of the trust, then basic principles of trust law and conservation of quality do impose such a duty on inheriting generations.¹⁸¹ The inher-

180. Trustees are under a duty to use reasonable care and skill to preserve the trust property. RESTATEMENT (SECOND) OF TRUSTS § 176 (1959). They must also attempt to make the trust property productive. *Id.* at § 181. The Restatement notes that "profits arising from the sale or exchange of the principal of trust property or any enhancement in the value of the principal of the trust property are allocable to principal." *Id.* at § 233 comment b. Since increases in value are allocated to the principal, the trustee is under the duty to preserve the enhanced corpus of the trust.

181. When the purpose of the trust is threatened, a trustee may petition the court for application of cy pres or deviation. Both deviation from trust terms and the doctrine of cy pres developed as judicial methods for changing the express terms of a trust. 2 SCOTT, *supra* note 58, at § 167; RESTATEMENT (SECOND) OF TRUSTS §§ 167, 399 (1959).

Deviation permits changes in the administration of the trust in order to preserve the corpus and purpose of the trust. An expanded notion of deviation is relevant to the concept of a global trust. Under this doctrine, the trust could remain dynamic; each generation could protect the trust by altering the administration of the trust to conform with conditions which were not foreseeable at the time the trust was created, but which would reasonably threaten the trust in the foreseeable future if accommodations were not made. For examples of application of this doctrine in the area of trust law, see *Toledo Trust Co. v. Toledo Hospital*, 187 N.E.2d 36 (1962) (Courts will not allow deviation merely because it is requested); *Bank of Delaware v. Clark*, 249 A.2d 442 (1968) (Deviation is only allowed when "it is clearly required for the benefit of all interested parties and for the preservation of the trust corpus").

While deviation of trust terms allows changes in the administration of both private and charitable trusts, the cy pres doctrine allows the purpose of a charitable trust to be altered if the original purpose becomes illegal, impracticable or impossible. RESTATEMENT (SECOND)

iting generation certainly has an obligation to ensure that the planet does not degenerate further. For example, if a past generation has disposed of hazardous wastes in such a way that some of their ill-effects are felt by the present generation, and will be felt even more by future generations, the present generation arguably is responsible to take whatever measures are necessary to ensure that the wastes do not contaminate groundwater or other media so as to harm future generations. To do otherwise would undermine the purposes of the trust.

It is not equitable, however, for one succeeding generation to shoulder the costs of cleaning up after its predecessors, if it receives no offsetting benefits. If one generation can inflict externalities on another, and if all generations follow this pattern, the purpose of the trust will eventually be defeated. Thus, we need urgently to devise methods of encouraging accountability between generations.¹⁸² As detailed below, we should develop methods to force those who produce wastes which inflict serious health risks on future generations to handle the costs of cleaning up the wastes and of caring for those harmed by them.¹⁸³ If properly designed, such measures might encourage living generations to proceed with greater care.

Before discussing these measures, however, we must examine two important problems in applying the principle that each generation should leave the planet in no worse condition than received: 1) how to treat real price differentials in resources between generations; and 2) how to treat unique natural resources.

i. Price Differentials. The issue confronting generations immediately succeeding our own is not likely to be physical scarcity of natural resources, so much as higher real prices for them. In other words, most natural resources will be scarce only in the sense that they will cost more to obtain.¹⁸⁴ Those who argue that there will always be substitute

OF TRUSTS § 399 (1959). The cy pres doctrine is judicial acknowledgment of the fact that conditions change over time and these changes could render a particular charitable purpose impossible to perform. The cy pres doctrine may be inapplicable to the global trust, because the purposes of the trust are conceived as remaining the same; only the means used would alter over time. Because the method of administration would change in the global trust, the trust doctrine of deviation is, however, useful by analogy.

182. It is not practical, for example, to rely on litigation to recover compensation for injuries inflicted by previous generations, even if causality could be shown. Current litigation involving claims for compensation for health injuries allegedly caused by the U.S. Nuclear testing in the 1950's in Utah and Nevada illustrates some of the problems in establishing causation several decades after the events occurred. See *Allen v. United States*, 527 F. Supp. 476 (D. Utah 1981); see also *Atom Bomb Tests Leave Infamous Legacy*, 218 SCI. 266 (1982); REPORT OF THE INTERAGENCY TASK FORCE ON HEALTH EFFECT OF IONIZING RADIATION (June 1979).

183. See *infra* text accompanying notes 366-70.

184. See O'Toole & Walton, *Intergenerational Equity as it Relates to Conservation and Coal Extraction Standards*, 22 NAT. RESOURCES J. 53, 64 (1982).

resources and improvements in extraction technology would likely object to the possibility of an increase in real prices. If these prices did rise, they would argue that the increase was caused by rising costs of other production factors, such as labor, rather than the inability of supply to meet demand.¹⁸⁵

If, however, the net price of natural resources is higher to future generations than to the present one, who should bear the burden of these higher costs? The actions of one generation may raise the real price of natural resources to those in succeeding generations who are least able to pay for them. Moreover, future generations in countries dependent upon resources whose prices do rise may be particularly hard hit. These future generations, however, may have inherited a sufficiently increased level of income and investment in capital and technology to offset any increase in the prices of natural resources relative to other inputs.¹⁸⁶

The possibility that the net prices of natural resources will be higher to future generations raises complex issues of accountability between generations. We should note, however, that the first principle for administering our trust—the obligation to conserve a diverse resource base—is an effective strategy for minimizing the frequency and intensity of real rises in nonrenewable resource prices.

ii. Unique Natural Resources. Another issue in applying the principle of passing the planet on in no worse condition than received is how to treat natural resources which may be unique. For example, a site which offers unique scenic beauty may also harbor important energy or mineral resources.¹⁸⁷ If we preserve the site, we ensure that the next generation will also be able to enjoy its unique beauty. But, if we assume that development of the the mineral resources is economically sound, we will have lost present economic benefits. If we choose to develop the mineral resource, and development destroys the site's unique beauty, we will have benefited the present generation, but future generations will lose an irreplaceable resource. The principles for administering the trust caution against causing such a loss, both because it leaves the planet in worse condition than received and because it may decrease the diversity of the resource base left to future

185. Barnett and Morse have shown that the real prices for several minerals adjusted for inflation have not risen in this century. H. BARNETT & C. MORSE, *supra* note 113, at 164-201. The real prices for timber have, however, risen during certain periods. *Id.* at 170-71. The authors conclude that the data suggests limited scarcity, as defined by prices, during certain time periods.

186. See O'Toole & Walton, *supra* note 184. The authors contend that price increases of fossil fuels may be offset by high incomes, made possible by present consumption of fossil fuels. *Id.* at 64.

187. B. ACKERMAN, *supra* note 170, at 212-13.

generations.¹⁸⁸

Each generation must decide whether a given site is a unique resource that needs to be preserved. Unfortunately, future generations are not represented in this deliberation, although the decision could have an irreversible impact on them. Thus, even if a nation democratically decides to discard a unique resource, the decision may conflict with the values of future generations. Indeed, future generations might be willing to compensate present generations handsomely for preserv-

188. This conclusion assumes that areas of unique natural beauty are valuable resources, even though their tangible benefits to our species may be more difficult to document than the benefits from mineral resources. *See generally* J. SAX, *supra* note 83, for the proposition that areas of unique natural beauty are valuable natural resources. National parks should be preserved because they provide a place for reflection, and serve as models of "continuity, stability and sustenance, adaptation, sustained productivity, diversity, and evolutionary change." *Id.* at 46, 61. *See also supra* note 83. That we do value areas of unique beauty is evidenced by the fact that many countries have adopted legislation designating areas of unique natural beauty as parks, wilderness areas, and the like. *See* B. LAUSCHE, *supra* note 167. *See also* S. ERCMAN, *supra* note 89, at 221-27 (synopsis of nature conservation laws in each European state).

African nations have been particularly active in enacting legislation to protect their flora and fauna. *See, e.g.*, the African Convention on the Conservation of Nature and Natural Resources, *reprinted* in 5 INTERNATIONAL PROTECTION OF THE ENVIRONMENT: TREATIES AND RELATED DOCUMENTS 2037-2060 (B. Ruster & B. Simma eds. 1976) [hereinafter cited as the African Convention on Conservation]. The convention is comprehensive in scope and lays down the fundamental principle that the "contracting states shall undertake to adopt the measures necessary to ensure conservation, utilization, and development of soil, water, flora and fauna resources in accordance with scientific principles and with due regard to the best interests of the people." *Id.* at Art. III.

Many African countries have enacted domestic laws protecting their natural resources. Ghana was one of the first countries to establish an Environmental Protection Council (Decree 239 of January 23, 1974). More recently, Ghana has set up a Forestry Commission with a chief administrator to manage the forestry and wildlife resources. Ghana Forestry Commission Act of 1980. The Environmental Protection Council has also proposed a Water Pollution Control Bill. Other African countries have also passed legislation to ensure conservation of wildlife and biological reserves. *E.g.*, Zimbabwe (then Rhodesia) passed the Parks and Wildlife Act (No. 14 of 1975), and general legislation setting up an extensive system of parks and wildlife which are to be protected; Botswana passed the Fauna Conservation Act (ch. 38:01 L.R.O. 1/1976 and an Amendment Act in game reserve or sanctuary, with a list of species which are to be protected; Gambia passed the Wildlife Conservation Act of 1977 (No. 1 of 1977), which establishes national parks, reserves, and sanctuaries, and controls hunting through a permit system which limits the number of animals caught, and prohibits certain methods of hunting and sale of certain species.

In the South Pacific, Papua New Guinea passed a Conservation Areas Act (No. 52 of 1978), which sets aside areas with "particular biological, topographical, geological, historical, scientific, or social significance, or other special value for the present community and for future generations." *Id.* at Art. III, § 12(1), at 5.

The enactment of legislation does not mean the laws will automatically be enforced. Each of the Conservation Acts includes fines and/or imprisonment as penalties for breaking the law, but without adequate enforcement by competent authorities, the objectives of the laws will not be met. The management of wildlife and biological reserves must also employ the people living in the region. Controlled tourism and hunting or gamekeeping must become viable methods of integrating the ideals of conservation with the need for economic development of the region. Otherwise, laws passed by the developing countries of Africa will show the best intentions but have no real meaning.

ing a given site, if only they had the opportunity. Some attempt must be made to give future generations representation in the decisionmaking process if their needs and desires are to be taken into account.

In addition, at times the international community may wish to preserve a unique site even though the government that controls the site does not wish to do so. If so, other countries may attempt to offer economic or political incentives sufficient to induce the host government to preserve the site. The international situation differs then from the intergenerational one in that interested countries can offer compensation to the controlling government for preserving the site;¹⁸⁹ future generations can offer no such compensation.

Our cultural heritage also contains unique items. Do we leave the planet in worse condition if we destroy them? How do we determine whether a given item is a unique resource which needs to be preserved? To answer these questions we can, in part, draw on our past cultural preservation efforts. National governments and individuals have for centuries preserved selected cultural items by establishing museums. In the last decade the international community has begun to use a new vehicle for cultural preservation: the designation of certain areas as World Cultural Properties under the Convention Concerning the Protection of the World Cultural and Natural Heritage.¹⁹⁰ Although these efforts implicitly recognize the interests of future generations in our cultural heritage, it is not clear that they will be sufficient to prevent the loss of unique cultural properties with enduring value to future generations.

C. *Implications for Economic Development*

Efforts to protect the environment have often been viewed as efforts to preserve the status quo, and hence to retard economic growth. At the turn of the century, the conservation movement in the United States was divided between preservationists like John Muir, who fought for preserving natural areas in their pristine state, and multiple use adherents like Pinchot, who fought for making use of forests and

189. See the World Heritage Convention, *supra* note 81. Technical and emergency assistance are provided to developing countries through the World Heritage Fund. See *infra* note 298. Training assistance to museum staff is also provided bilaterally. Interview with Richard Cook, International Division, U.S. Dep't of Interior, July 15, 1982.

190. The World Heritage Convention, *supra* note 81, at art.11, §§ 1-2. The United States has set up a procedure for nominations, public comment, and screening to select its nominees for the World Heritage List. See 48 Fed. Reg. 7640 (1983) (announcement of the nomination process for 1983); 48 Fed. Reg. 1037 (1982) (list of 112 properties included on World Heritage List). See also *Mountains, Fort Win U.S. "Beauty" Pageant*, Washington Post, July 12, 1982, at A13, col. 3.

other natural areas while conserving them.¹⁹¹

In the early 1970's, many developing countries feared that environmental protection would be promoted at the expense of economic development. The tension between environmental protection and economic development was the dominant issue of debate at the United Nations' first Conference on the Human Environment in 1972 in Stockholm. Prior to the Conference, a meeting of experts was held in Founex, Switzerland, to address this perceived tension. For the first time, the issues were put into a unified analytical framework. The resulting Founex report concluded that

the major environmental problems of developing countries are mainly ones of rural and urban poverty. But simply getting high rates of economic growth, will not by itself guarantee the easing of the urgent social and human problems. As countries develop, they also need to attain social and cultural goals as part of the development process. Environmental issues thus became part of a wider, more integrated view of the development process.¹⁹²

Robert McNamara, then President of the World Bank, put it more bluntly at the 1972 Conference:

The question is not whether there should be continued growth. There must be. Nor is the question whether the impact on the environment must be respected. It has to be. Nor—least of all—is it a question of whether these considerations are interlocked. They are. The solution of the dilemma revolves clearly not about whether, but about how.¹⁹³

In May 1982, countries met in Nairobi for a tenth anniversary conference on the human environment. Awareness of the need for environmentally sound development had increased. As M. Tolba, Director of the United Nations Environment Programme, told the conference, "Stockholm accepted the idea that the solution lay in environment-based development which enhances rather than damages the environment. Then it was a revolutionary concept, today it is common currency among decision-makers."¹⁹⁴ The World Conservation Strategy of 1980 also endorses the concept that conservation and economic development must be integrated.¹⁹⁵

191. For a history of the American Conservation Movement, see S. HAYS, *supra* note 131; S. FOX, *supra* note 131; G. PINCHOT, *THE FIGHT FOR CONSERVATION* (1910).

192. See ENVIRONMENT AND DEVELOPMENT (THE FOUNEX REPORT ON DEVELOPMENT AND ENVIRONMENT), submitted by a Panel of Experts Convened by the Secretary-General of the United Nations Conference on the Human Environment, June 4-12, 1971, Founex, Switzerland [hereinafter cited as THE FOUNEX REPORT].

193. R. McNamara, Address to the United Nations Conference on the Human Environment, Stockholm, Sweden, 1972, *quoted in* N. MEYERS, *supra* note 161, at 207 (1979).

194. *A Reckoning At Nairobi*, DEV. FORUM, June 1982 at 1, col. 1.

195. WORLD CONSERVATION STRATEGY, *supra* note 63, at sec. 1, paras. 9-12, and sec. 9. Developing countries stand the most to lose with disappearing resources. The integration of conservation with development is of utmost importance to them. See Eidsvik, *National*

How do the principles for administering the planetary trust affect countries' aspirations for economic development? Briefly, they help ensure that development can continue to take place. Taken together, they offer a framework for providing future generations with plentiful and diverse resources to use in attaining their goals. The trustees' obligation to enhance options by conserving a diverse resource base should help to ensure that countries have multiple options in developing their economies.¹⁹⁶ It will protect a country's flexibility and help preserve its maneuvering space in analyzing and making decisions about economic development. The obligation to leave the planet in no worse condition than received similarly constrains those who would degrade the planet's life-support systems and the ecological processes essential to sustained development.

These duties place the heaviest burden on developed countries, who are still the largest despoilers of our natural environment.¹⁹⁷ If these duties are not fulfilled, the developing countries seem to have the most to lose, for they have the least resources to be able to adapt quickly and effectively to deteriorating environmental conditions.¹⁹⁸ Moreover, to the extent that developing countries must use scarce resources for remedial environmental action, their growth rates will slow.¹⁹⁹

Poverty has been recognized as a primary cause of ecological degradation. As the World Conservation Strategy observes, "the dependence of rural communities on living resources is direct and immediate Unhappily, people on the margins of survival are compelled by their poverty—and their consequent vulnerability to inflation—to destroy the few resources available to them."²⁰⁰ If people are to be made willing and able to fulfill their obligations as trustees of the planet, their poverty must be alleviated.²⁰¹ We must adopt both short-term measures and a long-term strategy of development which is sustainable

Parks and Other Protected Areas: Some Reflections on the Past and Prescriptions for the Future, 3 ENVIRONMENTAL CONSERVATION 185 (1980).

196. As UNEP's Dr. Tolba said:

On virtually every front there has been a marked deterioration in the quality of our shared environment. The result is that now, when we need more of everything—more housing, more shelter, more food, more jobs, more fresh water—the planet's capacity to meet those needs is being undermined.

