



# Proceedings of the Abraham Kuyper Consultation February 2, 2002

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## **A Re-Examination of Values and Moral Responsibilities Towards Nature in a 21st Century Context: Anthropocentrism, Ecocentrism and Theocentrism**

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*This paper was originally delivered at the  
First Abraham Kuyper Consultation,  
"Common Grace: Theology, Ecology, and Technology,"  
at Princeton Theological Seminary  
on February 2, 2002.*

*This version represents an edited form of the original paper.*



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Towards Nature in a 21<sup>st</sup> Century Context:  
Anthropocentrism, Ecocentrism and Theocentrism**

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Presented at the Inaugural Conference on Theology, Technology and the Environment  
Kuyper Center for Public Theology  
Princeton Theological Seminary  
February 2, 2002  
Revised April 2002

I would like to thank Keeva Kase for help in refining some of the arguments in this paper. I would also like to acknowledge Max Stackhouse, Jennifer Howard-Grenville, Michael Johnson-Cramer, Candida Brush, and Susan Svoboda for other helpful suggestions and feedback.

## I. Introduction

The past century has witnessed unprecedented economic growth and human prosperity. World population increased by a factor of four. The world economy increased by a factor of fourteen (Thomas, 2002). Global per capita income tripled (World Business Council on Sustainable Development, 1997). Average life expectancy increased by almost two-thirds (World Resources Institute, 1994). But at the same time, the past century has also witnessed unprecedented human impacts on the natural environment. For example, sulfur dioxide and carbon dioxide emissions increased by a factor of 17 and 14 respectively. Marine fish catch increased by a factor of thirty-five (Thomas, 2002). Is something wrong here? Are the negative effects of our material development on the world's natural ecosystems, both as individuals and as a society, inconsistent with the most basic Christian principles?

Many within Christian traditions have begun an examination of such probing questions. Yet, these examinations tend to be based on a human centered, or anthropocentric, view of environmental morality. The moral imperative to protect nature is based primarily on its use as a source of materials for continued human development. It holds no value unto itself. Can we, as Christians, maintain such a view in the contemporary context of global climate change, species extinction and genetically modified organisms; a time when human activity and human technology have unprecedented and far-reaching effects on the natural world?

Today's environmental problems are fundamentally caused, not by our technologies per se, but by the human values that guide their development. These values, which reside on the individual, cultural and institutional levels, guide the identification of environmental problems and human needs as well as the development of technologies to solve them (Bazerman & Hoffman, 1999; Arthur, 1988; Barley, 1985; David, 1985). They define what is right, good and

appropriate. And in relation to the environment, they define how we view nature and how we view our place within it. What is a forest, mountain or river? Is it a stand of timber, a quarry of rock, or a source of power? (Dreyfus, 1991). Or, are these all parts of broader ecosystems that contain non-human life?

Values embedded within such questions lead technology development as the tangible response and solution to problems as they are conceived and framed. In the formation of values - those that guide human action and technological development - the institution of religion holds a central place alongside that of the market and political economies. Yet, it has been far too absent in the debate. If we are to fully understand the cause of environmental problems and enact sustainable solutions, an examination of religious thought must be considered.

This paper will present a framework for addressing the question of whether there exists a moral imperative to protect the environment for reasons other than purely anthropocentric values. It will begin this examination by setting up the issue with two contrasting types of environmental problems: one in which protection efforts have clear benefits for human populations and are therefore supported by current Christian understandings of its basic principles; and another in which protection efforts are either neutral or in fact harmful to human populations, leaving the moral imperative for its protection unclear. It will then step back in history to expose some of the undercurrents that run through this issue, employing the debate over the Hetch-Hetchy dam in 1906 as a means to explain two opposing views of environmental morality: anthropocentrism and ecocentrism. It will then elaborate the writings of scholars who see the roots of environmental problems in historic Christian traditions and then describe how contemporary religions are changing to incorporate environmental concerns. It will offer the counterpoint by those who see a danger in this incorporation. Through these examples, we can

see that the core of the question about nature's value lies in a struggle over ecocentric and anthropocentric values.

But these value sets need not be in conflict. This paper will offer a balancing of values, a theocentric framework based on an appreciation of the totality of nature as a system designed by God for which humans are given a place, not solely above it, but also within it. A key to realizing this place is separating nature into its deep and shallow structures, one a domain where we participate in the process of creation, and the other, a domain where we resist such intrusions and restrain our material desires. And in determining how to act within each structure, we can utilize fundamental Christian (and non-Christian) moral values of wisdom, humility, reverence, selflessness, moderation, and mindfulness to reassess our views towards the environment and our actions within it.

## **II. Framing the Question: Two Types of Environmental Problems**

Pope John Paul II called "the ecological crisis a moral issue" (*Washington Post*, 1998: A1) imploring that "all people of good will must work to ensure the effective protection of the environment, understood as a gift from God." (Associated Press, 1999: A1). But the core of this message is predicated on principle of the *Universal Destination of Goods*, the belief that the goods of this world are intended, by God, for the benefit of all people. Nature becomes a resource, a source of materials for avoiding "the inevitable consequences of hunger and misery" for humans (Pope John Paul II, 1999). In his 1990 World Day of Peace Address, he argued that "The Earth is ultimately a common heritage, the fruits of which are for the benefit of all...It is manifestly unjust that a privileged few should continue to accumulate excess goods, squandering available resources, while masses of people are living in conditions of misery at the lowest level

of subsistence. Today the dramatic threat of ecological breakdown is teaching us the extent to which greed and selfishness - both individual and collective - are contrary to the order of creation, an order which is characterized by mutual interdependence" (Pope John Paul II, 1990). Does this view hold a dilemma for the resolution of today's environmental problems?