This means that our room for maneuver has narrowed considerably since 1972. Tropical forests are being depleted at a rate of almost eight million hectares every year and going with them are their precious mines of irreplaceable genetic resources.

A Reckoning At Nairobi, *supra* note 194, at 12.

197. See WORLD CONSERVATIONS STRATEGY, *supra* note 63, at 11.

198. See generally THE FOUNEX REPORT, *supra* note 192.

199. See I. Sachs, *Environmental Concern and Development Planning*, in THE FOUNEX REPORT, *supra* note 192, at 72-77.

200. THE WORLD CONSERVATION STRATEGY, *supra* note 63, at Sec. 1, para. 10.

201. See THE FOUNEX REPORT, *supra* note 192 at 10-11.

given our planet's finite resources. The proposed principles for administering the trust are consistent with, and indeed promote, sustainable economic development.

III

INTERNATIONAL LAW AND INTERGENERATIONAL OBLIGATIONS

The previous sections of this article developed the thesis that we hold the planet in trust for future generations and that as trustees we have a duty to conserve options and to conserve quality in administering the corpus of the trust. No approach to long-range global environmental problems can be effective, however, unless it is accepted by states and becomes part of international law. Considerable progress has already been made towards acceptance in international law of a fiduciary obligation to future generations and of a duty to conserve the natural and cultural heritage.

A. Nature of the Obligation in International Law

What is the status of the fiduciary obligation to future generations in international law? How is this deeply held moral obligation transferred into a legally enforceable imperative?

There are two major sources of international law: treaties or conventions, and customary international law.²⁰² Although no international treaty spells out a legal obligation to future generations, there are many international agreements, discussed later in this article, which may be viewed as steps toward implementing such an obligation.²⁰³

I contend further that our fiduciary obligation to future generations should be regarded in international law as an obligation *erga omnes*.²⁰⁴ Obligations *erga omnes*, which are based in customary inter-

202. See Statute of the International Court of Justice, Art. 38(1), done June 26, 1945, 59 Stat. 1055, T.S. No. 933, (1945). The statute also recognizes as a source of international law "the general principles of law recognized by civilized nations." *Id.* at Art. 38 (1)(c).

203. See *infra* notes 225-306 and accompanying text. In particular the Law of the Sea Convention, *supra* note 94, and Agreement Governing the Activities of States on the Moon and other Celestial Bodies [hereinafter the Moon Treaty], G.A. Res. 34/68, 34 U.N. GAOR Supp. (No. 46) at 77, U.N. Doc. A/34/46 (opened for signature Dec. 18, 1979), at art. 11 (1979) declare certain natural resources to be the Common Heritage of Mankind, which implies that there is an obligation between generations.

204. Obligations *erga omnes* refer to the protection of interests shared by the international community. In the Barcelona Traction, Light and Power Company, Limited (New Application: 1962)(Belgium v. Spain, Second Phase) 1970 I.C.J. 4 [hereinafter cited as Barcelona Traction Case], the International Court of Justice distinguished the obligations of a State toward the international community from those owed to another State:

[A]n essential distinction should be drawn between the obligations of a State towards the international community as a whole, and those arising vis-a-vis another State in the field of diplomatic protection. By their very nature the former are the concern of all States. In view of the importance of the rights involved, all States

national law, protect the interests of the international community as a whole, rather than those of individual countries. Each country is obligated toward the international community as a whole to respect these obligations.²⁰⁵ The fiduciary obligation to future generations is analogous to such fundamental norms as the prohibitions against genocide and slavery, which the International Court of Justice has characterized as obligations *erga omnes*;²⁰⁶ it is necessary for the maintenance of social communities; it binds all states together, past, present and future.²⁰⁷

If our obligation to future generations constitutes an obligation *erga omnes*, it must be reflected in customary international law. Customary international law requires a consistent general practice. It also requires a psychological element: that the parties to an agreement believe the obligation is required or believe it is consistent with international law.²⁰⁸

can be held to have a legal interest in their protection; they are obligations *erga omnes*.

Id. at 32. The Court referred to the outlawing of acts of aggression and genocide and protection from slavery and racial discrimination as examples of *erga omnes* obligations in contemporary international law.

205. Thus, in theory any State should have a legal interest sufficient to obtain *locus standi* before the International Court of Justice to complain about the violation of an obligation *erga omnes*. See *infra* text accompanying notes 333-40.

206. Barcelona Traction Case, *supra* note 204, at 32.

207. See generally THE CONCEPT OF *JUS COGENS* IN INTERNATIONAL LAW: PAPERS AND PROCEEDINGS 50 (1967) (report of a conference organized by the Carnegie Endowment for International Peace, Lagonissi [Greece] April 1966, analyzing the fundamental character of certain legal principles). The doctrine of *jus cogens* precludes States from negotiating treaties which contravene a preemptory norm of international law. Arguably the fiduciary obligation to future generations is so basic to the human community that *jus cogens* would preclude a treaty that had as its goal stopping the existence of the human species. There may be some norms of environmental protection which eventually will be regarded as *jus cogens*.

208. I. BROWNIE, PRINCIPLES OF PUBLIC INTERNATIONAL LAW 4-12. Brownlie lists four elements of custom:

(a) *Duration*. No particular duration is required if the consistency and generality of a practice are proved. The passage of time is evidence of consistency and generality.

(b) *Uniformity, consistency of the practice*. Substantial uniformity is required. In the *Asylum Case* (Columbia v. Peru), 1950 I.C.J. 266, 277 the International Court found that:

[t]he facts brought to the knowledge of the Court disclose so much uncertainty and contradiction, so much fluctuation and discrepancy in the exercise of diplomatic asylum and in the official views expressed on various occasions, there has been so much inconsistency in the rapid succession of conventions on asylum, ratified by some States and rejected by others, and the practice has been so much influenced by considerations of political expediency in the various cases, that it is not possible to discern in all this any constant and uniform usage, accepted as law

(c) *Generality of the practice*. While the practice need not be universal, the problem is to determine the meaning of the failure of a substantial number of states to protest the practice by other states. Silence may mean either tacit agreement or a simple lack of interest.

While our fiduciary obligation to future generations is *de lege ferenda*,²⁰⁹ it is hard to establish that it already exists as part of customary international law. Certainly many international agreements, charters, declarations and United Nations resolutions evidence concern for future generations and establish precepts intended to protect and enhance the welfare of both present and future generations.²¹⁰ The United Nations Charter, drawn up in the aftermath of World War II, affirmed the

(d) *Opinio juris et necessitatis*. This requires that States adhere to a practice from a sense of legal obligation. The problem is essentially one of proof.

See A. D'AMATO, THE CONCEPT OF CUSTOM IN INTERNATIONAL LAW 74-98 (1971). D'Amato contends that the essential elements of customary international law are an articulation of a legal rule and acts or commitments which follow or reflect it. *Id.*

209. WEBSTER'S NEW INTERNATIONAL DICTIONARY (1972) ("of or proposing a law").

210. See, e.g., The Charter of the United Nations, June 26, 1945, 59 Stat. 1031, T.S. No. 993. The Final Document of the Tenth Special Session of the General Assembly, G.A. Res. S-10/2 U.N. GAOR Supp. (No. 4) at 3, U.N. Doc A/S-10/4 (1978), July 1, 1978, U.N. Doc. A/RES/S-10/2, provides: "The General Assembly, alarmed by the threat to the very survival of mankind posed by the existence of nuclear weapons . . . Removing the threat of a world war—a nuclear war—is the most acute and urgent task of the present day. Mankind is confronted with a choice: we must halt the arms race and proceed to disarmament or face annihilation." *Id.* at 5. The Charter of Economic Rights and Duties of States, *supra* note 9, provides that "[t]he protection, preservation and enhancement of the environment for the present and future generations is the responsibility of all States . . ." *Id.* at art. 30.

The Statute of the Council of Europe, May 5, 1949, 87 U.N.T.S. 103, 104 declares that "the pursuit of peace based upon justice and international cooperation is vital for the preservation of human society and civilization . . ."

The Charter of the Organization of African Unity, May 25, 1963, 479 U.N.T.S. 39, reprinted in 2 I.L.M. 766 (1963), states as one of its purposes that "[t]he Organization shall . . . co-ordinate and intensify their cooperation and efforts to achieve a *better life for the peoples of Africa*. . . ." *Id.* at art. II, sec. 1(b) (emphasis added).

The Pact of the League of Arab States, at Cairo, Mar. 22, 1945, 70 U.N.T.S. 237, 248, was entered into, in part,

"in order to direct [the signatory governments'] efforts toward the goal of the welfare of all the Arab States, their common weal, *the guarantee of their future* and the realization of their aspirations . . ."

Numerous countries recognize an obligation to future generations. The Preamble to the Constitution of the United States includes a duty to future generations among the reasons for establishing the Constitution: "We the people of the United States, in order to form a more perfect union, establish justice . . . and secure the blessings of liberty to ourselves *and to our posterity* . . ." (emphasis added). Reference to posterity is also made in the Preamble to the Japanese Constitution: "We, the Japanese people, acting through our duly elected representatives in the National Diet, determined that we shall secure for ourselves *and our posterity* the fruits of peaceful co-operation with all nations and the blessings of liberty throughout this land . . ." (emphasis added). Kenpo (Constitution) preamble (Japan), *reproduced in translation in* THE CONSTITUTION AND CRIMINAL STATUTES OF JAPAN 3 (1957).

The leadership of the U.S.S.R., in a speech read to the United Nations, recognized the obligation to future generations during a general session on nuclear disarmament. Brezhnev's text read: "the Soviet union is assuming an obligation not to be the first to use nuclear weapons, being confident in the power of sound judgment and believing in mankind's ability to avoid self-annihilation and ensure peace and progress for present and coming generations." Brezhnev's Message to the United Nations General Assembly, June 15, 1982. Gromyko then reaffirmed the importance of the United Nations Charter: "In our days as well, the charter's clear cut provisions from the scourge of war cannot but move every person . . ." President Reagan, addressing the same meeting of the United Nations,

universal concern for the welfare of future generations in its opening statement: "[W]e the peoples of the United Nations, determined to save succeeding generations from the scourge of war" ²¹¹ The Stockholm Declaration of the United Nations Conference on the Human Environment in 1972 expressed a consensus that we need to conserve the planet's natural heritage for future generations. ²¹² The Declaration's first principle provides that "[m]an . . . bears a solemn responsibility to protect and improve the environment for present and future generations;" its second principle declares that "[t]he natural resources of the earth, including the air, water, land, flora and fauna . . . must be safeguarded for the benefit of present and future generations through careful planning and management." ²¹³ The World Charter for Nature, adopted by the United Nations General Assembly in November 1982, expresses global concern for the natural heritage we pass to future generations and provides principles to guide us in conserving that heritage. ²¹⁴

While these and other documents express deep concern for future generations and implicitly assume some duty toward them, taken alone they do not suffice to establish a fiduciary duty to future generations as an existing norm of customary international law. ²¹⁵ Moreover, the

referred explicitly, at several points to obligations to future generations. Address of June 17, 1982.

The National Environmental Policy Act (NEPA) states as an objective that the Nation "fulfill the responsibilities of each generation as trustee of the environment for succeeding generations" National Environmental Policy Act of 1969, 42 U.S.C. § 4331 (b)(1) (1976).

211. The United Nations Charter was adopted in San Francisco on June 26, 1945, and entered into force on October 24, 1945. 59 Stat. 1031, T.S. No. 993.

212. The Stockholm Declaration, *supra* note 87. For the text of the Conference Recommendations and Action Plan, see Senate Comm. on Foreign Relations, 92d Cong., 2d Sess., UNITED NATIONS CONFERENCE ON THE HUMAN ENVIRONMENT. 12-90 (Comm. Print 1972); Staff of House Comm. on Public Works, 92d Cong., 2d Sess., REPORT ON THE UNITED NATIONS CONFERENCE ON THE HUMAN ENVIRONMENT (Comm. Print 1972).

213. The Stockholm Declaration, *supra* note 87 at 4. See generally Sohn, *The Stockholm Declaration on the Human Environment*, 145 HARV. INT'L L.J. 423 (1973) (for analysis of the twenty-six Principles of the Declaration and the negotiating history).

214. The World Charter for Nature, *supra* note 90, at 17. The preamble to the Charter explicitly refers to a global concern for the heritage we leave to future generations. The recently adopted Charter sets forth five principles which are to govern States in their use of the natural heritage: protection of the essential processes of nature from disruption; protection of genetic viability and maintenance of necessary habitats; conservation of land and sea, with special protection to unique areas and representative samples of ecosystems and habitats of rare or endangered species; maintenance of optimal sustainable productivity from all resources; and protection of nature from degradation caused by warfare. The Charter then lays out in eight articles more specific but still rather general guidelines which are to govern States in their relation to nature. Implementation is left to the individual States. The Charter was adopted by a vote of 111-1 with 17 abstentions. The United States cast the sole vote against the Charter.

215. We could also consider the fiduciary obligation to future generations as a general principle of international law recognized by civilized nations. Cf. Statute of the Interna-

duty they create has not been defined with sufficient precision to be treated as a rule of customary international law. Nevertheless, certain standards of environmental protection may be viewed as rules of customary international law and treated as obligations *erga omnes*.²¹⁶

We should strengthen the legal status of our obligation to future generations by embodying it in international treaties and agreements. Agreements regarding the protection of our natural and cultural heritage help define the principles proposed for administering the planetary trust in the context of specific substantive problems. Moreover, such agreements may enunciate specific rules of accountability to future generations which are accepted by diverse members of the international community. The basic rules imposed by these treaties may eventually emerge as norms of customary international law, binding upon all people. Indeed, as discussed below, we have recently taken some steps in this direction.

B. *The Historical Perspective*

The classical system of international law was distinctly European law. It arose at a particular stage of European political development: the demise of church domination and the rise of the nation-state system.²¹⁷ Not surprisingly, international law emphasized respect for national territorial boundaries. Its purpose was to create minimum order among states and to allocate certain powers between them. The central principle of the system was "national sovereignty," which Inis Claude describes as a "principle of irresponsibility."²¹⁸ Claude comments that "[i]t was not surprising that an international legal system, shaped and controlled by sovereigns, should have served the major function of ratifying the concept of sovereignty, sanctifying rights of sovereigns, and legitimizing the irresponsibility of sovereigns."²¹⁹

During the Nineteenth Century states adapted international law to rising laissez-faire economic theories, by reducing restraints on economic activities.²²⁰ When countries did prescribe rules governing eco-

tional Court of Justice, *supra* note 202, at art. 38(1)(c). General principles are rooted in domestic jurisprudence, in rules that have been accepted in the laws of "all civilized nations." They are applied to the relations between States. See Friedmann, *The Uses of 'General Principles' In the Development of International Law*, 57 AM. J. INT'L L. 279 (1963).

216. In the *Nuclear Tests Cases* before the International Court of Justice, New Zealand argued that there was an emerging norm of customary international law prohibiting nuclear testing in the atmosphere. *Nuclear Tests Cases* (Australia v. France) 1975 I.C.J. Pleadings Vol. II, 210-11. The Court never reached the merits of the case.

217. See H. STEINER & D. VAGTS, *TRANSNATIONAL LEGAL PROBLEMS* 329-32 (2d ed. 1976).

218. I. CLAUDE, *SWORDS INTO PLOWSHARES, THE PROBLEMS AND PROGRESS OF INTERNATIONAL ORGANIZATION* 20 (2d ed. 1956).

219. *Id.* at 21.

220. H. STEINER & D. VAGTS, *supra* note 217, at 330.

conomic behavior, they sought to protect and encourage foreign investment.²²¹ Moreover, during the 18th and 19th centuries, international law complemented Western European and American law in protecting property and contract rights.²²²

This heritage of classical international law has three important implications for our analysis of our obligations to future generations. First, it is predicated on a competitive nation-state system. This system frustrates the fulfillment of our fiduciary obligations to future generations. Each generation has an obligation not to profit at the expense of beneficiaries in succeeding generations, or to act in conflict with their interest. By forcing states to maximize current military and economic power or face competitive disadvantage, the competitive nation-state system induces actions which conflict both with the interests of future generations and with those of other members of the present generation. Second, classical international law is predicated on the Western economic system, which now uses discount rates determined by market rates of interest to determine the relative desirability of resource investments. While economists have developed the conceptual tool of a social discount rate to account for societal preferences, this rate cannot, in practice, capture fully the long-term interests of future generations.²²³ Finally, classical international law has encouraged foreign investment, with little accompanying concern for the impact of such investment on host countries' natural systems.

The laissez-faire perspective of classical international law has only recently begun to adapt itself to the dramatic changes in public attitudes toward the environmental consequences of human activities. Communities increasingly recognize that they are no longer isolated bodies. Rather, they must interact with other communities to achieve their social, economic, and political goals. There is also an increasing recognition of global interdependencies in all spheres of life.²²⁴ In particular, we are increasingly aware of the human impact on complex natural and physical systems of the planet which are oblivious to national political boundaries.

221. *Id.*

222. H. STEINER & D. VAGTS, *supra* note 217, at 330.

223. See *supra* notes 114-26 and accompanying text. Countries have never developed a global social discount rate. Admittedly, agreement upon such a global discount rate would be difficult. Moreover, targeted countries could argue that by applying such a rate, they have effectively been taxed by the international community and should be compensated accordingly.

224. See, *inter alia*, M. CAMPS, *THE MANAGEMENT OF INTERDEPENDENCE* (1974); H. CLEVELAND, *THE THIRD TRY AT WORLD ORDER: U.S. POLICY FOR AN INTERDEPENDENT WORLD* (1977).

C. *The Current Perspective*

Our attitude towards global environmental issues in 1984 has changed dramatically since 1962, a mere twenty-two years ago, when Rachel Carson's *Silent Spring*, a precursor of the environmental movement, was published.²²⁵ This change in attitude has been gradual, but steady.

When 113 countries met for the first Conference on the Human Environment in Stockholm in 1972 they disagreed about the need to protect the environment, but ultimately agreed upon a comprehensive plan "for the preservation and improvement of the human environment, for the benefit of all people and for their posterity," and established the United Nations Environment Programme (UNEP).²²⁶ Now the need to protect the environment is widely accepted. The UNEP's 1982 report on the world environment, however, cautioned that "despite the evidence that people's perception of environmental problems has improved, it is less clear that many groups have adapted their lifestyles as a result."²²⁷

Nevertheless the last two decades have seen an unprecedented volume of national and international action on environmental concerns.²²⁸ Many international agreements, conferences, resolutions, and expert reports have addressed international environmental issues and, at least indirectly, our obligation to future generations.²²⁹ By reviewing developments, we can assess how far we have come towards recognizing and accepting our obligations as trustees for future generations.

I. *Protection of the Natural Heritage*

In the last decade, the world community has devoted considerable attention to protecting our natural heritage, but efforts to date seem woefully inadequate to meet the rapidly escalating problems. For convenience, we can categorize efforts to protect the natural heritage into two groups: those protecting resources within national spaces (includ-

225. R. CARSON, *SILENT SPRING* (1962).

226. The Stockholm Declaration, *supra* note 87. The Stockholm Action Plan for the Human Environment was submitted in the Report of the United Nations Conference to the Human Environment, A/Conf. 48/14/Rev. 1, June 1972, and endorsed in G.A. Res. 2994, 27 U.N. GAOR Supp. (No. 30) at 42, U.N. Doc. A/8730 (1972).

227. THE WORLD ENVIRONMENT, *supra* note 8, gives a ten-year assessment of the Stockholm Conference Declaration and Action Plan. For a critical report on the Nairobi Conference and UNEP's 10 year assessment, see Tinker *Stockholm Euphoria and Nairobi Blues*, NEW SCIENTIST 663-74 (1982).

228. The Commission on Environmental Policy, Law and Administration (CEPLA) in Bonn has collected over 18,000 pieces of environmental legislation in its computerized files, much of it enacted recently. Letter to the author from Wolfgang Burhenne, CEPLA Director (Aug. 7, 1981). The Institute is located in Bonn, West Germany, and is supported by the IUCN.

229. ENVIRONMENTAL LAW, AN IN-DEPTH REVIEW, UNEP Report No. 2 (1981).

ing natural resources shared by states with common borders), and those protecting international common spaces. This section summarizes efforts to protect the natural heritage in each of these categories and then analyzes the extent to which they show acceptance in law of an obligation to future generations.

a. National Spaces

National sovereignty is the prevailing legal principle governing the natural heritage found within the territories of states. United Nations General Assembly Resolutions,²³⁰ the Charter on the Economic Rights and Duties of States,²³¹ and the U.N. Declaration on the Human Environment²³² affirm states' sovereignty over their natural resources. This means that states must enact and implement their own policies to protect the natural heritage within their own national boundaries.

During the last few decades the quantity and scope of national legislation protecting the natural heritage has increased dramatically. The United States, Canada, and Western European countries have led the world in enacting legislation to protect air and water quality, maintain soils, and control various sources of pollution. Since these efforts are widely known, and material on them is readily available, they will not be discussed at length here.²³³ What is not so widely known or appreciated is that nearly all countries today have enacted at least one statute protecting the environment.

It is difficult to generalize about the scope and effectiveness of national environmental legislation in developing countries. One of the earliest acts of the new state of Papua New Guinea was the adoption of the Conservation Areas Act, which sets aside areas with "particular biological, topographical, geological, historical, scientific, or social significance or special value for the present community and for future generations"²³⁴ On the African continent, national legislation has focused primarily on setting aside parks and wildlife preserves, and protecting certain species of wildlife.²³⁵

230. See the U.N. Resolution on Permanent Sovereignty Over Natural Resources, G.A. Res. 3171, 28 U.N. GAOR Supp. (No. 30) at 52, U.N. Doc. A/9030 (1973) which recalls six previous general Assembly Resolutions related to permanent sovereignty over natural resources. See also the Declaration and Programme of Action on the Establishment of a New International Economic Order (NIEO), *supra* note 9, at 4, 9.

231. The Charter of Economic Rights and Duties of States, *supra* note 9, at 51.

232. The Stockholm Declaration, *supra* note 87, at Principle 21.

233. See S. ERCMAN, *supra* note 89. For the text of United States environmental statutes, see SELECTED ENVIRONMENTAL LAW STATUTES (1983).

234. Conservation Areas Act, No. 52, of 1978. Art. III. 12(1), at 5 (Papua New Guinea).

235. See, e.g., Parks and Wildlife Act No. 14 of 1975, legislation in Zimbabwe, that set up an extensive system of parks and wildlife which are to be protected; Botswana Fauna Conservation Chapter 38:01 L.R.O. 1/1976 and an Amendment Act in 1979, whereby the President may declare any area to be a game reserve or sanctuary, with a list of species

One problem with national efforts to protect the environment is that they are often limited in scope and territorial reach. Although many countries have enacted laws to control air and water pollution, they often apply only to certain provinces or municipal areas. Some countries have enacted laws regulating the importation of pesticides, but they are often too general to be effective.²³⁶

Even when national environmental laws appear, on their face, to offer effective solutions, their implementation is often plagued with problems. Foremost is the problem of enforcement, which appears in all countries. While the conservation statutes often provide for fines and or imprisonment as penalties for violation of the law, these penalties are rarely invoked.²³⁷ Second, national governments often fail to win the cooperation of people in affected areas. To build support for environmental protection programs, governments must educate local people about environmental problems and provide them with economic incentives to cooperate. The establishment of game reserves, for example, must be accompanied by measures which bring economic advantage to local people, if they are to succeed. Finally, protecting the environment from air and water pollutants can be expensive. Countries fear that proper environmental controls will make their products less competitive in international trade. This fear may also be fostered by foreign multinational corporations which insist that it would be impossible or too expensive to develop natural resources in host countries while using proper environmental controls. Thus, the impact of national legislation to protect environmental quality has remained modest in many countries.

Both developed and developing countries are cooperating increasingly in regional programs to protect the environment. Such programs have been born of a growing awareness that countries cannot protect the environment within their borders without the cooperation of their neighbors. Most agreements address specific problems, such as pollution of lakes, rivers or seas, and protection of endangered species.²³⁸

which are to be protected; Gambia passed the Wildlife Conservation Act of 1977, No. 1 of 1977, which establishes national parks, reserves, and sanctuaries, and controls hunting through a permit system which limits the number of species caught, and prohibits certain methods of hunting and the sale of certain species.

236. 6 U.S. NATIONAL RESEARCH COUNCIL, NATIONAL ACADEMY OF SCIENCES, PESTICIDE DECISION MAKING 85-91 (1977). For international efforts to regulate pesticides, see D. KAY, THE INTERNATIONAL REGULATION OF PESTICIDE RESIDUES IN FOOD (1976).

237. For example, the Endangered Species Convention, *supra* note 87, can be a powerful tool for controlling international transportation of protected species, but enforcement depends on the ability and willingness of customs officials to identify individual wildlife. Domestic laws also are dependent upon the enforcement efforts of local officials. See E. ECKHOLM, *supra* note 158, at 193-94.

238. About 300 multilateral treaties can be considered as concerned with international protection of the environment, many of which are regional agreements. See A. KISS, SUR-

The 1968 African Convention on the Conservation of Nature and Natural Resources, for example, provides for the protection of certain species and encourages the establishment of nature reserves in member countries.²³⁹ Regional conventions will play an increasingly important role in maintaining environmental quality.

Other international agreements are broader in territorial scope, pledging countries of different regions to engage in concerted action to protect the environment within their national boundaries. Four international conventions explicitly aim to protect the natural heritage located inside state borders: the Convention on Wetlands of International Importance (1971);²⁴⁰ the Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973);²⁴¹ the Convention on Conservation of Migratory Species of Wild Animals (1979);²⁴² and the Convention Concerning the Protection of the World Cultural and Natural Heritage (1972).²⁴³ Each of these conventions constrains what member states can do to their domestic resources and provides for mutual accountability.

Principle 21 of the Stockholm Declaration on the Human Environment posits that states have an obligation to ensure that activities occurring within their jurisdiction or under their control do not cause harm in areas beyond their national spaces.²⁴⁴ While scholars and government officials have debated whether Principle 21 merely restates a constraint found in traditional international law or whether it imposes a new constraint on countries in order to protect the environment, it has increasingly been accepted as part of the international normative framework.²⁴⁵ Principle 22 calls for broadening liability for causing environmental damage. The International Law Commission has been studying extending national liability to cover injuries caused by acts, such as the emission of air or water pollutants, which are not prohibited by international law. A draft report of the Commission's study is under review.²⁴⁶

One issue the Stockholm Conference was unable to resolve was the mutual obligation of countries sharing a natural resource. In 1973, the U.N. General Assembly addressed the issue, adopting Resolution

VEY OF CURRENT DEVELOPMENTS IN INTERNATIONAL ENVIRONMENTAL LAW 43 (IUCN Env'tl. Pol'y & L. Paper No. 10, 1976).

239. The African Convention on Conservation, *supra* note 188.

240. The Wetlands Convention, *supra* note 87, at 970.

241. The Endangered Species Convention, *supra* note 87, at 1090.

242. The Migratory Species Convention, *supra* note 87, at 16.

243. The World Heritage Convention, *supra* note 81, at 41, TIAS 8226 at 4.

244. The Stockholm Declaration, *supra* note 87, at Principle 21.

245. See J. SCHNEIDER, WORLD PUBLIC ORDER OF THE ENVIRONMENT 142-44 (1975).

246. International Law Commission, "Second Report on International Liability for Injurious Consequences Arising Out of Acts Not Prohibited by International Law," U.N. Doc. A/CN.4/346, Add. 1 and Add. 2 (June 12-13, June 30, July 1, 1981).

3129, "Cooperation in the Field of the Environment Concerning Natural Resources Shared by Two or More States." Resolution 3129 calls for the establishment of "adequate international standards for the conservation and harmonious exploitation of natural resources common to two or more States."²⁴⁷ The Resolution calls on states sharing resources to cooperate in managing them through a "system of information and consultation within the framework of the normal relations existing between them."

Subsequent to the adoption of Resolution 3129, the UNEP established a working group which drafted a code of principles governing shared resources.²⁴⁸ These draft principles are essentially procedural. They would create a duty to provide prior notice and information, and to consult about actions affecting the shared resource. The principles have been considered by various states, but have never been formally codified. Nevertheless, they have been drawn upon in several bilateral and multilateral initiatives addressing specific environmental problems, such as weather and climate modification,²⁴⁹ and transfrontier pollution.²⁵⁰ These developments suggest the emergence of a norm in international law requiring states sharing common natural resources to provide each other with prior notice and information about actions that could significantly affect the resource, and, upon request, to consult about the proposed activity.

The latest broad international effort to protect the natural heritage is the World Charter for Nature, adopted by the United Nations General Assembly in October 1982.²⁵¹ The Charter's preamble explicitly recognizes a global concern for the heritage passed to future generations.²⁵² The Charter sets forth five principles to guide countries in using the natural heritage: protection of the essential processes of nature

247. G.A. Res. 3129, 28 U.N. GAOR Supp. (No. 30) at 48-49, U.N. Doc. A/9030 (1973).

248. See the Draft Principles of Conduct in the Field of the Environment for the Guidance of States in the Conservation and Harmonious Utilization of Natural Resources Shared by Two or More States, Report of the Intergovernmental Working Group of Experts on Natural Resources Shared by Two or More States on the Work of Its Fifth Session, U.N. Doc. UNEP/IG. 12/2, at 9 (1978).

249. United Nations Environment Programme/World Meteorological Organization, DRAFT PRINCIPLES OF CONDUCT FOR THE GUIDANCE OF STATES CONCERNING WEATHER MODIFICATION (1978). See "Draft Document Concerning Co-operation Between States in Weather Modification," in REPORT OF WMO/UNEP MEETING OF EXPERTS DESIGNATED BY GOVERNMENTS ON THE LEGAL ASPECTS OF WEATHER MODIFICATION, Sept. 17-21, 1979, Appendix C.

250. See OECD Council Recommendation on Implementing a Regime of Equal Right of Access and Non-discrimination, 16 I.L.M. 977 (1977); OECD Council Recommendation on Principles Concerning Transfrontier Pollution, 14 I.L.M. 234 (1975). See also Smetts, *The OECD Approach to the Solution of the Transfrontier Pollution Problem* in ENVIRONMENTAL LAW, INTERNATIONAL AND COMPARATIVE ASPECTS, A SYMPOSIUM (J. Nowak ed. 1976).

251. The World Charter for Nature, *supra* note 90.

252. *Id.* at preamble.

from disruption; protection of genetic viability and maintenance of necessary habitats; conservation of land and sea, with special protection to unique areas, representative samples of ecosystems and habitats of rare or endangered species; maintenance of optimal sustainable productivity from all resources; and protection of nature from degradation caused by warfare.²⁵³ The Charter then lays out somewhat more specific guidelines.²⁵⁴ Implementation is left to the individual states.²⁵⁵

Although hortatory, the Charter is significant because it seeks to constrain states' actions on matters which have long been their almost exclusive preserve. Its explicit concern for the quality of the natural heritage that we pass to future generations is encouraging.²⁵⁶

b. International Common Spaces

So far, we have discussed countries' obligations with regard to resources located within their national spaces. We turn now to national obligations in the development and use of international common spaces, such as the atmosphere, oceans, Antarctica, and outer space. Three recent developments have important implications for the management of common spaces: 1) the expansion of national jurisdiction into common spaces, 2) the development of rudimentary institutions for managing common spaces, and 3) the emergence of the concept of a "common heritage of mankind" in certain common spaces, such as the ocean and the Moon. Each has implications for how we fulfill our fiduciary obligation to future generations.

Perhaps the most visible development during the last decade has been the massive extension of national jurisdiction over the oceans. The new Law of the Sea Convention legitimates claims of coastal states to economic resource zones up to two hundred miles wide and gives countries fortunate enough to have a long continental margin exclusive jurisdiction to the outer edge of the margin, even if it goes beyond 200 miles.²⁵⁷ The Convention thus converts some of the most economically valuable ocean territory, which formerly was common space, into na-

253. *Id.* at art. I, para. 1-5.

254. *Id.* at art. II.

255. *Id.* at art. III, para. 22-23.

256. The U.N. Secretary General has been preparing a report which further underlines these points. See Historical Responsibility of States for the Preservation of Nature for Present and Future Generations, adopted by the U.N. General Assembly, on Oct. 27, 1981 by the vote of 80-0 with 55 abstentions. G.A. Res. 36/7, 36 U.N. GAOR Supp. (No. 51) at 14, U.N. Doc. A/36/51. The Resolution asked the Secretary General to complete a Report which will address the pressures to protect nature from a build-up of armaments.

257. Law of the Sea Convention, *supra* note 94, at Arts. 57, 76, 77. For an analysis of some of the issues raised by the trend toward extension of national jurisdiction, see THE NEW NATIONALISM AND THE USE OF COMMON SPACES, ISSUES IN MARINE POLLUTION AND THE EXPLOITATION OF ANTARCTICA (J. Charney ed. 1982) [hereinafter cited as THE NEW NATIONALISM].

tional space. National sovereignty over these areas is not complete, however; it varies according to the function in question. Thus, while countries have exclusive jurisdiction within 200 miles for the exploitation of natural resources, they are generally not allowed to interfere with freedom of navigation in these areas.