This section will set up two categories of environmental problems to bring into greater relief the form of the question being posed. In the first category, Christian principles define a clear view on the morality of our impact on nature insofar as it benefits human populations. According to the UN Food and Agriculture Organization, four of the world's seventeen major fisheries are commercially depleted and nine more are in serious decline (Nickerson, 1994). Since 1950, world-wide water supply has decreased due to increasing contamination while demand has increased from 1,300 to 4,200 cubic kilometers (World Resources Institute, 1994). It is estimated that 70 percent of the rivers in India alone are polluted with industrial waste (Clarke, 1993). Each year 27.5 billion tons of topsoil are lost through erosion world-wide (Engelman & LeRoy, 1995). In the US alone, 2.2 billion tons of soil in cropland were lost to erosion in 1992 (US Dept. of Agriculture). It is estimated that the area of continental US wetlands has decreased by 47% between 1780 and 1980, from 89 million to 42 million hectares (World Resources Institute, 1994).

Are these examples of sinful behavior? The Catholic Catechism says yes, equating environmental degradation with theft from present and future generations - "The seventh commandment (Thou Shalt Not Steal) enjoins respect for the integrity of creation. Animals, like plants and inanimate beings, are by nature destined for the common good of past, present, and future humanity. Use of the mineral, vegetable, and animal resources of the universe cannot be divorced from respect for moral imperatives. Man's dominion over inanimate and other living

beings granted by the Creator is not absolute; it is limited by concern for the quality of life of his neighbor, including generations to come” (Ligouri Publications, 1994: 580).

And these environmental affronts represent clear attacks on the integrity of nature as, in essence, a theft from human populations. Unless decisive actions are taken, for example, the population of many fish species will drop below levels necessary to assure sustainable yields, leaving many fish dependent populations in search of other sources of food and economic livelihood. Diminished availability of fresh water is expected to affect as many as 2.9 billion people in the next twenty-five years (Population Action International, 1996). An estimated 11 percent of the earth's fertile soil has been eroded, chemically altered, or physically compacted so as to damage its original biotic function. This diminished food carrying capacity bears directly on human needs. The continued loss of wetlands impacts human communities through their diminished capacity to act as purification and detoxification systems for aquatic environments and critical components for flood control.

But, are these material needs of present and future generations the only appropriate metric to think about the morality of our impact on the natural environment? While avoiding human suffering is an important imperative for individual and collective moral action, measuring the value of the environment based solely on the material needs of humans, both in present and future generations, is not adequate to solve other contemporary environmental issues.

Consider a second category of environmental problems. In this category, the short-term benefits of growth for human populations are known while the long-term consequences of pollution for the natural ecosystem are not. Protection efforts are either neutral or may, in fact, be harmful to human populations. And more germane to this paper, the moral imperative to advance human needs is clear while the need to protect natural ecosystems is not.

Each year, an estimated 27,000 species of flora and fauna are becoming extinct (Wilson, 1992). Scientists estimate that another 4 to 8 percent of tropical forest species may face extinction over the next 25 years (Reid, 1988). Should these species be protected if we cannot see their purpose for human survival or if their survival is contrary to human needs? Should, for example, the protection of the endangered snail darter have taken precedence over the Tellico Dam on the Little Tennessee River and the power needs of the human communities it served in 1975?

Forestland worldwide has been disappearing at an estimated rate of 59,500 square miles per year since 1980, a disappearance rate of 63 acres per minute or a yearly area nearly equivalent in size to the state of Florida (World Resources Institute, 1994). Should we consider the morality of this behavior only in that it translates into the clearing of farmland for human survival, the cutting of firewood for heating and cooking and the production of building materials for human shelter and economic growth in countries worldwide? Or, should we also consider the habitat destruction of the many species that live within them?

Worldwide increases of greenhouse gas emissions have increased from 1.6 billion tons in 1995 to 7.0 billion tons in 1997 yielding some scientific models to predict an increase in the Earth's temperature of 1.5 - 4.5°F in the next 100 years (US Office of Science and Technology, 1997). Attempts to control these emissions impact virtually every sector of the world economy and their continued ability to provide for human needs. Should we endure the economic and social costs of what some economic models predict to be a drag on US GDP of nearly 2 percent (Stipp, 1997) - an amount roughly equal to \$150 billion per year - when we are not certain that the scientific predictions are accurate?

We, as a society, are fulfilling the Genesis mandate to dominate nature. Yet, we are unwittingly altering the stability of the world's ecosystems in the process. The utilitarian needs of human populations are often in conflict with the integrity of global ecosystems. More importantly, the moral imperatives for improving the former are explicit in Christian doctrine, while those for protecting the latter are not. Should the needs of humans served by local, regional and global economies always take precedence over the needs of nature manifest in local, regional and global ecologies? Our emerging ability to catastrophically alter the global environment forces a contemporary reexamination of how we morally value the environment and what our role should be within it (Hoffman & Ehrenfeld, 1998).

### **III. Framing the Debate over Anthropocentric and Ecocentric Values for Nature:**

#### **The Hetch-Hetchy Dam in 1906**

The question of how to value nature first became a political issue in the United States at the beginning of the 20th century, as a war of words, values and ideals emerged over the water needs of the city of San Francisco and the sanctity of one of the country's most beautiful national parks, Yosemite. The ensuing debate took seven years to resolve and involved newspapers, politicians, public debate and the invocation of God. In 1906, San Francisco suffered the worst earthquake in its history. But, worse than the earthquake were the fires that followed. As water supplies ran dry, the fires consumed much of the city. In their wake, the Mayor made a secure public water supply for the safety of the city's inhabitants one of his most important priorities. Lying east of the city was the Hetch-Hetchy Valley in Yosemite National Park. With its steep cliffs, narrow entrance and abundant water flow, the valley was an ideal site for a dam.

At the same time, the country was rediscovering the value of nature as something important to its identity. An avid hunter and fisherman, President Theodore Roosevelt tripled the amount of National Forest land, named 5 new National Parks and established the National Forest Service. While it was clear that National Forests were to be used for natural resource extraction as well as conservation purposes, the status of the National Parks had not yet been established or tested. Between 1906 and 1913, eight Congressional hearings were held on the issue. Representing either side of the debate were John Muir, the naturalist writer, and Gifford Pinchot, the first head of the US Forest Service. Both had the ear of the President and both represented polar opposite views.