Claims of national sovereignty in Antarctica have been suspended while the Antarctic Treaty²⁵⁸ is in effect. Since the Treaty's inception, countries have taken steps to ensure that certain activities carried on in Antarctica will benefit all countries. The new Convention on the Conservation of Antarctic Marine Living Resources looks in this direction.²⁵⁹ Nevertheless, countries have vigorously and persistently asserted claims to Antarctic territory and to the mineral resources it may contain.²⁶⁰

The increasing extension of national jurisdiction into common spaces has an important implication for the planetary trust: that states and their political subdivisions will have an increasingly important role in fulfilling our fiduciary obligations to future generations. This trend suggests that we must focus on decentralized implementation of our fiduciary obligations.

The second important development in the management of common spaces is the establishment of rudimentary international institutions to manage certain common spaces. These institutions are resource-specific and perform only limited management functions. They include the International Whaling Commission,²⁶¹ the International Commission for Northwest Atlantic Fisheries,²⁶² and the International Seabed Authority.²⁶³ In theory, such collective institutions could help fulfill fiduciary obligations to future generations.²⁶⁴

258. The Antarctic Treaty, *done* Dec. 1, 1959, 12 U.S.T. 794, T.I.A.S. No. 4780. *See generally* THE NEW NATIONALISM, *supra* note 257.

259. Convention on the Conservation of Antarctic Marine Living Resources, May 7-20, 1980, — U.S.T. —, T.I.A.S. No. 10240 (1980).

260. *See* THE NEW NATIONALISM, *supra* note 257.

261. International Convention for the Regulation of Whaling, Dec. 2, 1946, 62 Stat. 1716, T.I.A.S. No. 1849. Art. III establishes the International Whaling Commission.

262. International Convention for the Northwest Atlantic Fisheries, Feb. 8, 1949, 157 U.N.T.S. 158. Art. II establishes the International Commission for Northwest Atlantic Fisheries.

263. Law of the Sea Convention, *supra* note 94, at Sec. 4, Part X, Arts. 156-83.

264. The main problem of collective action is that of enforcement. This can be illustrated by the recent International Whaling Commission vote to set zero catch limits on all commercial whaling by 1986, with a gradual phasedown of catch quotas until that date. The motion passed by a vote of 25 to 7 with 5 countries abstaining, with several new members of the Commission giving the anti-whaling side its requisite three-quarters majority. Whaling nations such as Japan and Norway, however, are expected to lodge formal objections, which they are entitled to do within 90 days of the decision. Under I.W.C. rules, formal objections allow those countries to continue whaling and these countries may choose to ignore the 1986 deadline altogether. Fishing and trade sanctions could then be imposed by other nations. In the case of the United States, a unilateral fishing sanction would cost the Japanese more

The third development affecting our management of common spaces is the growing acceptance by many countries of the idea that resources in common space are the common heritage of mankind. This idea has gained adherents as common spaces have become susceptible to commercial exploitation. As the phrase "common heritage" implies, this heritage encompasses both past and future generations.²⁶⁵

The notion of a common heritage has only recently been formally recognized in international law. In 1967, Arvid Pardo, Malta's ambassador to the United Nations, first put forth the proposition that the deep seabed is the common heritage of mankind.²⁶⁶ Three years later, the United Nations General Assembly adopted this principle as the foundation for the Law of the Sea Conference.²⁶⁷ The Law of the Sea Convention, which emerged after more than a decade of negotiations, gives substance to the common heritage principle in the context of seabed resources. The Convention bars claims of exclusive sovereignty over seabed resources, establishes an international regime to govern their exploitation, and provides for countries to share the benefits of exploitation.²⁶⁸ The new Moon Treaty similarly declares that the Moon and its natural resources are the common heritage of mankind, but delays the establishment of a management regime until exploitation of the resources becomes possible.²⁶⁹

than \$425 million a year, compared to the \$50 million which makes up their entire whale catch. As one reporter stated: "There is no other restraint—except Japanese good sense." Wynn, *Win for Whales*, 298 NATURE 412 (1982); see Tangley, *IWC Sets Commercial Whaling Moratorium*, 122 SCI. NEWS 71 (1982).

265. See, e.g., R.J. DUPUY, *L'OCEAN PARTAGE* (1979).

266. While the term "common heritage of mankind" was first offered by Pardo, the term "mankind" has been used in a number of post-World War II treaties, including THE ANTARCTIC TREATY OF 1959. See Goldie, *A General International Law Doctrine for Seabed Regime*, 7 INT'L LAW 796 (1973).

267. The Declaration of Principles Governing the Sea-Bed and Ocean Floor, and the Subsoil Thereof, Beyond the Limits of National Jurisdiction, Dec. 17, 1970, G.A. Res. 2749, 25 U.N. GAOR Supp. (No. 28) at 24, U.N. Doc. A/8028 (1970), reprinted in 10 I.L.M. 220 (1971).

268. Law of the Sea Convention, *supra* note 94, at 52, 53, 173.

269. The Moon Treaty, *supra* note 203. Article 11 includes eight numbered paragraphs and states in pertinent part:

- "1. The moon and its natural resources are the common heritage of mankind, which finds its expression in the provisions of this Agreement and in particular paragraph 5 of this article.
2. The moon is not subject to national appropriation by any claim of sovereignty, by means of use or occupation, or by any other means.
3. Neither the surface nor the subsurface of the moon, nor any part thereof or natural resources in place, shall become property of any State, international intergovernmental or non-governmental entity . . .
4. States Parties have the right to exploration and use of the moon without discrimination of any kind, on the basis of equality and in accordance with international law and the provisions of this Agreement."

Id. at 79.

There is debate as to whether or not "use" in paragraph 4 includes "exploitation." The

These agreements notwithstanding, governments do not agree on the meaning or implications of the common heritage principle.²⁷⁰ Most states accept that the principle, at a minimum, precludes any country from claiming exclusive sovereignty over an area designated as common heritage and obligates them to negotiate in good faith about arrangements for the area. Beyond these basic notions, they disagree. This disagreement reflects broader philosophical, political, and economic differences among countries.

The Law of the Sea negotiations gave rise to two alternative interpretations of how the common heritage principle should be applied to seabed resources. The interpretation advocated by most states, whether developed or developing, has the following elements: 1) no one should exploit the deep sea and its seabed until rules have been agreed upon to ensure that exploitation will be in the common interest; 2) no state should acquire more than its equitable share of the ocean's resources; 3) the world community should determine what constitutes equitable sharing, taking into account the interests of those who did not have a chance to participate in exploiting these resources in the past; 4) an international body should have exclusive and comprehensive authority to administer a deep seabed regime.²⁷¹

A contrary interpretation of the common heritage, rooted in the Lockean notion of property and in a philosophical commitment to free enterprise, is espoused by the Reagan Administration. This interpretation has several elements. First, no state may claim sovereignty over the seabed; therefore, in the absence of a convention to which it is a party, the United States does not need the permission of others to remove seabed minerals. Second, by allowing private enterprise to ex-

critics of this treaty see the United States as providing the technology but not getting an economic return on its investment. Critics are also afraid of an international resource management authority for the Moon being dominated by Third World countries who have the majority in the United Nations. See "The Moon Treaty," Hearings before the Subcommittee on Science, Technology, and Space of the Committee on Commerce, Science, and Transportation, the United States Senate, 96th Cong. 2d Sess., "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies," July 29 and 31, 1980, Serial No. 96-115, GPO Washington (1980) and "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies," Prepared at the request of Hon. Howard W. Cannon, August 1980, Part III, GPO (1980).

270. Jurists also disagree about the concept. Ian Brownlie has characterized the common heritage of mankind as "essentially a concept of *exploitation of and access to resources*." Protection of the Global Heritage, (remarks by Ian Brownlie) 75 AM. SOC. INT'L L. PROC. 32 at 36 (1981) (emphasis in original). The counter position, that the concept is intended primarily to affect the distribution of benefits from the resource, is developed in the discussion following Professor Brownlie's presentation. *Id.* at 52-56.

271. See "The Basic Conditions of Protecting, Exploration and Exploitation," The Third United Nations Conference on the Law of the Sea, Eleventh Session, New York, March-April 1982, Annex III of the Convention on the Law of the Sea and Resolutions, reproduced by the Office of Ocean Law and Policy, Department of State, Washington, D.C., June 1982.

exploit the resources of the seabed, states will satisfy their obligation to the common heritage by increasing the supply and reducing the cost of currently scarce minerals; the principle does not give any country or international authority the right to a particular share of the resources, nor does it mandate redistribution of wealth or technology. Third, national and private enterprises, rather than any international authority, should conduct mining operations. Finally, an international authority which licenses mining enterprises may be desirable to facilitate mining and prevent conflict over mining claims, but it should be confined to recording mining claims, collecting modest licensing fees and resolving disputes. Moreover, the authority should be structured so as to ensure countries a voice commensurate with their technical and capital contribution to seabed mining.²⁷² Because the Convention on the Law of the Sea adopts the former interpretation over this one, the United States and other countries have refused to sign it.

Despite this disagreement, however, countries are increasingly advocating that the common heritage principle be used to govern the management resources in common spaces. Malayasia, for example, has suggested that the principle be applied to Antarctic resources.²⁷³

As originally proposed, the common heritage principle clearly embraced the idea of an obligation to future generations.²⁷⁴ This earlier concern with intergenerational equity could be addressed by incorporating the principles of conservation of options and conservation of quality into the common heritage principle. Moreover, while the principle has been applied only to common spaces, such as the seabed and the moon, in the context of intergenerational obligations it should extend to the natural heritage, wherever located.²⁷⁵

272. See President Reagan's statement on January 29, 1982, and the statement of Ambassador James L. Malone, Special Representative of the President for the Third U.N. Conference on the Law of the Sea, before the House Merchant Marine and Fisheries Committee on February 23, 1982, Current Policy No. 371, App. E in U.S. DEPT. OF STATE, REPORT OF THE UNITED STATES DELEGATION TO THE ELEVENTH SESSION OF THE UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA (1982).

273. Statement by Malaysian Prime Minister Dr. Mahathir at the 37th Sess. of the U.N.G.A., Sept. 1982. The General Assembly considered the question of Antarctica in the Fall of 1983 and adopted a resolution requesting "the Secretary-General to prepare a comprehensive, factual, and objective study on all aspects of Antarctica" and to report back to the 39th Session of the General Assembly. G.A. Res. Dec. 15, 1983, U.N. Doc. A/38646 (1983).

274. See *supra* notes 265-69.

275. For purposes of protecting the welfare of future generations, all natural resources on the planet are part of the heritage. While the extension of the doctrine to cover all parts of the natural heritage would appear to demand significant surrender of sovereignty by States, this is not necessarily so. States will continue to define the normative content of the principle and to implement it within their territories.

c. National Security and Environmental Security

In the last decade, the link between war and the environment has become clearer than ever before.²⁷⁶ Because of the growing realization that warfare is one of the gravest threats to the environmental integrity of the planet,²⁷⁷ the proposition that national security must include environmental protection has gained broader acceptance.

Traditionally national security has been defined as military security. This view assumes that the principal threat to a country's security is military attack by other countries.²⁷⁸ In light of events in the last two

276. The environmental impact of war was a major topic at the UNEP Conference in Nairobi. See *THE WORLD ENVIRONMENT*, *supra* note 8, at 594-608. See also Dr. Tolba's statement at the Nairobi Conference quoted in "A Reckoning at Nairobi," *supra* notes 194 and 196.

277. See *supra* note 6 and accompanying text.

278. See *WEAPONS OF MASS DESTRUCTION AND THE ENVIRONMENT*, *supra* note 10. Several treaties have been negotiated in an effort to limit resort to nuclear weapons and other weapons of mass destruction and to prevent the use in warfare of environmental modification techniques. See Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water, Aug. 5, 1963, 14 U.S.T. 1313, T.I.A.S. No. 5433 (1963) [hereinafter cited as the Limited Nuclear Ban Treaty]; Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, T.I.A.S. No. 6347; Treaty for the Prohibition of Nuclear Weapons in Latin America (also known as the Treaty of Tlatelolco), Feb. 14, 1967, 634 U.N.T.S. 281, reprinted in 6 I.L.M. 521 (1967) (entered into force for twenty-two Latin American States as of Dec. 31, 1979); Treaty on the Non-Proliferation of Nuclear Weapons, July 1, 1968, 21 U.S.T. 483, T.I.A.S. No. 6839 (1968); Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil Thereof, Feb. 11, 1971, 23 U.S.T. 701, T.I.A.S. No. 7337 (1971); Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, Apr. 10, 1972, 26 U.S.T. 583, T.I.A.S. No. 8062 (1972); Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, G.A. Res. 31/72, 31 U.N. GAOR Supp. (No. 39) at 36, U.N.Doc. A/31/39 (1976). A U.S.A.-U.S.S.R. joint initiative for a Chemical Weapons Convention for eventual submissions to the Committee on Disarmament was under active bilateral negotiation from 1977 to 1980. A Radiological Weapons Convention has been under active consideration by the Committee on Disarmament on the basis of a joint U.S.A.-U.S.S.R. proposal submitted in 1979. See *THE WORLD ENVIRONMENT*, *supra* note 8, at 615, table 16-8.

Countries have increasingly recognized that war itself destroys a country's natural and cultural heritage and have agreed upon measures to try to protect these heritages. The 1977 Protocol to the Geneva Convention of 1949 on the laws of war prohibits "methods or means of warfare which are intended, or may be expected, to cause widespread long term and severe damage to the natural environment." Art. 35, para. 3. Other articles of the Convention stress the need to protect the natural environment and prohibit attacks on the natural environment as reprisals. The 1972 World Heritage Convention obligates States "not to take any deliberate measures which might damage directly or indirectly the cultural and natural heritage situated on the territory of other states parties to this Convention." *Supra* note 81 at art. 6, para. 3.

Preparations for war impact heavily on the environment. Expenditures for armaments divert resources away from other uses to which they could be put. The Stockholm International Peace Research Institute estimates that by the end of 1980 global military expenditures had quadrupled since 1946—reaching over \$450 billion per year (in 1978 dollars) by 1980. This represents a 2 to 2.5% annual increase in real terms from 1970 to 1980. These

decades, such as the Arab oil embargo, monetary and trade crises, and environmental disasters, some countries have reconsidered this rather narrow concept of national security. Loss of topsoil, deforestation, and depletion of oil reserves may threaten national security by creating economic stresses, such as inflation and unemployment, which in turn cause political unrest and make countries more dependent upon other countries, and hence more vulnerable to manipulation by them. In *Building a Sustainable Society*, Lester Brown describes the problem as follows:

In the late twentieth century, the key to national security is sustainability. If the biological underpinnings of the global economic system cannot be secured, and if new energy sources and systems are not in place as the oil wells begin to go dry, then economic disruptions and breakdowns are inevitable. In effect, the traditional military concept of 'national security' is growing ever less adequate as nonmilitary threats grow more formidable. The purpose of national security deliberations should not be to maximize military strength, but to maximize national security.²⁷⁹

One major advance since the Stockholm Conference on the Human Environment in 1972 is a growing consciousness that the condition of a state's soils, water, and other natural resources affects its security. This consciousness, however, has yet to be fully incorporated into national security planning.²⁸⁰

expenditures are of particular concern if they compete with and jeopardize environmentally sound management of our resources.

The production and testing of weapons can cause environmental degradation and pollution, such as the problem of disposing of highly radioactive nuclear wastes from the production of nuclear weapons. Indeed, the civilian spin-off from military research and development can raise additional problems of environmental pollution—e.g., the disposal of nuclear wastes generated by civilian uses of nuclear power. The Limited Nuclear Test Ban Treaty and the London Ocean Dumping Convention (which covers the dumping of radioactive wastes at sea) are significant international agreements which address these issues and impose constraints on countries to protect ecological processes and the health of human populations. Limited Nuclear Test Ban Treaty, *supra*; Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Dec. 29, 1972, 26 U.S.T. 2403, T.I.A.S. No. 8165 [hereinafter cited as London Ocean Dumping Convention].

Finally, the settlement of disputes by peaceful means is an integral part of environmental security. The U.N. Charter prohibits the use of force to settle disputes in Article 2(4), and the Inter-American Convention on the Rights and Duties of States provides in Article 10 that "the primary interest of States is the conservation of peace," 499 Stat. 3097, T.S. No. 881 (1933). Peace provides states with the conditions necessary to be able to fulfill obligations toward their environmental and cultural heritage. This means that states, in their capacity as trustees for a global trust, need to conserve options by which to avoid war and to maintain peace.

279. L. BROWN, *supra* note 7, at 364.

280. Conceiving of environmental security as part of national security will challenge the information-gathering and analytical skills of governments because non-military threats to security are harder to define. *Id.* at 362-63.

d. *Human Rights and Environmental Security*

Within the last decade, a number of scholars have argued that the right to a healthy and decent environment which can be passed on to future generations should be recognized as a human right.²⁸¹ Richard Falk, for example, contends that human rights must include "the rights of individuals and groups (including those of unborn generations) to be reasonably secure about their prospects of minimal physical well-being and survival (and) the duty of governments and peoples to uphold this right by working to achieve sustainable forms of national and ecological security."²⁸²

There is now considerable momentum towards international recognition of a right to environmental security. The Council of Europe, for example, has been considering incorporating such a right into its documents.²⁸³ The scope and effect of the right, however, have yet to be defined.

There are two justifications for recognizing a human right to a decent environment. First, ecological balance is necessary if our species is to survive. Second, ecological balance is necessary if human beings are to enjoy a minimally healthy existence. These justifications are similar to those underlying numerous other human rights recognized in recent decades. The law of human rights focused initially on the civil and political rights of individuals against society.²⁸⁴ As former colonies gained independence, this focus was expanded to include economic, social, and cultural rights, such as those recognized in the International Covenant on Economic, Social and Cultural Rights of 1966.²⁸⁵ The right to environmental security is an economic and social obligation of the community to all its members, rather than an individual freedom vis-a-vis society. In this sense, it is analytically similar to the economic, social and cultural rights set forth in the 1966 Covenant.²⁸⁶

The extension of human rights law to embrace environmental security may accelerate the realization of the purposes of the planetary trust by encouraging communities to fulfill their obligations to future

281. R. FALK, *HUMAN RIGHTS AND STATE SOVEREIGNTY* (1981); W. GORMLEY, *HUMAN RIGHTS AND ENVIRONMENT: THE NEED FOR INTERNATIONAL COOPERATION* (1976); Cassin, *Les Droits de l'homme* 140 *RECUEIL DES COURS* 321, 327 (1974 IV).

282. R. FALK, *supra* note 281, at 146-47.

283. For a comprehensive account of the efforts of the Council of Europe on this issue, see W. GORMLEY, *supra* note 281, at 74-120.

284. Universal Declaration of Human Rights, G.A. Res. 217(III), 3 GAOR Supp. at 71, U.N. Doc. A/810 (1948).

285. International Covenant on Economic, Social and Cultural Rights, *adopted* by G.A. Res. 2200, 21 U.N. GAOR Supp. (No. 16) at 49, U.N. Doc. A/6316 (1966).

286. See Henkin, *Economic-Social Rights as "Rights": A United States Perspective*, 2 HUM. RTS. L.J. 223 (1981); Henkin, *Rights: Here and There*, 81 COLUM. L. REV. 1582 (1981).

generations.²⁸⁷

2. *Protection of the Cultural Heritage*

Communities have long recognized the importance of preserving cultural resources for future generations.²⁸⁸ We have, perhaps, made greater progress in preserving the quality and diversity of our cultural resource base than we have in protecting our natural heritage. Nearly all countries today have one or more important museums, although in many cases little attention is paid to displaying or maintaining the collection. To what extent do our efforts to date serve to maintain the quality and diversity of our cultural resources for future generations? In answering this question we must be concerned with both human and natural degradation of archaeological sites, art objects, and other cultural properties. We must also be concerned with the maintenance of a living historical record of cultural practices and traditions of the human species. Moreover, new causes of degradation must be guarded against; the forthcoming revolution in information technology, for example, may lead to the retention of less diversity in the cultural resource base.

Three major international agreements govern the protection of cultural resources: one protecting designated properties during times of armed conflict,²⁸⁹ one providing for the designation and maintenance of certain properties as world natural and cultural properties,²⁹⁰ and one prohibiting illicit trade in cultural properties.²⁹¹

287. Extending human rights to environmental security raises the philosophical question of how we can define our relationship to nature. By treating environmental security as a human right, we implicitly legitimate an exclusively anthropocentric view of our relationship with nature. This creates theoretical tension with the views of those who believe that all species have equal rights to exist. *See supra* notes 13-14. Depending on how we define the human right to environmental security, it could justify more active intervention in the environment than would be acceptable to those advocating equality of species. On the other hand, one can argue that while a "human right" to environmental security may appear to be anthropocentric, it actually is extending "human rights," including the basic right to exist, to other species.

288. For excellent coverage of international and national efforts to preserve cultural properties for future generations, see S. WILLIAMS, *THE INTERNATIONAL AND NATIONAL PROTECTION OF MOVABLE CULTURAL PROPERTY, A COMPARATIVE STUDY* (1978). Nearly all countries today have one or more important museums, although in many cases little attention is given to displaying or maintaining the collection.

289. The Convention for the Protection of Cultural Property in the Event of Armed Conflict, May 14, 1954, 249 U.N.T.S. 240 (1956).

290. The World Heritage Convention, *supra* note 81.

291. The UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property, *adopted* by the General Conference of UNESCO, Paris, November 14, 1970, 10 I.L.M. 289 (1971) [hereinafter cited as the Cultural Property Convention].

The 1954 Convention for the Protection of Cultural Property²⁹² grew out of a growing recognition that modern methods of warfare could easily destroy important cultural resources. Under the Convention, UNESCO is to maintain a registry of cultural properties requiring protection. While protection has been far from perfect, countries have displayed some willingness to protect cultural properties which they perceive to be important during wartime. Examples include Jerusalem and the famous Angkor Wat temple complex in Kampuchea (Cambodia), which survived one war intact, but has been damaged in recent years by fighting and neglect.²⁹³

The 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage seeks to coordinate and assist national efforts to preserve natural and cultural resources. More importantly, it provides procedures for countries to designate resources of universal importance as World Heritages.²⁹⁴ Since the first 12 sites on the World Heritage list were chosen in 1976, the number of nominations submitted has increased annually.²⁹⁵ A few countries, including the United States, have national legislation which assists them in identifying potential sites and maintaining them.²⁹⁶ To date, the World Heritage Committee, composed of government representatives, has placed 112 cultural and natural properties on the list.²⁹⁷

292. The Convention for the Protection of Cultural Property in the Event of Armed Conflict, *supra* note 289.

293. See Garrett, *The Temple of Angkor: Will They Survive?* 161 NAT'L GEOG. 548 (May, 1982).

294. The World Heritage Convention has been ratified by 63 countries, including the United States. The Convention calls for coordinated and consistent protection of heritages in each country and provides for:

the establishment of a 21-member nation World Heritage Committee within UNESCO, the development and maintenance of a World Heritage List, the preparation of a List of World Heritage in Danger, the establishment of a World Heritage Fund, the provision of technical assistance to participating countries upon request, and the promotion and enhancement of public knowledge and understanding of the vital importance of heritage conservation at the international level. Countries voluntarily nominate natural and cultural properties to the World Heritage List. Under the Convention, each participating nation assumes responsibility for taking "appropriate legal, scientific, technical, administrative and financial measures necessary for the identification, protection, conservation, presentation and rehabilitation" of World Heritage properties situated in its territory. The Convention also seeks to ensure that each country recognizes the importance of natural and cultural heritage in the lives of its people.

The Report of the Rapporteur, the World Heritage Committee, Fifth Sess., Sydney, Australia, Oct. 26-30, 1981, UNESCO, released Paris, Jan. 5, 1982, CLT/005/5.1.82.

295. *Id.*

296. See, e.g., The National Historic Preservation Act of 1966, 16 U.S.C. 470 a-i, a-2 (1982). See *Mountains, Fort Win U.S. "Beauty" Pageant*, *supra* note 190, for a review of the 1982 nominees to the World Heritage List.

297. The World Heritage List consists of 112 cultural and natural properties found in all parts of the world. It includes the Old City of Quito in Ecuador, the Pyramids in Egypt, Simien National Park in Ethiopia, Versailles in France, Relics of the Ashanti Civilization in Ghana, Tikal National Park in Guatemala, the Mayan Site of Copan in Honduras, Persepo-

Sites on the World Heritage list are eligible to receive assistance from the World Heritage Fund. The budget for the fund is small, currently \$1,940,000. About one-third of this goes for technical assistance to developing countries.²⁹⁸ The Convention has greater significance than these figures suggest, because it demonstrates that countries can agree that certain natural and cultural properties are worth preserving for future generations and are willing to provide at least modest sums to assist in preserving them. Countries have not agreed, however, on the need for a program to monitor maintenance of sites on the World Heritage list. The United States has argued in favor of monitoring; other countries regard it as an intrusion on their sovereignty.²⁹⁹

States have also expressed concern about international traffic in archaeological relics which they deem to be part of their cultural heritage. In 1970, UNESCO negotiated the Cultural Property Convention, prohibiting the import, export, and transfer of designated cultural properties without the consent of the country of origin.³⁰⁰ Although the United States Senate ratified the treaty, the House has yet to pass legislation implementing it.³⁰¹

Countries have also entered into bilateral and regional agree-

lis in Iran, the Urnes Stave Church in Norway, Wieliczka Salt Mine in Poland, the Ancient City of Damascus in Syria, Mesa Verde, Yellowstone, and the Grand Canyon in the United States, and Garamba National Park in Zaire. *Report of the Rapporteur, supra* note 294.

298. See Technical Co-operation Requests Statement of Accounts of the World Heritage Fund and Adoption of the Budget, in *Report of the Rapporteur, supra*, note 294. The Committee budgeted \$1,940,000.00 for the period November 1, 1981-October 31, 1982. Technical assistance to developing countries is dispersed widely, with the top figure of \$113,450 going to Ethiopia for Simien National Park. Of the requests for assistance in cultural properties, \$67,800 went to Syria to help preserve the old City of Damascus. There is also an emergency assistance fund from which Nepal has received monies in the past.

The United States has not contributed to the Fund for the last two consecutive years, but in 1980 the U.S. made a contribution of \$340,000. See Fradier, *The World Heritage—A Heritage in Jeopardy*, in *WORLD CULTURAL HERITAGE*, UNESCO Information Bulletin No. 18, May 1982, at 7-11. As Fradier states:

As it is widely recognized that the heritage, if of exceptional interest, belongs to the whole of mankind, the magnitude and gravity of the dangers with which it is threatened impose an equally binding obligation on all societies and individuals, who theoretically have a claim on the human heritage. All countries should therefore participate in its protection "by the granting of collective assistance"

Id. at 7.

299. See *The Report of the United States Delegation to the Fifth Ordinary Session of the World Heritage Committee*, Sydney, Austl., Oct. 26-30, 1981, submitted to the Secretary of State by G. Ray Arnett, Chairman of the Delegation, prepared by James F. Orr, National Park Service, U.S. Dept. of Interior.

300. Cultural Property Convention, *supra* note 291.

301. By a vote of 79-0 the Senate gave its advice and consent to the ratification of the UNESCO Cultural Property Convention. The instrument of ratification, however, cannot be deposited until the Convention is implemented by Congress. Enabling legislation was introduced in the Senate in 1973. S. 2677 93d Cong., 1st Sess. (1973). In the House, the bill was introduced in 1976. H.R. 14171 94th Cong., 2nd Sess. (1976), and was referred to the subcommittee on Trade of the House Ways and Means Committee, where it died in committee. See S. WILLIAMS, *supra* note 288, at 164, n.516.

ments, and enacted national legislation, to protect cultural resources. Latin American countries have attempted, albeit unsuccessfully, to address the problem of trade in archaeological relics through the San Salvador Convention.³⁰² A bilateral treaty between Mexico and the United States provides for the recovery and return of stolen archaeological, historical and cultural properties; it has had moderate success.³⁰³ These and other efforts are suggestive of the widespread understanding that countries which value their cultural properties are entitled to have other countries desist from helping plunderers. For those objects of art which deteriorate rapidly in their natural environment, however, preservation in foreign countries may be the only feasible way to preserve them for future generations, when there is no local capacity to do so.

European countries have also enacted regional agreements to protect their cultural heritage. The 1954 European Cultural Convention³⁰⁴ provides that "[e]ach Contracting Party shall regard the objects of European cultural value placed under its control as integral parts of the common cultural heritage of Europe, shall take appropriate measures to safeguard them and shall ensure reasonable access thereto."³⁰⁵ In the 1969 European Convention on the Protection of Archaeological Heritage, countries agreed to create "reserve zones" in which "material evidence to be excavated by future generations of archeologists" will be preserved.³⁰⁶

The agreements described above indicate that many countries are seriously concerned with their cultural heritage, and are willing to agree upon at least modest measures to conserve it. Regrettably, the measures taken to date have focused almost exclusively on individual cultural properties and physical sites. Yet cultures exist within the social and economic context of particular societies. Since this broader cultural milieu is subject to and shaped by outside influences, it is more difficult to conserve than objects of art, monuments, and historic sites,

302. The Convention on Protection of the Archaeological, Historical, and Artistic Heritage of the American Nations (San Salvador Convention), was unanimously adopted by the General Assembly of the Organization of American States. Resolution 210 (VI-0/76), June 16, 1976, *reprinted in* 15 I.L.M. 1350 (1976). The United States, however, never joined the Convention.

303. Treaty Providing for Recovery and Return of Stolen Archaeological, Historical and Cultural Properties, July 17, 1970, United States-Mexico 22 U.S.T.S. 494, T.I.A.S. No. 7088, 791 U.N.T.S. 313. While it does not follow that all countries will, in fact, try to deter illegal traffic in their cultural antiquities, examples such as these treaties are suggestive of a growing concern.

304. European Cultural Convention, December 19, 1954, 218 U.N.T.S. 139, 18 Europ. T.S. 1. Parties were members of the Council of Europe in 1954.

305. *Id.* at 142.

306. European Convention on the Protection of the Archaeological Heritage (1969), May 6, 1969 *reprinted in* S. WILLIAMS, *supra* note 288, at 284.

but the utility of doing so has been demonstrated. For example, African countries, since gaining independence, have sought out indigenous cultural values and institutions which were almost destroyed during the colonial era. They have attempted to combine these values with the values and social institutions of their colonial heritage that are harmonious with their new national identity. As part of this process, they have developed and published national cultural plans intended to serve as vehicles for the exchange of experience and data.³⁰⁷ The heterogeneous cultural base that is emerging from this process of selection will increase the options available for current and future generations of Africans to draw upon in seeking to fulfill their goals. This process sets a worthy example for other countries to draw upon.

IV

IMPLEMENTING OUR FIDUCIARY OBLIGATION TO FUTURE GENERATIONS

The task of implementing our fiduciary duties to future generations will be difficult. Our state and international institutions are designed to handle relatively short-term problems which last no more than a few years. They are not well suited to address longer-range issues, particularly environmental problems whose harmful effects may

307. In 1969, only eight of the forty-one African States which had won independence had enacted legislation protecting their cultural property. They were: Kenya, Malawi, Mali, Nigeria, the Central African Republic, the Sudan, Tanzania and Uganda. H. Niec, *Legislative Models of Protection of Cultural Property*, 27 HASTINGS L.J. 1089, 1116 (1976). Almost all African countries have established cultural policies. These policies not only include protection of cultural property but also use of culture to promote economic and social development. For example, the objectives of the cultural policy of Tanzania include:

1. A selective revival of our traditions and customs.
2. Promotion and preservation of our cultural heritage.
3. Our culture as an instrument of national development and unity.
4. The development of our tribal cultures into one national culture.
5. The contribution of our culture towards the development of mankind and the contribution of other cultures to our own development.
6. The necessity of overhauling the educational systems inherited from the former colonial powers and the need for all Tanzanians to remove the influence of the colonial mentality from their minds.

L.A. MBUGHUNI, *THE CULTURAL POLICY OF THE UNITED REPUBLIC OF TANZANIA 18* (Studies and Documents on Cultural Policies, 1974).

The African countries, which have a diverse cultural resource base, are in the process of selecting which institutions to keep, and which cultures they should borrow from. As President Julius Nyerere of Tanzania states:

I don't want anybody to imagine that to revive our culture means at the same time to reject that of any other country. A nation which refuses to learn from foreign cultures is nothing but a nation of idiots and lunatics. Mankind would not progress at all if we refused to learn from each other. But to learn from each other's cultures does not mean we should abandon our own. The sort of learning from which we can benefit is the kind which helps us to perfect and broaden our own culture.

Id. quoted in Tanzania National Assembly Official Reports 10, Dar es Salaam, 10 December 1962.

not appear for a decade or more. Indeed, powerful political incentives encourage those in positions of power to focus primarily on issues that will bring tangible results in a short time. To fulfill our fiduciary duties to future generations, however, we will have to adopt a long-range perspective.³⁰⁸

I propose that we adopt four basic strategies as a first step in carrying out our fiduciary obligations to conserve options and the quality of the planet. These four strategies are: 1) representation of future generations in international, regional, national, and local decisionmaking; 2) development of a global information network for monitoring resource diversity and environmental quality; 3) promotion of scientific research and development to analyze the impact of human activities upon the natural environment, to develop alternative resources, and to increase the efficiency of the exploitation of existing resources; and 4) establishment of a trust fund for future generations, which could be used to clean up damages inflicted by prior generations and to provide compensation to individuals in future generations who suffer particularized harm from the acts of those in prior generations. The remainder of this article will address these proposals briefly, saving detailed analysis of their application to specific problems for a later article.