To John Muir, the idea of damming the Hetch-Hetchy was a sacrilege against God. He wrote, "Hetch-Hetchy valley is a grand landscaped garden, one of nature's rarest and most precious mountain temples. Dam Hetch-Hetchy, as well dam for water tanks the people's cathedrals and churches. For no holier temple has ever been consecrated by the heart of man" (Hott & Garey, 1989). He railed against dam supporters (which he called "Satan and company") writing, "These temple destroyers, devotees of ravaging commercialism, seem to have a perfect contempt for nature. And instead of lifting their eyes to the God of the Mountain, lift them to the almighty dollar" (Hott & Garey, 1989). With words and sentiments like these, Muir appealed to the moral conscience of Americans and mobilized support for the idea that this wilderness should be conserved because it possessed, if not embodied, spiritual value beyond what humans could comprehend.

For Gifford Pinchot, on the other hand, nature represented material resources for human needs. He argued that "The fundamental idea of forestry is the perpetuation of forest by use. Forest protection is a means to protect and sustain resources." Pinchot believed that you could

have “multiple use” of the National Parks, allowing for hunting, fishing, grazing, forestry, watershed protection and the preservation of wilderness values. In fact, he could not fathom the idea that utilitarian values should not drive land-use policies. He wrote, “As for me, I have always regarded the sentimental horror of some good citizens at the idea of using natural resources as unintelligent, misdirected and short-sighted...The question is so clear that I cannot understand why there’s been so much fuss about it. The turning of the Hetch-Hetchy into a lake will not be a calamity. In fact, it will be a blessing. It is simply a question of the greatest good to the greatest number of people" (Hott & Garey, 1989).

In resolving the debate, Roosevelt sided with Pinchot. While most of the nation’s newspapers condemned the Hetch-Hetchy dam, Congress granted final approval for its construction in 1913. However, while the valley now lies submerged, this event had important elements regarding moral values and environmental protection. First, it marked the beginning of a formal acknowledgement in our society that there is value to nature in what was seen as a primal state (Hott & Garey, 1989). Designated wild places have become a part of the American psyche such that no comparable intrusion into a National Parks has occurred since Hetch-Hetchy. In 1916, the National Park Service Act granted measures of protection for the rest of the system.

And second, it personified a fundamental struggle of ideals over how we should view nature and our place within it. In this debate, Muir and Pinchot represent two contrasting views of nature that have been articulated in several domains since then: anthropocentric and ecocentric views of nature (Catton & Dunlap, 1980). Gifford Pinchot presented the anthropocentric, or human centered view, which holds that unlimited human progress is possible through the exploitation of nature's infinite resources. Consistent with views such as Francis Bacon's assertion that that we must "torture nature's secrets from her," humans are considered separate

from and superior to nature, which is itself viewed as an inert machine, infinitely divisible and moved by external rather than internal forces (Gladwin, Kennelly & Krause, 1995). Of this view, C.S. Lewis observed "We reduce things to mere *Nature* in order that we may 'conquer' them. We are always conquering *Nature*, because '*Nature*' is the name for what we have, to some extent, conquered" (Lewis, 1953: 44).

John Muir offered the ecocentric view that non-human nature has intrinsic value and that economic advancement should be foregone for the needs of nature (Devall & Sessions, 1985). Humans are not separate or superior to nature, but rather occupy an equal place within the entire natural system, such that human development should be sought only insofar as it does not infringe on the integrity of natural ecosystems (Egri & Pinfield, 1994).

While these two men invoked this debate, it has yet to be resolved. The contest over anthropocentric and ecocentric values lives on in the debate over whether to allow oil companies to drill in the Alaska National Wildlife Refuge (ANWR). Should we place the value of a primal eco-system such as ANWR — one that almost no human will ever see — over the utilitarian needs of the United States for energy security? Deeper moral questions are raised by this issue and are increasingly entering the debate. Would protecting ANWR be tantamount to reducing the status of humans relative to nature? Are we to subordinate nature to our technological society or are we to subordinate our material needs to the preservation of wild places? Is there a moral imperative to help us resolve this dilemma? This is a debate to which Christian values can make an increasingly clear and important contribution. Given our growing power over the natural environment, the imperative for that contribution grows ever larger.

#### **IV. Christian Values and the Environment: Historic and Evolving Contemporary Views.**

In 1949, conservationist Aldo Leopold lamented that no important change in our ethical appreciation of nature could ever be accomplished “without an internal change in our intellectual emphasis, loyalties, affections and convictions. The proof that conservation has not yet touched these foundations of conduct lies in the fact that philosophy and religion have not yet heard of it” (Leopold, 1949: 210). Leopold looked forward to an extension of moral judgment that would include maltreatment of the land, which in his day was considered by many as morally neutral. Indeed, religious teaching and scripture in his day appeared to support maltreatment of the environment. Many looked to Genesis as the origin of this support. Historian Lynn White offered this critique, writing that our ecological problems derived from Christian attitudes that lead us to think of ourselves as “superior to nature,” and to be “contemptuous of it, willing to use it for our slightest whim” (White, 1967: 1205). Historian John Passmore continued this critique:

*“The Lord created man, so Genesis certainly tells us to have ‘dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth and over every creeping thing that creepeth upon the earth’ (1: 26). This has been read not only by Jew but by Christian and Muslim as man’s charter [sic], granting him the right to subdue the earth and all its inhabitants. And God, according to Genesis, also issued a mandate to mankind: ‘Be fruitful and multiply and replenish the earth and subdue it’ (1: 28). So Genesis tells men not only what they can do, but what they should do – multiply and replenish and subdue the earth. God is represented, no doubt, as issuing these instructions before the Fall. But the Fall did not, according to the Genesis story, substantially affect man’s duties. What it did, rather was to make the performance of those duties more onerous. After the Flood ... God still exhorted Noah thus: ‘Be fruitful, and multiply, and replenish the earth’ (9:1). But then added two significant riders. The first rider made it clear that men should not expect to subdue the earth either by love or by exercise of natural authority, as distinct from force: ‘And the fear of you and the dread of you shall be upon every beast of the earth and upon every fowl of the air, upon all that moveth upon the earth and upon all the fishes of the sea: into your hand they are delivered’ (9:2). The second rider — ‘every moving thing that liveth shall be meat to you’ (9:3) — permitted men to eat the flesh of animals. In the Garden of Eden, Adam, along with the beasts, had been vegetarian, whose diet was limited to ‘every herb bearing seed...and every tree, in which is the fruit of a tree yielding seed’ (1:29). Now, in*

*contrast, not only the 'green herb' but all living things were handed over to Adam and his descendants as their food."* (Passmore, 1974: 6).