Certainly it will not be possible to implement all of these strategies on a global scale in the near term. It may be appropriate and easier to initiate some of them at the regional level. For others, we will wish to begin at the national level. What is important is that we take initial steps now toward implementing these strategies, which we can then build upon in the years to come.

A. Representation of Future Generations

Although decisions made today will affect the welfare of future generations, these generations are generally not represented in the decisionmaking process. While future generations, if given the chance, might be willing to pay large sums of money to prevent certain events, such as climactic change triggered by high carbon dioxide levels, they have no way of voicing their preferences in present decisionmaking processes. We can take at least a small step towards ensuring that the interests of future generations are respected by granting standing to a representative of future generations in judicial or administrative proceedings or by appointing and publicly financing ombudsmen charged with ensuring compliance with the proposed trust principles once they are embodied in positive law.

308. See Boulding, *supra* note 22. Boulding argues that the capacity to consider the long-range issues helps us to manage present problems better. See generally REGIMES, *supra* note 100.

1. *Standing for Future Generations*

A representative of future generations should be granted standing to intervene in proceedings of domestic, regional, and international courts and administrative bodies.

In United States courts, a guardian ad litem could be designated to present claims on behalf of future generations. Historical evidence suggests that the Framers intended the United States Constitution to protect future generations. Historian Henry Steele Commager has observed that "what was uppermost in the minds of the founding fathers all the time [was a] sense of fiduciary obligation to posterity."³⁰⁹ Historical records support the proposition that the Constitution embodies a principle of intergenerational fairness.³¹⁰ If members of future generations constitute a constitutionally protected class, a guardian should be appointed to represent their interests in judicial proceedings, since they cannot themselves assert the protection.

When both immediate and long-range harm to the environment is threatened, as by nuclear testing in the atmosphere, the interests of present and future generations may coincide. In these cases, courts may authorize parties to represent a class including both present and future generations. In the United States, there is already judicial precedent for such treatment.³¹¹ In other cases, where the interests of future generations differ from those of the present, a separate representative will be needed to present their claims.³¹²

309. H. Commager, *America in Its Third Century—What Prospects?* 7-8 (March 7, 1976) (address before the National Town Meeting at the John F. Kennedy Center for the Performing Arts, Washington, D.C.) (transcript on file at the Environmental Law Office, the Lewis & Clark Law School), *quoted in* Gardner, *Discrimination Against Future Generations: The Possibility of Constitutional Limitation*, 9 ENVTL. L. 29, 37 (1978).

310. Gardner, *supra* note 309 at 37.

311. In *Cape May County Chapter, Inc., Izaak Walton Leag. v. Macchia*, 329 F. Supp. 504 (D.N.J. 1971), the Court accepted unborn generations as members of the represented class in a class action brought under the National Environmental Policy Act (NEPA) and related acts. "The members of [the] class are so numerous, in being and in generations yet unborn, as to make it . . . impossible to bring them all before the Court, and with respect to whom there are substantial and common questions of fact and law." *Id.* at 514. In August 1982 Iowa, Missouri and Nebraska filed suit against United States Government officials to enjoin withdrawal of Missouri River water for a pipeline project to transport coal. *Missouri v. Andrews*, Civ. No. CV 82-L-442 (D. Neb., filed Aug. 18, 1982). The Iowa Attorney General put it bluntly: "It is high time that we insist on our full legal rights in order to protect the river for future generations." *Wash. Post*, Aug. 19, 1982, at A-4, col. 1.

312. Stone has proposed that a guardian be appointed by the court for trees and other natural objects. The guardian would bring suit in the name of the natural object when that object is threatened. C. STONE, *supra* note 14. Throughout legal history we have extended rights to groups of people who were previously thought to be incapable of having certain rights (e.g., women and blacks at various times in the United States). When the concept of according rights to a new category is first discussed, it may seem ridiculous, for until the entity receives rights, it is seen as merely an object to be used. *See* Tribe, *supra* note 13, at 1341-46.

Charitable trust law also offers guidance regarding how to provide representation for future generations. The power to enforce a charitable trust lies primarily with the attorney general as protector of the public for whom the trust is established.³¹³ Similarly, in enforcing the planetary trust, the attorney general or some other official could serve as a protector of future generations and designate guardians ad litem³¹⁴ to represent their interests.³¹⁵ The authority to represent future generations should be centralized in one office per jurisdiction; otherwise any private party could gain standing by claiming to represent future generations.³¹⁶ This centralization should not prevent private parties from bringing breaches of trust duties to the attention of the attorney general or other responsible official and requesting designation as guardian *ad litem* for future generations in a specific case.³¹⁷

313. RESTATEMENT (SECOND) OF TRUSTS § 391 (1959). Suit to enforce a charitable trust may also be brought by a co-trustee, by a person who has a special interest in enforcement of the trust, and in some states, by a local district or county attorney. *Id.* § 391 comments a-c. If the suit is initiated by someone other than the attorney general, the attorney general should be joined as a party to the action. *Id.* § 391 comment c.

One who may incidentally benefit from the trust usually cannot maintain an action to enforce the trust. *Id.* § 200 comment c. Bogert distinguishes between those who receive advantages from the administration of a charitable trust and the beneficiaries of that trust. The public at large is the real beneficiary of all charitable trusts; the individuals who receive the direct benefits of the trust are not the beneficiaries, *per se*, but merely the conduits through whom the social gains flow to the actual beneficiary. BOGERT & BOGERT, *supra* note 30, at §§ 362, 411. Thus, the attorney general may enforce the suit as a representative of the true beneficiary, the public. *Id.* § 411.

314. The term "guardian ad litem" is used here to refer to the group or individual who would be authorized to represent the interests of future generations in a specific lawsuit. This term, like the term "trustee" is used as an analogy. The guardian should not be subject to the formalities of a traditional guardian ad litem.

315. The law governing enforcement of private trusts also bears on the issue of representation for future generations. In a private trust, the beneficiary, or his representative, can maintain a suit to enforce the trust if the trustee misadministers the trust or fails to perform his duties as trustee. RESTATEMENT (SECOND) OF TRUSTS §§ 199, 200 (1959). "If a beneficiary is under an incapacity, a suit may be brought on his behalf by his guardian." *Id.* § 200 comment a.

316. The charitable trust experience is instructive here:

The purpose of vesting in some public official such as the Attorney General the exclusive power to begin proceedings to enforce charitable trusts is obvious. The persons affected by such trusts are usually some or all of the members of a large and shifting class of the public. If any member of this class who deemed himself qualified might begin suit, the trustee would frequently be subjected to unreasonable and vexatious litigation. Often no given individual can prove that he will necessarily benefit from the charity. All may be prospective or possible beneficiaries, but no one can be said to be a certain recipient of aid. In ultimate [sic] analysis it is the public at large which benefits, and not merely the individuals directly assisted. Obviously, there is good reason for vesting in a single authority the discretion and power incident to the enforcement of such trusts, rather than in leaving the matter to the numerous, changing, and uncertain members of the group directly to be aided.

BOGERT & BOGERT, *supra* note 30, at §§ 411, 414.

317. The suit to enforce a charitable trust may be brought by the attorney general on his own initiative, or on the initiative of an interested citizen who has brought the alleged

The standing requirements enunciated by the United States Supreme Court will pose a hurdle for those purporting to represent future generations in federal courts.³¹⁸ The landmark environmental case of *Sierra Club v. Morton*³¹⁹ set forth a two-prong test for standing: whether the plaintiff is within the zone of interests protected by law, and whether the plaintiff has suffered harm from the activity in question.³²⁰ To the extent that the planetary trust is enacted into positive law with enforceable duties, future generations will clearly be within the zone of interests protected. Arguably, they cannot suffer harm until they are born. The event causing harm occurs in the present, however, so it must be curbed in the present if harm is to be prevented.³²¹

An alternative to granting standing to a representative of future generations, is to grant standing to the co-trustees of any trustees who allegedly breach their fiduciary duties. Co-trustees and persons with a "special interest" share with the attorney general the power to seek equitable relief to enforce a charitable trust.³²² Under the planetary trust,

breach to the attention of the attorney general and demanded action. *Id.*, § 411, at 413. In the context of the planetary trust, if the Natural Resources Defense Council wished to prevent the burning of helium-rich natural gas, it could request the attorney general to designate it as a guardian for future generations to represent them in court. As a guardian, it might function similarly to a relator: "A relator is a party in interest who is permitted to institute a proceeding in the name of the People or the attorney general when the right to sue resides solely in that official The attorney general prescribes his own rules for granting such consent and they may be entirely informal." *Brown v. Memorial National Home Foundation*, 162 Cal. App. 2d 513, 538-39, 329 P.2d 118, 133 (1958), *cert. den.* 358 U.S. 943 (1958). As a condition of granting consent, the attorney general usually must approve any out of court resolution of the dispute. BOGERT & BOGERT, *supra* note 30, § 411 at 424, 427.

318. For discussion of these issues, see Gardner, *supra* note 309, at 50-52.

319. 405 U.S. 727 (1971).

320. *Id.* at 733. A mere interest in a problem, no matter how longstanding, is not sufficient to confer standing upon an organization. *Id.* at 739. Rather the organization itself or some of its members must have suffered economic or other harm. *Id.* at 735. In a more recent case the Supreme Court refused to apply the "zone of interest" test in determining whether the plaintiffs had standing to challenge the constitutionality of the Price-Anderson Act governing liability for nuclear accidents. *Duke Power Co. v. Carolina Environmental Study Group, Inc.*, 438 U.S. 59 (1978). Lower courts have continued, however, to apply the test in environmental cases involving statutory claims. The Court did require in *Duke Power* that plaintiffs show injury in fact and a substantial likelihood that the relief requested would prevent or redress the injury. *Id.* at 79. A representative of future generations should easily be able to demonstrate that the relief requested would prevent the claimed injury from occurring as a result of the activity under challenge. The injury might subsequently arise, however, from other activities not affected by the requested relief.

321. In this sense it raises concerns similar to those raised by activities which pose significant risks of serious health damage occurring several decades from now. See *Reserve Mining Co. v. United States*, 498 F.2d 1073 (8th Cir. 1974); *Reserve Mining Co. v. Environmental Protection Agency*, 514 F.2d 492 (8th Cir. 1975) (risk to public health from iron ore tailings). As in charitable trusts, suits to enforce a planetary trust would seek equitable relief "to compel the trustees to perform their duties . . . or to enjoin them from committing a breach of trust, or to compel them to." RESTATEMENT (SECOND) OF TRUSTS § 392 comment a (1959).

322. RESTATEMENT (SECOND) OF TRUSTS § 391 comments a-c (1959).

members of the present generation as co-trustees could file suit for breach of a fiduciary obligation. This approach is analytically related to an *actio popularis*, in which members of the public have the right to take legal action to vindicate a public interest.³²³ The environmental statutes of seven U.S. states³²⁴ and recently enacted environmental legislation of New South Wales, Australia offer precedent for this approach.³²⁵ The New South Wales legislation, for example, provides broad protection to the environment and establishes a Land and Environment Court in which any person is entitled to remedy or restrain a breach of the legislation, whether or not his or her personal rights have been infringed by the breach.³²⁶ Suits by co-trustees could facilitate enforcement of the planetary trust and ensure against the possibility that an attorney general might fail to appoint a guardian ad litem to represent future generations in meritorious cases. This approach, however, is also subject to abuse. It could result in specious lawsuits, brought by plaintiffs who, while purporting to act as co-trustees, are

323. For a concise review of the origins of *actio popularis*, see Schwelb, *The Actio Popularis and International Law*, 2 ISRAEL YEARBOOK ON HUMAN RIGHTS 46, 47 n.6 (1972).

324. These are Connecticut, Florida, Indiana, Massachusetts, Michigan, Minnesota, and South Dakota. The Environmental Protection Act of 1971, CONN. GEN. STAT. ANN. §§ 22-a-1 to -22 (West 1975 & Supp. 1983); Environmental Protection Act of 1971, FLA. STAT. ANN. § 403.412 (West 1973); Environmental Legal Actions, IND. CODE ANN. §§ 13-6-1-1 to -6-1-6 (West 1983); MASS. GEN. LAWS ANN. ch. 214, § 7A (West Supp. 1983) (Ten residents required to bring suit); Thomas J. Anderson, Gordon Rockwell Environmental Protection Act of 1970, MICH. COMP. LAWS ANN. §§ 691.1201 to .1207 (West Supp. 1983); Minnesota Environmental Rights Law, MINN. STAT. ANN. §§ 116B.01 to .13 (West 1977); South Dakota Environmental Protection Act of 1973, S.D. CODIFIED LAWS ANN. §§ 34A-10-1 to -10-15 (West 1977 & Supp. 1983). The Michigan Act is typical. It provides that "any person" may maintain an action for declaratory or equitable relief against the state and its instrumentalities or against "any person, . . . corporation, . . . or other legal entity for the protection of the air, water and other natural resources and the public trust therein from pollution, impairment or destruction." Thomas J. Anderson, Gordon Rockwell Environmental Protection Act of 1970, MICH. COMP. LAWS ANN. § 691.1201 (Supp. 1983). See Sax & Conner, *Michigan's Environmental Protection Act of 1970: A Progress Report*, 70 MICH. L. REV. 1004 (1972); Sax & DiMento, *Environmental Citizen Suits: Three Years' Experience Under the Michigan Environmental Protection Act*, 4 ECOLOGY L. Q. 1 (1974). In *McCloud v. City of Lansing*, No. 13057-C, (Cir. Ct. May 14, 1971), Judge Reisig recognized that both present and future generations have an interest in maintaining the quality of the environment:

The plaintiff, Mr. McCloud, put it well with reference to the public trust and the public domain and the public interest—an interest which is there to be protected, an interest which Mr. McCloud possesses . . . and an interest which our children born and yet to be born possess, in maintaining that public domain. . . .

Id. at 4, quoted in Sax & DiMento, *supra*, at 36.

325. Environmental Planning and Assessment Act, N.S.W. STAT. ACT. NO. 203 (1979); Land and Environment Court Act, N.S.W. STAT. ACT. NO. 204 (1979).

326. Environmental Planning and Assessment Act, *supra* note 325, at § 123(1). "Any person may bring proceedings in the Court for an order to remedy or restrain a breach of this Act, whether or not any right of that person has been or may be infringed by or as a consequence of that breach." See Bentil, *General Recourse to the Courts for Environmental Protection Purposes and the Problem of Legal Standing—A Comparative Study and Appraisal*, 11 ANGLO-AM. L. REV. 286, 295-308 (1982) for analysis of *locus standi* in Australian law.

actually pursuing their own interests. If co-trustees were required to join the attorney general as a party to the litigation, such abuse would be less likely to occur.³²⁷

Countries should grant each other's representatives of future generations reciprocal access to their national courts and administrative bodies. In 1974, the Scandinavian countries signed the Nordic Convention on the Protection of the Environment granting citizens of the four member countries reciprocal access to each other's courts and administrative agencies.³²⁸ The Convention provides that "any person who . . . may be affected by a nuisance caused by environmentally harmful activities" has the right to challenge the activity before the appropriate court or administrative authority.³²⁹ Moreover, each country is to appoint a special "supervisory authority" charged with safeguarding general environmental interests.³³⁰ These provisions provide support for designating a public interest group to represent future generations who "may be affected" by actions of a member country before that country's administrative or judicial bodies. Alternatively, the special authority charged with safeguarding the "environmental interest" could be entrusted with the task of seeing that fiduciary duties to future generations are observed.

At the international level, states should have standing to represent future generations in cases before the International Court of Justice (I.C.J.). The Court's jurisdiction extends to all cases which parties refer to it and to all matters specifically provided for in the Charter of the United Nations or in treaties and conventions in force.³³¹ Cases involving violations of our fiduciary obligation to future generations could arise as violations of specific treaties or agreements concerned with actions posing a threat to future generations.³³² Examples include the dumping of toxic chemicals, the storage of nuclear wastes, and the

327. If suit to enforce a charitable trust is brought by a co-trustee or a person having a "special interest," the attorney general should be joined as a party to the case. RESTATEMENT (SECOND) OF TRUSTS § 391 comment c (1959).

328. Convention on the Protection of the Environment (The Nordic Convention), done February 19, 1974, reprinted in 131 L.M. 591 (1974). Parties to the Nordic Convention are Denmark, Norway, Sweden and Finland.