Cistercian monk, Thomas Merton criticized the traditional interpretation of subduing nature when he wrote that "God's attitude toward his creation is supposed to give us a whole view that is totally different. [But] our view of creation tends to be a pagan view. Use whatever is there - use it. Do what you want with it. You have the power over it. You can do anything you like with it" (Merton, 1963a). In an unpublished letter to Rachel Carson (marine biologist and author of *Silent Spring* (Carson, 1962)), Merton wrote that our society is suffering from a "dreadful hatred of life" that is "buried under our pitiful and superficial optimism about ourselves and our affluent society." He felt that God's love is "manifested in all His creatures, down to the tiniest, and in the wonderful interrelationship between them" (Merton, 1963b).

Much has changed since these critiques were written, making their challenge all the more urgent. Historian Paul Kennedy makes an important distinction between the environmental dangers of today compared to those of Leopold's, Carson's, Merton's, Passmore's and White's time. He warned that "the environmental crisis we confront [today] is quantitatively and qualitatively different from anything before, simply because so many people have been inflicting damage on the world's ecosystem during the past century that the system as a whole — not simply its various parts — may be in danger" (Kennedy, 1993: 96).

Indeed, in today's changing context of global climate change, species extinction and endocrine disruption, many of the world's Christian religions are becoming more involved in environmental issues and, as a consequence, reconsidering their view of the morality of the issue. In 1991, the Presbyterian Church decided to place environmental concerns directly into the church canon, thus making it a sin to "threaten death to the planet entrusted to our care"

(Associated Press, 1991). In 1997, His All Holiness Bartholomew I, spiritual leader of the world's Orthodox Christians, equated specific ecological problems with sinful behavior. He announced that "For humans to cause species to become extinct and to destroy the biological diversity of God's creation, for humans to degrade the integrity of the Earth by causing changes in its climate, its water, its land, its air, and its life with poisonous substances — these are sins" (Stammer, 1997: A1).

Moving beyond statements of values, Christian views on environmental protection are also being mobilized into social and political action. In 1996, Christian evangelical groups rallied support for Endangered Species Act reauthorization, calling it "the Noah's ark of our day," and challenging Congress' apparent attempt to "sink it" (Steinfels, 1996). In 1998, both the National Council of Churches — a coalition of Protestant, Greek Orthodox, Catholic and Jewish religious leaders — and the National Religious Partnership for the Environment — a coalition of the National Council of Churches, the US Catholic Conference and the Coalition on the Environment and Jewish Life — rallied to support the Kyoto Treaty on climate change, sending a letter to President Clinton and lobbying senators to get the treaty implemented because it is "an important move towards protecting God's children and God's creation" (Cushman, 1998: A10).

But, this folding of religious and environmental values, particularly as it relates to political and social action has forced many within the religious community to express concern. This form of "green spirituality" is seen by some as a move beyond concern for balanced stewardship and towards the exaltation of "horticulture over humanity" (Acton Institute, 1999), an indiscriminate attack on economic development and/or the deification of the environment. What we can see is that this particular debate takes form similar to that of Muir and Pinchot.

## V. A Critical Rebuttal to "Green Spirituality"

In recent years, religious scholars have begun to dispute whether there exists any theological imperative to support the notion that environmental protection is a religious issue. Some have worried that preaching the environmental message threatens to put trees and animals ahead of people and before God as the center of the Universe. "There is a certain pantheistic element in all this" warns Reverend Robert Dugan of the National Association of Evangelicals (Kloehn, 1997: A1). After the 1990 Earth Day, Cardinal John O'Connor expressed concern that some environmentalists may be deifying the environment (such as those who support the Gaia Principle - the notion that the earth is one organism). He cautioned that "The earth exists for the human person and not visa versa" adding that until "we've developed respect for the human person, we are not going to have respect for our planet" (Goldman, 1990: B12). Thomas Derr (1996: 23) argues that "we have an obligation to care for [nature] as a fit habitat for human beings...Our commitment and our duty is to love the world both for our own sakes, and for love of its Maker."

Father Robert Sirico, President of the Acton Institute for the Study of Religion and Liberty leads the charge against what he calls the "grave danger of green spirituality." Its goals, he believes, are "not to preserve nature's beauty, but to restrict the advance of economic progress." He warns that "looking upon nature as a lens through which we see God's hand as author of creation is not the same as finding God Himself present in nature, much less substituting nature for God" (Sirico, 1999: A10). He feels that economic growth is paramount to the betterment of humankind and that any environmental efforts to restrict such growth are wrong. He writes that "having respect for God's created order does not mean that it cannot and must not be used for the benefit of humankind; rather a belief in the sanctity of life requires that

we accept our responsibilities to have dominion over nature." To see otherwise "comes close to suggesting that the life of 'nature' is as precious as that of human beings. It is impossible to avoid the conclusion that this theory would reduce the status of human life to that of the animal kingdom. In addition, owing to its radical implications for economic systems, it would likely lead to the massive curbing of production, economic exchange and innovation" (Sirico, 1999: A10). He adds, "religious environmentalists are too willing to bend their faith in order to please those who place the Earth, as opposed to man, at the center of God's creation" (Sirico, 1994: 47).

This debate parallels the debate between Muir and Pinchot over anthropocentric and ecocentric values. And as such, it provides important boundaries within which to construct our moral imperative to protect the environment. Must the debate take such polar terms? Must the interests of humans and nature be seen as separate and in conflict? Just as academics have begun to question whether the intellectual separation between economics and ecology can be overcome and merged into a single discipline (Williams, 1980), religious thought can seek to overcome the spiritual separation of human development and environmental protection.