329. *Id.* art. 3.

330. *Id.* art. 4.

331. Statute of the International Court of Justice, *supra* note 202, Art. 36(1).

332. See the London Ocean Dumping Convention, *supra* note 278, which regulates the deliberate dumping into the sea of all wastes. It includes special provisions for radioactive waste for which the International Atomic Energy Agency (IAEA) has specific rule-making responsibility. 20 NUCLEAR L. BULL. 23,37 (December 1977).

On July 22, 1977, the O.E.C.D. issued a Decision directing its Nuclear Energy Agency (NEA) to set up a "multilateral consultation and surveillance mechanism for sea dumping of radioactive waste." *Id.* at 38. Twenty-one countries are now parties to the OECD Multilateral Consultation and Surveillance Mechanism for Sea Dumping of Radioactive Waste. For discussion of the Role of the Mechanism, see 20 NUCLEAR L. BULL. (December 1977).

violation of customary international laws which threaten the well-being of future generations. Thus, the I.C.J. might have jurisdiction to hear suits alleging violations of fiduciary duties to future generations, either when specific treaties or agreements, such as those regulating dumping of toxic chemicals or storage of nuclear wastes, are violated. Similarly, the I.C.J. could hear cases involving customary international obligations, protecting the well-being of future generations.

Two jurisdictional questions arise with regard to a state's right to represent future generations before the I.C.J.: whether it can represent its own future nationals and whether it can represent future nationals of other countries as well. It is well-settled that a state can represent its present nationals before the Court.³³³ Since a state is a continuing entity, it should also be able to represent its future nationals. In certain cases, concurrent injury to present and future generations can be shown. For example, nuclear radiation may have both immediate and long-term effects, including an increase in miscarriages, birth defects, and sterility.³³⁴ In the *Nuclear Tests Cases*, Australia obtained an interim order from the I.C.J. by a vote of 8 to 6 to enjoin France from proceeding with nuclear tests in the Pacific which caused radioactive fallout over Australia.³³⁵ In its application for an interim order, Australia asserted that the radioactive fallout on the territory of Australia and its dispersion in Australian air space without consent "impairs Australia's independent right to determine what acts shall take place within its territory and in particular whether Australia and its people shall be exposed to radiation from artificial sources."³³⁶ Given the long-term effects of radioactive fallout, "Australia and its people" implicitly included future nationals.

The question of whether a state should be granted standing to represent the future nationals of other countries is more difficult. Nevertheless, it should be answered in the affirmative. Where actions by members of the international community affect the environment globally, the interests of the future generations of one country and those of other countries are often inseparable.

In accordance with the principle of *erga omnes* a state may assert the right to represent interests of the international community without having to establish direct injury to its nationals or vested interests. In the *Barcelona Traction* case (second phase), the I.C.J. proclaimed that

333. *Mavrommatis Palestine Concessions* (Greece v. Great Britain) 1924 P.C.I.J., ser. A, No. 2; and *Nottebohm* (Liecht. v. Guat.) 1955 I.C.J. 4.

334. See, e.g., P. GOODWIN, *NUCLEAR WAR: THE FACTS ON OUR SURVIVAL* 40-42 (1981).

335. *Nuclear Tests* (Austl. v. Fr.) 1973 I.C.J. 99, 106. (Interim Protection Order of June 22, 1973).

336. *Id.* at 103.

obligations *erga omnes* "[b]y their very nature . . . are the concerns of all states. In view of the rights involved, all states can be held to have a legal interest in their protection."³³⁷ Several scholars contend that each state already has an obligation to the international community at large to protect the environment and, hence, has standing to contest the violation of this obligation.³³⁸ Thus, if, as argued above, the proposed principles for administering the planetary trust were to constitute obligations *erga omnes*, states should be granted standing to raise claims concerning them.³³⁹ Although the *Barcelona Traction* opinion and the dissenting opinions in the *South West Africa* cases and *Nuclear Test* cases have indicated that under certain circumstances, *erga omnes* obligations may serve as a basis for standing,³⁴⁰ the I.C.J. has yet to grant a

337. *Barcelona Traction Case*, *supra* note 204, at 32.

338. See Bilder, *The Present Legal and Political Situation in Antarctic* in THE NEW NATIONALISM, *supra* note 257, at 198; J. SCHNEIDER, *supra* note 245, at 130-31. See also Brownlie, *A Survey of International Customary Rules of Environmental Protection*, 13 NAT. RESOURCES J. 179, 183 (1973).

339. See *supra* notes 202-08 and accompanying text.

340. *Barcelona Traction Case*, *supra* note 204, at 32; *Nuclear Tests Cases* (Austl. v. Fr.) 1974 I.C.J. 253, 369-70 (Judgment of Dec. 20, 1974) (Joint Dissenting Opinion). See also the Dissenting Opinion of Judge Barwick at 437-38, which states that if the Applicant State had established that the obligation to observe the prohibition against nuclear testing was *erga omnes*, she would "have the requisite legal interest, the *locus standi* to maintain this basis of its claim." *Id.* at 437. See generally, Dugard, *The Nuclear Tests Cases and the South West Africa Cases: Some Realism About the International Judicial Decision*, 16 VA. J. OF INT'L L. 463, 465-71 (1976).

In the *South West Africa* cases, Ethiopia and Liberia applied to the Court to affirm the status of South West Africa as a mandated territory and to declare that South Africa had violated the Mandate Agreement and the Covenant of the League of Nations in its administration of the territory, in particular by the practice of apartheid. While the Court decided in 1962 that it had jurisdiction to hear claims concerning the Mandate, it determined in 1966 that the applicant States lacked the requisite *locus standi* to raise them, because their own interests and those of their nationals were not affected. E. McWHINNEY, *THE WORLD COURT AND THE CONTEMPORARY INTERNATIONAL LAW-MAKING PROCESS* 17 (1979). The dissenting opinions of Judge Jessup and Judge Tanaka strongly supported the right of a State to assert claims of "general interest." *South West Africa Cases* (Ethiopia v. S. Afr. and Lib. v. S. Afr.) 1966 I.C.J. 6, 388 (Jessup, J., dissenting). *Id.* at 252 (Dissenting opinion of Judge Tanaka).

In the *Nuclear Tests Cases*, Australia and New Zealand cited extensively the Court's *Barcelona Traction* dicta concerning *erga omnes* obligations. Both countries asserted their individual State interests to be free from nuclear fallout imposed by the French atomic testing, as well as the community interest or obligation *erga omnes* based on an emerging customary international law prohibiting nuclear testing in the atmosphere. See *Nuclear Tests Cases* (Austl. v. Fr.) 1975 I.C.J. Pleadings, vol. I, 33-35; and (N.Z. v. Fr.) 1975 I.C.J. Pleadings, Vol. II, 210-11 for the Applicant States' use of *erga omnes*. See also Goldie, *The Nuclear Tests Cases: Restraints on Environmental Harm*, 5 J. MAR. L. AND COM. 495-502 (1974) for an appraisal of the legal interests raised by Australia and New Zealand. The court never reached the merits of the case. By a vote of 9-6 the Court viewed the interest of Australia and New Zealand as interests exclusive to them and hence found that the objective of the suit, the termination of the specific series of tests by France, had already been fulfilled. *Nuclear Tests Cases* (Austl. v. Fr.) 1974 I.C.J. 272 (Judgment of Dec. 20, 1974); (New Zealand v. France) 1974 I.C.J. 478 (Judgment of Dec. 20, 1974). If the court had specifically considered the claim of both applicants that they represented "community interests" in addi-

state standing on this basis.

2. *An Ombudsman for Future Generations*

Establishing an ombudsman for future generations is, perhaps, the most promising approach to representing future generations in present-day local, national, regional, and international decisionmaking processes. Ombudsmen would be responsible for ensuring that the trust principles, as developed in detail by positive law, were observed, for responding to complaints, and for alerting communities to threats to the conservation of our planetary heritage.

The earliest ombudsman's office was established in Sweden in 1809 to provide the parliament with a means to control the observance of laws by judges, civil servants and military officers. Today, ombudsmen inspect government agencies, courts, and prisons; investigate problems of law enforcement; and take about 3200 complaints from the public each year.³⁴¹ A major virtue of ombudsmen is their almost complete flexibility in responding to complaints from citizens and in conducting investigations.

Ombudsmen now exist all over the world. They operate in some states in the United States, and in most provinces in Canada.³⁴² In addition, nongovernmental institutions, such as universities and newspapers in the United States, have established their own ombudsmen. At the international level, Amnesty International operates as an informal nongovernmental ombudsman for the protection of human rights.³⁴³

One of the more recent developments in Sweden is the appointment of ombudsmen for specific issues and constituencies. These in-

tion to their own specific interests, the Court might have issued a declaratory judgment on the merits. *Nuclear Tests Cases* (Austl. v. Fr.) 1975 I.C.J. Pleadings Vol. I, 14; (N.Z. v. France) 1975 I.C.J. Pleadings, Vol. II, 9 (Applications Instituting Proceedings 1973). Both of the Applicant States asked the Court to "adjudge and declare" that the nuclear testing constituted a violation of international law.

341. See SWEDISH INSTITUTE, FACT SHEETS ON SWEDEN, THE SWEDISH OMBUDSMAN (April 1981). The Swedish Parliament has empowered the Parliamentary Ombudsman with full discretion to decide which cases should be investigated, pursued in court, or reported to the supervising authorities for disciplinary or other actions. Each year the ombudsman submits an annual report which contains proposals for the amendment of existing laws or for new legislation. See, e.g., THE SWEDISH PARLIAMENTARY OMBUDSMAN REPORT FOR THE PERIOD JULY 1, 1978 TO JUNE 30, 1979 (1980).

342. See, e.g., K. WEEKS, OMBUDSMEN AROUND THE WORLD: A COMPARATIVE CHART (2d ed. 1978); W. GELLHORN, OMBUDSMEN AND OTHERS: CITIZENS' PROTECTORS IN NINE COUNTRIES (1967). For an examination of the use of ombudsmen in the United States see ESTABLISHING OMBUDSMAN OFFICES: RECENT EXPERIENCE IN THE UNITED STATES (S. Anderson & J. Moore eds. 1971).

343. Amnesty International serves as a watchdog over states' observance of basic human rights by monitoring States' behavior, investigating complaints, and publicizing the results. The society is headquartered in London, with local chapters throughout the world.

clude an ombudsmen for antitrust, equal opportunity, consumers, the press, and children.³⁴⁴ Sweden has proposed an international ombudsman for children.³⁴⁵ There is also some precedent for the establishment of an ombudsman for the environment. In 1967, Wisconsin established the Office of Public Intervenor, which functions to some extent as an ombudsman in protecting the state's environment and natural resources.³⁴⁶ When the United Nations' Environment Programme was established, member countries looked to it to perform, for global environmental issues, some of the watchdog and educational functions which ombudsmen serve.³⁴⁷ Additionally, there is a wide network of non-governmental institutions which also function as informal ombudsmen for the environment. The Sierra Club, the Natural Resources Defense Council, and the Environmental Defense Fund, for example, have brought numerous public lawsuits to protect the environment,³⁴⁸ and groups such as the World Wildlife Fund and the International Union for the Conservation of Nature (IUCN) have publicized environmental problems, educating both governments and individuals.³⁴⁹

Ombudsmen for future generations should be responsible for ensuring that the proposed principles for administering the planetary trust are observed. They could oversee enforcement of relevant laws,

344. See *supra* note 341.

345. Tullberg, *The Children's Ombudsman as an International Concept*, in RADDA BARNENS & SWEDISH SAVE THE CHILDREN, THE OMBUDSMAN AND CHILD MALTREATMENT 30-38 (1980). Tullberg states that "[a]n international ombudsman, based here in Geneva, for example, could perhaps act as . . . a 'watchdog' and as a kind of 'psychosocial' complement to UNICEF—a person with strength and power to protect the psychological, social and legal needs and rights of children together with what is done for them with regard to food, shelter and medical care." *Id.* at 35.

346. See P. DUBOIS & A. CHRISTENSEN, PUBLIC ADVOCACY AND ENVIRONMENTAL DECISION MAKING: THE WISCONSIN PUBLIC INTERVENOR (1977). The Office of the Public Intervenor in Wisconsin was established in 1967 under a reorganization plan which merged the then Conservation Department with the Department of Resource Development. Supporters argued that the Public Intervenor was necessary to continue the adversary role played by the old Conservation Department in hearings administered by the Public Service Commission. *Id.* at 6-8.

For a proposal for an ombudsman in connection with the administration of a compensation fund for victims of toxic pollution, see Note, *A Proposal for the Administrative Compensation of Victims of Toxic Substance Pollution: A Model Act*, 14 HARV. J. ON LEGIS. 683, 753-54 (1977). The author argues that an ombudsman would be needed to protect the "structural integrity of the process" and to meet "the demands of equity." *Id.* at 753.

347. At the time of the Stockholm Conference on the Human Environment in 1972, R. Gardner proposed that we consider establishing an international environmental ombudsman. Gardner, *The Role of the U.N. in Environmental Problems*, 26 INT'L ORG. 237, 254 (1972). See also J. SCHNEIDER, *supra* note 245, at 130.

348. See L. WENNER, THE ENVIRONMENTAL DECADE IN COURT (1982), for a review and assessment of United States public interest environmental groups in court.

349. For a comprehensive review of the activities of the IUCN, see R. BOARDMAN, INTERNATIONAL ORGANIZATION AND THE CONSERVATION OF NATURE (1981).

respond to specific complaints of citizens or non-governmental institutions, and act as watchdogs to alert communities to threats to the well-being of future generations. In performing these tasks ombudsmen may act as mediators, communicators, and public educators—roles which existing ombudsmen often play.³⁵⁰ The following sections of this article discuss some methods that ombudsmen for future generations could use to perform these tasks.

a. Enforcement of Existing Laws

One essential function of the proposed ombudsmen would be to ensure that laws or treaties enacted to conserve the planetary trust are obeyed and executed by public officials, corporations, and citizens. To carry out this function, ombudsmen will need to be able to intervene in administrative or judicial proceedings. There is precedent for giving ombudsmen this power. In Sweden, substantive laws governing equal opportunity, consumer protection, and child abuse have given the ombudsmen charged with overseeing their enforcement the right to intervene on behalf of affected individuals in administrative and court hearings.³⁵¹ Countries which establish an ombudsman for future generations could follow this model.

It will be more difficult for ombudsmen at the international level to have similar power and authority. Since countries resent intrusions on their sovereignty, ombudsmen may be limited to monitoring compliance with international agreements, investigating alleged violations, and publicizing their findings to the international community. In this respect, ombudsmen for future generations may resemble present day Human Rights Commissions, which serve as instruments to prod member States into observing the human rights covenants they have signed. Even though these Commissions cannot enforce human rights with civil or criminal sanctions, they can monitor states' behavior and alert world public opinion to particularly abhorrent situations.³⁵²

350. Although the role of the ombudsman was originally conceived as that of a neutral investigator and facilitator for parliament and later for executive departments, the role of the ombudsman has developed to include that of a public intervenor—protecting the interests of the citizenry and actively pursuing policy goals.

351. See FACT SHEETS ON SWEDEN, THE SWEDISH OMBUDSMAN, *supra* note 341; LAW AND JUSTICE IN SWEDEN (October 1981).

352. The European Human Rights Commission (EHRC), for example, was established by the Convention for the Protection of Human Rights and Fundamental Freedoms, *done* Nov. 4, 1950, 213 U.N.T.S. 222. Under the terms of this Convention, any person may petition the Commission, *id.* art. 25, which may then conduct an on-site investigation and seek a "friendly settlement" with the State concerned. *Id.* art. 28. If a settlement cannot be reached, the Commission may report to the Committee of Ministers, who may determine that a violation exists and take action. *Id.* art. 31.

The Inter-American Commission on Human Rights (IACHR), an organ of the Organization of American States, seeks to promote the observance of human rights set forth in the American Declaration of the Rights and Duties of Man, O.A.S. Res. III, adopted by the

b. Management of Citizens' Complaints

Another important task of ombudsmen is to respond to citizen complaints about actions taken by local, state, and national administrative bodies. This task involves investigation of complaints, mediation of disputes, and, at times, intervention in administrative or judicial proceedings. At other times, it requires ombudsmen to guide citizens through bureaucratic procedures. The ombudsmen could serve as a "hot-line" for concerned citizens' complaints about violations or neglect of trust duties.