## **VI. Balancing Our Moral Imperative to Protect the Environment: A Theocentric View.**

In Genesis, man fell from grace and from Eden. And with his fall, so too did nature fall. Therefore, the moral integrity of nature (and humanity) is suspect. Yet, this suspicion has limits that endow nature with a degree of moral virtue. "The world of creation is totally subject to God's will. But the world of sin, which is the product of man's self will, is tainted" (Haak Adels, 1987: 24). Indeed, looking beyond man's self will, theologians and philosophers have long looked for God in nature. In this pursuit, Augustine saw God as the author of Nature, writing "I asked the earth, and it answered me, 'I am not he'; and whatsoever are in it confessed the same. I

asked the sea and the deeps, and the living creeping things, and they answered, 'We are not Thy God, seek above us' (Augustine, 1909). Pascal saw Nature as possessing the imprint of God's majesty, writing that "Nature is an infinite sphere whose center is everywhere and circumference nowhere. In short it is the greatest perceptible mark of God's omnipotence that our imagination should lose itself in that thought" (Pascal, 1966). Leibniz saw God's handiwork in the complexity of nature's design, writing "nothing better corroborates the incomparable wisdom of God than the structure of the works of nature, particularly the structure which appears when we study them more closely with a microscope" (Leibniz, 1969). And, Kuyper saw "two means whereby we know God, viz., the Scriptures *and Nature*" (Kuyper, 1943: 120). These perspectives provide the foundations for a theocentric framework for Christian views of the environment discussed in this section. These philosophers saw Gods' design in the interconnections within nature's systems (and as they connect to human systems within them). For each, nature is a reflection of God, a medium through which to see God's hand as its author.

### **Viewing Nature as a System Reflecting God's Design**

Jesus, in his *Sermon on the Mount*, (Matthew 6:26 - 6:30) held up the birds and flowers of nature as a model for how we are to live within God's plan. In fact, throughout his sermons and parables, he invoked metaphors and images of nature: mustard seed, sheep, shepherds, fish, fishermen, soil, planting, harvesting, grain, wheat, tress, springs of water.

In his *Canticle of the Creatures*, Saint Francis of Assisi goes further, connecting ourselves in "solidarity among all creatures" and all aspects of nature. "When he considered the primordial source of all things, he was filled with even more abundant piety, calling creatures, no matter how small, by the name of brother or sister, because he knew they had the same source as

himself. However, he embraced more affectionately and sweetly those creatures which present a natural reflection of Christ's merciful gentleness and represent him in Scriptural symbolism" (Bonaventure, 1978: 250).

Both Jesus and Saint Francis placed humankind above nature, but extolled the entirety of God's creation as an example of the virtue of God's design. So, to appreciate the entirety of that medium requires a change in our presently dominant views towards it. It requires a move from seeing nature as a collection of individual, inanimate parts to a system of interconnected, living pieces. Monica Weis challenges us to a deepening realization that "earth and heaven are not separate entities, and that our actions should flow from and express the dynamic balance and interconnectedness of life" (1992: 7). An appreciation of the interconnectedness of all life involves an "on-going dialogue with nature" (Allenby, 2002) as a part of God's creation and plan. It does not involve the deification of nature. Rather, it signals an awareness of our relation and interconnectedness to the world around us. If we can see ourselves as part of the whole of creation, then our attitudes towards and mistreatment of the natural environment become reflective of our failure to appreciate the connections between the parts and the whole, humankind and nature, neighbors and ourselves, and the past, present and future of our existence.

### **Placing Humankind within the System of Nature.**

Where is the boundary between humans and nature? This very simple question has been debated for centuries and reflects the varying views over what is nature. For some, nature is found only in the wilderness, the lonely places untouched or unspoiled by humankind (Williams, 1980). For others, it is found in the manicured gardens and landscapes which have been shaped by people. Rather than seeing these views in opposition, it is worthwhile to see them both as

important. In building our home, we naturally enter into a relationship with nature, shaping it to our needs while remaining alert to the natural systems by maintaining green space, avoiding floods, managing wildlife, etc. But as world population increases, there will be pressures to decrease the amount of the wild in favor of the altered, pressures that are driven, in part, by high modern hubris and technocratic blindness (Allenby, 2002). The wilderness is a complex collection of species whose relationships and processes are beyond our full understanding but may be essential to the maintenance of the ecosystems of the earth. Further, primeval nature provides a link between humankind and their origins, "a sense of community with the past and the rest of creation" (Dubos, 1976: 461). More importantly, this sense of community includes our relationship with God, the creator.

But the balance of that relationship is being upset. We have historically seen nature and our actions as separate, something we cannot continue to do. Today, "the [environmental] crisis is not simply something we can examine and resolve. We *are* the environmental crisis. The crisis is a visible manifestation of our very being, like territory revealing the self at its center. The environmental crisis is inherent in everything we believe and do; it is inherent in the context of our lives" (Evernden, 1985: 128).

Just as Pope John Paul II (1990) spoke of "mutual interdependence" in describing the order of creation, we can expand upon this notion to begin to see nature as a living totality animated by the designs and purpose of its creator - a system of which humans are a critical and integral part. Seeing ourselves as part of nature, we shift our perspectives from viewing ourselves as somehow above the environment towards being interdependent, interconnected and in communion with it. We move from seeing ourselves as "man *and* nature" to "man *in* nature"

(Dowie, 1995: 224); from seeking conflict to seeing harmony; from seeing ourselves as "victims" or "at the mercy" of nature to seeking communion with it.

To find that communion, we must seek a role of steward, one that balances the Genesis mandate for dominion with the challenge of replenishment. We may dominate nature towards our own goals, but we also seek to maintain its integrity and, where possible, improve it. These two objectives often appear to lie in conflict, a conflict that lies at the heart of many of our environmental problems. Economic growth for humankind and environmental protection for nature have long been assumed to exist in an intractable opposition. But this is increasingly being seen as a false dichotomy (Hoffman et al, 1999). In certain instances, the two can be mutually satisfied. The challenge is determining how and when this may be so. And in so doing, we can begin to understand appropriate action within a theocentric worldview. Viewing our actions as diverse and varied can help us understand when we should use our technology to dominate nature and when we should subsume our material desires for the replenishment of a stable environment.

### **The Shallow and Deep Structures of Nature.**

Nature can be conceptualized as possessing both a "shallow structure," that which is distorted and must be managed, tended, tilled and engineered by humankind to be its best, and a "deep structure," that which is the residual fabric of what God intended (Stackhouse, 2001). In the shallow structure of nature, we concern ourselves with nature as a resource for other human beings. We subdue nature to improve the living conditions for all human beings in the areas of food production, drinking water supplies, shelter, urban environments and transportation. We actively participate in the process of creation by seeking "symbiosis" or creative partnership

(Dubos, 1976). In the deep structure, we resist intrusion into nature's systemic fabric. We cease activities that lead to species extinction, global climate change, and ecosystem collapse. It is in the deep structure that we can see inherent value in nature for which it should be protected for its own sake. On this level, we recognize the underlying moral aspects of some of our behaviors that tamper with or damage nature's systems.

We have an obligation to use our intellect and seek the wisdom to understand the complex environmental web that God has created. The values we use to guide the purpose and trajectory of our technological activity must be based on a set of moral values that help us to assess when we are working within the shallow structure or tampering with the deep structure; when we should allow our needs to take precedence and when we should not. In the shallow structure, we have an obligation to search for ways to merge the needs of the human economy with the needs of the natural ecology. There is a moral imperative to using our intellectual abilities to discover alternative sources of energy that place little or no burden on the material resources or pollution adsorption capacities of the earth. Or similarly, there is a moral imperative to perfect tree farming, aquaculture and silvaculture rather than exhausting existing ecosystems whose complexity is beyond our understanding. In the deep structure, we have an obligation to learn the complexity of nature before we attempt to act in ways that may interfere with it. We must seek to learn about the connections between human actions and environmental effects, the limits of the environment to absorb our resource extraction and waste disposal, and the constantly changing state of the environment.

A moral appreciation for our differentiated role within nature brings to light new types of questions about how we interact within it. For example, a new debate has emerged over the production of genetically modified food. It has pitted the seemingly intractable perspectives of

those who see the benefits that this technology can bring to food production (an important human need) against those who see this as tampering with the underlying structure of nature and our environment (an important concern for self-restraint). Christian thinking has a role in this debate. To help resolve this issue, we can begin by asking whether we are acting within the deep or shallow structures of nature. To answer such questions, we must rely on our economic, political and technological capabilities, but we must also develop our foundational Christian values for guiding our actions and thoughts.

### **Foundational Christian Values and Theocentrism.**

To focus on subduing the earth while ignoring an obligation towards replenishment is a sign of prideful arrogance. It is representative of taking without giving back, of destroying thoughtlessly without creating thoughtfully. Our needs must be redefined beyond the utility satisfaction of our own self-interested desires. We must understand the consequences of our actions and live within the bounds of our environment that provides them. In order to understand how to act within the shallow and deep structures as well as how to identify when we are in one or the other, we need to build upon foundational Christian values for guiding our actions and our technologies. In point of fact, many of the values that the Christian faith already teaches can help in this pursuit. They merely need to be applied in new ways to reflect new realities and new purposes.

**Wisdom, humility and prudence.** "Ability to see the cultural value of nature boils down, in the last analysis, to a question of intellectual humility" (Leopold, 1949: 200). There is much that humankind does not understand about the natural environment. We do not know the full carrying capacity of the natural environment to bear the pollution that we are creating. Many

of our environmental problems have long time lapses between cause and effect such that the damage is created before it is detected (such as global climate change). Others have complex and poorly understood pathways between cause and effect (such as synthetic chemicals and endocrine disruption). While we must use our wisdom to understand nature, we must also have the humility to acknowledge all that we do not know. If we do not know the impact of our actions, we must practice the "precautionary principle," acting with prudence while acknowledging that all life that comprises the whole of God's creation has value. We must learn the humility of knowing when our technological prowess outpaces our ability to assess its impact on the environment.

**Respect and reverence.** A core to gaining humility is to devote an appropriate level of respect to the creation that is made by God and our role within it. If humanity, due to the fall, was ousted from the position as caretaker of Eden, how then can a Christian assert the right, or the knowledge, of proper earth management? To simply treat the life that is within nature as a "thing" -- our thing -- without any value beyond that which we apply to it represents materialism and the objectification of that which God has created. We must move beyond a view that the environment is ours alone, that it exists purely for our consumption in any way we desire. Are there moral implications to vivisection purely for economic reasons? Are there moral implications for hunting purely for pleasure? Is the suffering imposed upon livestock through large-scale food production the result of our sin (or Christian negligence)? In the face of world hunger, is our use of grain to fatten our livestock, rather than feed the poor a sin? Is the clear-cutting involved with this business a sin? Do each of these actions objectify and reduce the life in nature to mere material value, having no worth beyond what we extract or assign to it? Hunting deer in a community in which the size of the herd has overgrown the limits of the

ecosystem to support it represents our role as steward. It represents active participation in managing the shallow structure. Hunting mountain lions in the American West or Elephants in Africa solely for the purpose of personal pleasure may be a selfish and materialistic intrusion into the deeper structures of their respective ecosystems. It disrespectfully objectifies that living creature as inanimate and destined only for our individual enjoyment.

**Community and selflessness.** Many environmental problems are really the sum of many individual actions that are either occurring at the same time or have gone on for centuries, and now bear new weight because of their composite influence. Christian values lead us to reduce, not only our individual but also our collective impact on the earth's ecosystems. While we are a part of nature, our composite environmental impact binds us together as a community within nature. We must practice selflessness when our individual actions, if acted upon as a whole, would collectively destroy the "commons" of nature (Hardin, 1968). In this way, for example, littering may be seen as an act of estrangement from nature, from our neighbor and from God. It represents an arrogant self-centered view that the environment stops where we choose it to stop; that we are separate and distinct. It represents a selfishness that others in the community will clean up what we litter. And it represents disrespect for what God has made.