At the international level, this task, like that of overseeing enforcement of laws and treaties, raises thorny sovereignty issues. Ombudsmen may find it difficult to exert authority with respect to matters traditionally regarded to be within the sole authority of individual nation-states. Complaints which pit one state against another may prove particularly troublesome.³⁵³ Nevertheless, ombudsmen should investigate such complaints and mediate them when feasible.

c. Public Watchdog

Ombudsmen should also serve as watchdogs to alert the international, regional, national, or local community to impending violations of trust principles or other problems that may frustrate the achievement of trust purposes. Domestic ombudsmen now perform this task in relation to specific laws, although they devote less of their time to it than they might if they were not preoccupied with citizens' requests for immediate action. To perform this task, ombudsmen for future generations should be granted the right to intervene on behalf of future generations in administrative proceedings. The public intervenor in Wisconsin, for example, has authority to intervene to protect "public rights" in natural resources when asked to do so by state administrative

Ninth International Conference of American States, Bogota, 1948, OEA/Ser. L-IV/I. 4 Rev. (1965). The IACHR is empowered to receive complaints alleging violations of human rights in any of the member states of the OAS. Under Article 9 of the statute, the IACHR can make recommendations to member states, prepare studies and reports, and request information from member states. Inter-American Commission on Human Rights, Handbook of Existing Rules Pertaining to Human Rights, OEA/Ser. L/VII-23, doc. 21, rev. 5, at 10-11 (1978). These rules have been interpreted to authorize on-site investigations in countries where serious human rights violations occur. *Id.* at 40-42. The Commission can communicate its findings to governments, complainants, and the international community. See Farer and Rowles, *The Inter-American Commission on Human Rights*, in INTERNATIONAL HUMAN RIGHTS LAW AND PRACTICE 47, 48-71 (J. Tuttle ed. 1978).

353. The controversy over the definition of "destruction," which surrounds the Jordanian nomination of Jerusalem to the List of World Heritages in Danger is an example. The nomination by Jordan is opposed by Israel, which contends that its excavations in Jerusalem do not constitute destruction. See Annex VI, p. 3 of *The Report of the United States Delegation to the Fifth Ordinary Session of the World Heritage Committee*, *supra* note 299.

officials or legislative committees.³⁵⁴

The ombudsmen's watchdog function should not, however, end with the presentation of information to formal decisionmaking bodies. Ombudsmen should also serve as public educators, conveying information about threats to the planetary trust to the citizenry at large and educating citizens about the likely impact of specific actions upon the heritage they pass to future generations.³⁵⁵

To implement the planetary trust most effectively, we should establish local, national, and international ombudsmen. We should also consider establishing ombudsmen charged with handling specific environmental problems, such as destruction of cultural artifacts. We could either appoint separate ombudsmen for future generations, or rely on ombudsmen for specific functional areas to represent their interests. My tentative judgment is that the appointment of special ombudsmen for future generations would serve as a useful signal that the international community recognizes the impact of present-day decisionmaking on future generations. Nevertheless, ombudsmen overseeing specific environmental problems must ultimately bear primary responsibility for ensuring the proper execution of particular laws and agreements designed to conserve and enhance the human environment for present and future generations.

B. A System for Monitoring the Natural and Cultural Heritage

The second proposed strategy for implementing the planetary trust is to establish and maintain a global network to monitor the diversity of

354. See P. DUBOIS & A. CHRISTENSEN, *supra* note 346, at 10. The Public Intervenor is given notice of all proceedings under Wisconsin Statutes, Chapters 30 and 31 (construction of dams, bridges, artificial waterways, proposals for fills, dredgings, and projects affecting navigable waters), Chapter 144 (air and water pollution control), and Chapter 147 (permits regulating discharge of pollutants into the state's waters). The Public Intervenor must intervene in these proceedings when requested to do so by one of the division administrators. *Id.* The Intervenor may also intervene upon his or her own initiative or at the request of a legislative committee when the issue of protecting "public rights" in water and natural resources becomes relevant. *Id.* The Intervenor is in a potentially potent position because he or she receives a copy of every application filed with the Department of Natural Resources, and only the Intervenor, besides the agency itself, is able to view individual permit applications "in light of their potential for cumulative environmental harm." *Id.* at 14. The Swedish Ombudsman also serves as a public intervenor. See FACT SHEETS ON SWEDEN, THE SWEDISH OMBUDSMAN, *supra* note 341.

At a regional level, Article 4 of the Nordic Convention for the Protection of the Environment allows the "supervisory authority" of one State to intervene in another State to protect general environmental interests. 13 I.L.M. 591 (1974).

355. One of the most important functions of the ombudsman in Sweden is to serve as an educator to the public of its legal rights and responsibilities. The importance of education to environmental protection cannot be underestimated. Recognizing this, in Indonesia, the government has launched a campaign in elementary schools, awarding prizes for children's poems or drawings on the environment, to encourage their awareness. UNEP has also served this education function in their special programs.

the resource base and the quality of the planet's environment. This network could, in part, rely upon existing information-gathering programs, including the Global Environmental Monitoring System established by the United Nations Environment Programme, the World Weather Watch and climate monitoring programs of the World Meteorological Organization, the ocean monitoring system linked to the United Nations Environmental, Scientific and Cultural Organization (UNESCO), the United Nations' Food and Agricultural Organization (FAO) programs for monitoring natural resources, and many regional and national environmental information systems.³⁵⁶ The International Council of Scientific Unions' Committee on the Protection of the Environment (SCOPE) should be involved in designing and evaluating the network. A similar network should be established to monitor cultural diversity.³⁵⁷

To monitor accurately the attainment of trust principles, it will be necessary to establish baseline assessments of resource diversity and quality. It is also necessary to develop resource diversity and quality indices at both the global and national level. The UNEP's Earthwatch and Global Environmental Monitoring System (GEMS) programs represent steps towards developing such baselines. Under these programs, the UNEP intends to gather baseline data at selected natural sites and to monitor other sites for changes relative to the baseline data. To develop accurate indices, states will have to gather systematically baseline data on the diversity of selected categories of resources, such as micro-organisms, crops, fish, soils and mineral reserves, and will have to expand existing systems for gathering data on environmental quality.³⁵⁸

The data gathered from ongoing monitoring could be compared to

356. The United Nations Environment Programme's Earthwatch monitoring system includes the Global Environmental Monitoring System (GEMS), an International Register of Potentially Toxic Chemicals (IRPTC) and an International Referral System (INFOTERRA). For a review and analysis of the Earthwatch "intelligence service," see THE WORLD ENVIRONMENT, *supra* note 8, at 8-16. The authors suggest that computerized data banks offer a chance to make the three surveillance and information systems "more comprehensive and more responsive than was contemplated at Stockholm—because (assuming the software is compatible) UNEP might be able to link directly with a swelling host of national and international data centres." *Id.* at 14. For the meteorological monitoring system, see, for example, WORLD METEOROLOGICAL ORGANIZATION (WMO), WORLD WEATHER WATCH, THE PLAN AND IMPLEMENTATION PROGRAM 1980-83 (1979). The report is issued every four years.

357. This could be lodged in the United Nations Educational, Scientific and Cultural Organization (UNESCO) which already administers the World Heritage Convention, *supra* note 81. Both France and Japan have tried to compile national inventories of cultural properties. They have been able to inventory only the most accessible objects, because of high financial and administrative costs associated with the inventory. Japan has proposed that each country classify and inventory its most important items. S. WILLIAMS, *supra* note 288, at 190.

358. For a review and critical assessment of current efforts to monitor living resources, see Miller, *The Earth's Living Resources: Managing Their Conservation* in ENVIRONMENTAL

the baseline data in the proposed diversity and quality indices to assess our performance in fulfilling trust principles. If the monitoring data indicated that the diversity of some portion of the natural resource base was declining, we would be obliged to initiate measures to halt the decline.³⁵⁹

C. *Scientific and Technological Research and Development*

The third proposed strategy for implementing trust principles is a vigorous program of scientific research and development. Such research may enable us to refine the resource diversity and quality indices, and to monitor more accurately each generation's performance of trust duties. It may also yield new information about the impact of human activities on the diversity and quality of our natural and cultural heritage, thus helping us to assess with greater precision the risk that our present activities pose to them.

The so-called carbon dioxide problem, or "greenhouse effect," illustrates the need for ongoing research. If fossil fuel consumption continues at current levels, the increase in atmospheric carbon dioxide may raise the temperature of the Earth enough to cause major changes in global climate patterns and, possibly, to trigger the melting of the polar ice caps. At present, however, there are many uncertainties in assessing the risks and the consequences of increased carbon dioxide in the atmosphere. This makes it difficult to evaluate alternative strategies for addressing the problem. Yet, how we address the problem could significantly affect the welfare of future generations.³⁶⁰

Investment in scientific and technological research is also necessary to ensure the development of substitutes for those resources that we deplete, and to increase the efficiency with which we develop, extract, and utilize resources.³⁶¹ Moreover, it may help us identify re-

PROTECTION: THE INTERNATIONAL DIMENSION 240-66 (D. Kay and H. Jacobson eds. 1983).

359. It may be argued that while it is appropriate to monitor the diversity of the resource base, it is not in the best interests of the international community to disseminate the information broadly, since under certain assumptions it may induce people to freeloader in the system. One response to this problem is to enhance the awareness of people that they are joined together in intricate patterns of interdependence on the planet, both in the natural and social systems. When people become aware that they are tightly interdependent over a long period of time, it becomes in their own self-interest to take actions which consistently contribute to the general community interest. See Lave, *supra* note 27. See also R. FISHER, IMPROVING COMPLIANCE WITH INTERNATIONAL LAW 7 (1981).

360. For a scientific assessment, see CLIMATE RESEARCH BOARD, NATIONAL RESEARCH COUNCIL & U.S. NATIONAL ACADEMY OF SCIENCES, CARBON DIOXIDE AND CLIMATE: A SCIENTIFIC ASSESSMENT (1979); see also U.S. COUNCIL ON ENVIRONMENTAL QUALITY, GLOBAL ENERGY FUTURES AND THE CARBON DIOXIDE PROBLEM (1981); Schneider & Chen, *Carbon Dioxide Warming and Coastline Flooding: Physical Factors and Climatic Impact*, 5 ANN. REV. ENERGY 107 (1981).

361. See *supra* text accompanying notes 170-71.

sources which may be valuable in the future.³⁶²

The strategy of undertaking vigorous research and development efforts will assure that we pass to future generations a heritage rich in new theories, knowledge, materials, and equipment. Much research and development will be carried out in the private sector through commercial incentives, but when market incentives fail, governments must be willing to intervene.³⁶³

D. Trust Funds for Future Generations

The final proposed strategy is the establishment of trust funds to insure against the effects of activities which pose a significant risk of harm to the health of future generations by degrading environmental quality. Such funds could provide funds for cleaning up areas seriously polluted from activities such as the disposal of hazardous wastes.³⁶⁴ The trust fund could also fund scientific research to provide a better understanding of the effects of particular hazardous activities or to generate technologies for removing or detoxifying wastes.³⁶⁵

We could also design trust funds to compensate individuals who suffer particularized harms traceable to the actions of prior generations.³⁶⁶ While the community as a whole may benefit from certain

362. See *supra* text accompanying note 172.

363. The practical complexities of this recommendation are illustrated by Brazil's program for the promotion of fuel alcohol (ethanol). This program includes a substantial element of research and development on the design of ethanol-burning cars, varieties of sugar cane suited to regions close to gasoline markets, mixed cropping systems to allow sugar and staple food crops to be grown on the same acreage, and processes for producing ethanol from wood. There is also a substantial effort to assess the social and economic impact of expanded sugar cane production, which is projected to use about 6% of Brazil's crop land by 1985 and has apparently displaced considerable numbers of small farmers. At best, fuel ethanol replaces only the gasoline fraction of petroleum, so Brazil has in recent years been forced to import crude oil in order to export gasoline at low prices. For an official assessment of the program, see MINISTRY OF INDUSTRY AND COMMERCE, SECRETARIAT OF INDUSTRIAL TECHNOLOGY, BRASILIA, ASSESSMENT OF THE FUEL ETHANOL PROGRAM (1981).

364. The United States has enacted legislation which provides for a \$1.6 billion trust fund to cover emergency and longterm cleanup by the Federal Government of chemical spills and abandoned waste disposal sites that threaten the integrity of the natural environment. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §§ 9601-9657 (Supp. V 1981). Despite sweeping legal authority, the Federal Government has encountered numerous problems in implementing the program. For the regulatory framework governing current disposal of solid and hazardous wastes, see the Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901-6987 (1976 & Supp. V 1981).

365. For assessment of current technologies approaches to hazardous waste management, see U.S. OFFICE OF TECHNOLOGY ASSESSMENT, TECHNOLOGIES AND MANAGEMENT STRATEGIES FOR HAZARDOUS WASTE CONTROL (1983).

366. The United States response to the claims of Marshall Island residents for compensation for damage caused by U.S. nuclear tests in the area offers a precedent. After fifteen years of negotiation, the United States has agreed to establish a \$150 million trust fund for the residents. The agreement guarantees a minimum income from the trust for the next fifteen years, after which time, three-fourths of the income from the trust is to be set aside in

risk-creating activities, specific individuals may suffer serious loss. For example, a country may gain a strong national defense from nuclear weapons testing, but many individuals may suffer particularized harm from the tests.³⁶⁷ Similarly, the citizenry at large may benefit from the consumption of products which produce toxic wastes, but the wastes may cause health injuries to people residing near disposal sites and to their descendants.³⁶⁸ In such cases, it is impractical to rely on lawsuits as the primary means of compensation, both because it will likely be difficult and expensive to establish causality and because it will be difficult to collect judgments years after the harm-causing activity occurred.³⁶⁹

If trust funds are properly designed, they should stimulate efforts to understand and mitigate the risks to human health posed by the disposal of hazardous wastes. By imposing responsibility for compensation upon those who generate hazardous wastes, we will create an economic incentive for companies to reduce the production of wastes, to detoxify them, or to ensure safe disposal.³⁷⁰ Thus, the trust fund strategy offers a practical, and widely applicable, means of creating accountability between members of adjacent or nearly adjacent generations.³⁷¹ The establishment of trust funds, however, should be a last resort. It will be much easier to prevent the environment from deteriorating by employing the previous three strategies than to undertake remedial action once it has been despoiled.

perpetuity to cover future claims. Wash. Post, June 28, 1983, at A1, col. 3; see also N.Y. Times, July 8, 1982, at A11, col. 1. Trust funds could also be established to provide compensation to individuals suffering harm from toxic pollution. See Note, *supra* note 346.

367. In a case pending in Utah, citizens are seeking compensation from the United States Government for health injuries (cancer and leukemia), which they allege resulted from the nuclear tests conducted in Utah and Nevada during the 1950's. The victims were infants at the time the tests were conducted. *Allen v. United States*, 527 F. Supp. 476 (D. Utah 1981).

368. The Love Canal story is one of many recent examples of communities exposed to such severe health risks from hazardous wastes that residents have had to be evacuated. For a concise review of the Love Canal incident, see Baurer, *Love Canal: Common Law Approaches to a Modern Tragedy*, 11 ENV'T L. 133, 134-37 (1980).

369. The case pending in Utah regarding compensation for health damages from nuclear tests illustrates the difficulties in establishing causation. *Allen*, *supra* note 367. It is even more difficult to prove causality when many of the relevant documents are classified on grounds of national security. See *Atom Bomb Tests Leave Infamous Legacy*, *supra* note 182.

370. Japan passed the 1973 Law for the Compensation of Pollution-Related Health Injury which established a national compensation fund for those suffering health injuries from pollution. For detailed analysis of this law and the national compensation system, see J. GRESSER, K. FUJIKURA AND A. MORISHIMA, ENVIRONMENTAL LAW IN JAPAN 285-323 (1981).

371. Critics may contend that trust funds would not be economically sound, because such funds could probably generate a higher rate of return in alternative investments outside the trust. This argument applies principally to monies in the trust fund, not to research and development activities undertaken as part of the fund. But monies in the trust fund could be invested to provide a reasonable, yet secure, rate of return on the investment.

V

SUMMARY AND CONCLUSIONS

We hold the natural and cultural heritage of our planet in trust for future generations. As trustees we have a fiduciary obligation to conserve this heritage for future generations. Our fiduciary obligation consists of two duties: to conserve options by conserving the diversity of the natural and cultural resource base; and to conserve the quality of the trust's corpus by leaving the planet in no worse condition than we received it.

The administration of the planetary trust need not, however, be centralized. It does not require world government, but rather is consistent with a relatively decentralized world political order. Decentralization does not mean, however, that states should exercise greater national sovereignty over their resources. To the contrary, it suggests that the concept of national sovereignty, which developed in response to conditions three centuries ago, has in some respects become obsolete.

The proposition that we hold the planet in trust for future generations recognizes all human beings as planetary citizens. It acknowledges explicitly that our interdependence as people imposes constraints on what communities may do as sovereign entities. It subjects all people to a fiduciary obligation to future generations of our planet Earth.