**Moderation and self-control.** To simply subdue and take with no self-restraint is just the specter of materialism, the possession of what is not ours simply because we desire it. Protecting the environment can lead us to use only what we need from the shallow structure, share what resources are available for the benefit of all and leave alone those resources that are part of the deeper structure. Christian values lead to question the unrestrained materialism and consumerism that have become predominate values in society. They challenge us to use less of the earth's materials, by demanding less virgin materials and requiring less waste disposal. Consider, for

example, the US industrial system provides for the needs of hundreds of millions of people by consuming 2.7 billion metric tons of raw materials each year (not counting stone, sand and gravel (World Resources Institute, 1994). Each year, it also creates nearly 7 billion metric tons of solid waste (World Resources Institute, 1994), nearly 2.5 million metric tons of toxic chemicals (US EPA, 1992) and more than 120 million metric tons of conventional air pollutants (World Resources Institute, 1994). Is this amount of material use and disposal necessary? Christian values challenge us to move beyond seeking satisfaction of nature as products for our consumption and search for satisfaction in nature as God designed it. It leads us to a view that it is morally right to consume less and recycle or reuse what we do use.

**Mindfulness.** Earlier in this paper, His All Holiness Bartholomew I was quoted as saying that "for humans to degrade the integrity of the Earth by causing changes in its climate, its water, its land, its air, and its life with poisonous substances — these are sins" (Stammer, 1997: A1). This is quite a list of sins, sins we generally commit by definition. Nearly everything we do creates some environmental impact: driving a car, heating a house, buying material goods, even eating and breathing. Some issues - like over-consumption - have a choice involved. Others such as breathing, do not. Our Christian duty calls us to be aware and make thoughtful choices. When we know of our impact on the environment, we must remain thoughtful in acting so that we do not unless we have no choice. We may choose not to dump our used oil into the local storm drain, and ultimately in the local river (in many US cities) because we have recycling alternatives available. We may have no choice but to drive to the grocery store or fly to a conference. Mindfulness leads us to reexamine practices such as planned obsolescence, "disposable" products and excessive packaging. And, wherever possible mindfulness leads to an obligation to try and change systems that damage the environment.

**Vigilance, responsibility and correction.** Unfortunately, we may have reached a point in our development that there may no longer be such a thing as a "pristine" environment. All areas of the earth appear to show the fingerprint of human influence. Even the blood samples of polar bears in the supposedly primal ANWR show traces of man-made dioxin. Often unwittingly, we find that the context within which our actions take place is constantly changing. Our society's unending curiosity to explore new issues, our continuing need for new technology and our emerging awareness of the state of the environment pushes us toward a new awareness of our place within the environment. With each new vista comes new understanding of the problems we have created and the solutions they require. The Genesis mandate for replenishment of nature stands as a moral responsibility to correct damages we may have inadvertently created. Indeed, where the deep structure of nature is disrupted - birth defects due to chemical pollution, or destroyed fish populations due to disruptive fishing techniques, for example - we have the responsibility to use technology to recover as best we can an approximation to the deeper organic harmonies. There is a moral imperative to cease these human induced trends regardless of whether we can see their connection to human survival or even if their cessation is contrary to human needs.

These are all examples of how our modern context forces a reexamination of Christian values (and, in fact, non-Christian values as well) in light of a new era in which our material growth is inflicting mounting damage on the earth's ecosystems. Environmental problems have moral components, not solely because of their implications for humankind, but also because they represent instances where we should be protecting the value of nature and seeking our place within it. An appreciation for the full system of nature brings us into new light our questions about the morality of issues such as species protection, forestland destruction and industrial

pollution as a means to increase material production and economic profits without searching for ways to protect the integrity of the ecosystem that is lost through such practices.

## **VII. Conclusion**

Today, our contemporary spiritual challenge is to apply our God given intellect towards finding ways to live in harmony with nature through a theocentric view of our relationship with it. If we are ever to solve our contemporary environmental problems, this view will help us to consider the moral implications of our ecological impact, even when it does not bear directly on human existence. Unfortunately, the inertia of history based on material values and the forceful domination of nature make such a shift an enormous challenge. As the late philosopher Hans Jonas warned twenty years ago, "For such a role of stewardship no previous values and ethics have prepared us" (Jonas, 1973). And as Stephen Jay Gould wrote, humans have become "the stewards of life's continuity on earth." We "cannot abjure it. We may not be suited for it, but here we are" (Gould as cited in Calvin, 1994). The imperative for moral teaching and guidance in assuming this role has never been more needed.

Where Genesis holds that "in God's plan man and woman have the vocation of 'subduing' the earth as stewards of God" (Ligouri Publications, 1994: 95), theocentric ideals help us to imbue that role with an appropriate degree of humility and respect. As Monica Weis wrote "No longer can we humans see ourselves and our selfish desires as the center of living and the sole criterion for decision making. Our vocation is not to dominate the earth. Our vocation is to discover community with it. Understanding our true position as one living species on this living planet is...a recognition of ourselves as made of the very stuff of the planet" (Weis, 1992: 8-9).

This does not challenge the spiritual primacy of humans versus nature. In fact, the debate over the spiritual hierarchy between humans and nature becomes a distraction from the broader idea that we are a part of nature as God's creation. Just as our spiritual importance suffered no critical detriment by Galileo's assertions that the Earth was not the physical center of the universe, there is no reason why a shift in the presumed centrality of humankind vis-a-vis nature should inflict critical damage to our spiritual importance. A theocentric view of nature is not a challenge to the hierarchy of humans versus nature. It is not a proclamation that the life of nature is more or less precious than that of human beings. If it becomes a choice between one and the other, humans will always occupy the central place in God's creation - Genesis pronounces it and the responsibility for replenishment demands it. But this place is not inconsistent with the virtues of self-restraint, wisdom and prudence in respecting nature's integrity.

So, in capturing the moral implications of the relationship between humankind and nature, the need to protect human populations is right, but not complete. While environmental degradation does, at times, constitute theft from our neighbor, it also exposes how we can deviate from the Christian ideals towards which we strive. It represents a prideful arrogance towards the structures of nature as defined by God and an abdication of our responsibility to find harmony with them. To disconnect ourselves from nature and see it as inanimate and subservient only to our material desires is to degrade what it is -- a creation of God, as are we.

For considering how to bring about such a value shift, the 1991 Encyclical Letter, *Centesimus Annus* offers a provocative counterpoint to the generally accepted view of the domination of nature, one that should be brought to the fore of religious teaching on environmental protection.

*"In his desire to have and to enjoy rather than to be and to grow, man consumes the resources of the earth and his own life in an excessive and disordered way. At the root of the senseless destruction of the natural environment lies an anthropological error, which unfortunately is widespread in our day. Man, who discovers his capacity to transform and in a certain sense create the world through his own work, forgets that this is always based on God's prior and original gift of the things that are. Man thinks he can make arbitrary use of the earth, subjecting it without restraint to his will, as though it did not have its own requisites and a prior God-given purpose, which man can indeed develop but must not betray." (Pope John Paul II, 1991: 56).*

In this statement lies a Christian challenge to change our minds, hearts and actions towards the natural world and respect the value God intended in it. It is up to us to bring our Christian teachings to bear on our present-day ability to alter the environment in global and potentially catastrophic ways. Times have changed. We need a way to give moral voice to what is already intuitively correct to many, that there are times when there exists a moral imperative to protect nature for reasons beyond the utility of man.

## VIII. References

- Acton Institute for the Study of Religion and Liberty (1999) Organization flier (Grand Rapids, Michigan).
- Allenby, B. (2002) "Observations on the philosophic implications of earth systems engineering and management," Batten Institute Working Paper, Darden School of Business, University of Virginia.
- Arthur, B. (1988) "Self-reinforcing mechanisms in economics," In P. Anderson et al. (eds.) *The Economy as an Evolving Complex System*. (Reading, MA: Addison-Wesley).
- Associated Press (1991) "Presbyterians ratify teaching on sex, ecology," *The Boston Globe*, June 9, 1991: 4.
- \_\_\_\_\_ (1999) "The greatest gift...is faith: A statement of mission," *The Boston Globe*, January 24: A12.
- Augustine, (1909) *Confessions*, translated by E. Pussey (New York: P.F. Collier & Son).
- Barley, S. (1986) "Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments," *Administrative Science Quarterly*, 31, 78-108.
- Bazerman, M. & A. Hoffman (1999) "Sources of environmentally destructive behavior: Individual, organizational and institutional perspectives," *Research in Organizational Behavior*, 21: 39-79.
- Bonaventure, (1978) *The Life of St. Francis*, (Mahwah, NJ: Paulist Press).
- Calvin, W. (1994) "The emergence of intelligence," *Scientific American*, 271(4): 101-107.
- Carson, R. (1962) *Silent Spring*, (Boston, MA: Houghton Mifflin).
- Catton, W. & R. Dunlap (1980) "A new ecological paradigm for post-exuberant sociology." *American Behavioral Scientist* 20(1): 15-47.
- Clarke, R. (1993) *Water: The International Crisis* (Cambridge: MIT Press).
- Cushman, J. (1998) "Religious groups mount a campaign to support pact on global warming," *The New York Times*, August 15: A10.
- David, P. (1985) "Clio and the economics of QWERTY," *Economic History*, 75, 227-332.
- Derr, T. (1996) *Environmental Ethics and Christian Humanism*, (Nashville: Abingdon Press).
- Devall, B. & G. Sessions (1985), *Deep Ecology*, (Salt Lake City: Peregrine Smith Books).
- Dowie, M. (1995) *Losing Ground: American Environmentalism at the Close of the Twentieth Century* (Cambridge, MA: MIT Press).
- Dreyfus, H. (1991) *Being in the World: A Commentary on Heidegger's Being and Time*, (Cambridge, MA: MIT Press).
- Dubos, R. (1976) "Symbiosis between earth & humankind," *Science*, 193: 459-462.
- Egri, C. & L. Pinfield (1994) "Organizations and the biosphere: Ecologies and environments", in Clegg, Hardy & Wood (eds.), *Handbook of Organization Studies*, (London: Sage Publications).
- Engelman, R. & P. LeRoy, (1995) *Conserving Land: Population and Sustainable Food Production* (Washington DC: Population Action International).
- Evernden, N. (1985) *The Natural Alien*, (Toronto: University of Toronto Press).
- Gladwin, T., J. Kennelly & T. Krause (1995) "Shifting paradigms for sustainable development: Implications for management theory and research", *Academy of Management Review*, 20(4): 874-907.
- Goldman, A. (1990) "Focus on humans, Cardinal cautions," *New York Times*, April 23: B12.

- Haak Adels, J. (1987) *The Wisdom of Saints* (Oxford: Oxford University Press): 24.
- Hardin, G. (1968) "The tragedy of the commons: The population problem has no technical solution; It requires a fundamental extension of morality," *Science*, 162 (December 13): 1243-1248: 1244.
- Hoffman, A., J. Gillespie, D. Moore, K. Wade-Benzoni, L. Thompson & M. Bazerman (1999) "A mixed-motive perspective on the economics versus environment debate," *American Behavioral Scientist*, 42(8): 1254-1276.
- Hoffman, A. & J. Ehrenfeld (1998) "Corporate environmentalism, sustainability and management studies," in N. Roome (ed.) *Environmental Strategies for Industry: The Future of Corporate Practice*, (Washington DC: Island Press): 55-73.
- Hott, L. & D. Garey (1989) *The Wilderness Idea: John Muir, Gifford Pinchot and the First Great Battle for Wilderness*, video documentary by Direct Cinema Limited: Santa Monica, CA.
- Jonas, H. (1973) "Technology and responsibility: Reflections on the new tasks of ethics," *Social Research*, 40: 31-54.
- Kennedy, P. (1993) *Preparing for the Twenty-First Century*, (New York, NY: Random House): 96.
- Kloehn, S. (1997) "Evangelicals see beasts as blessed by their creator," *The Chicago Tribune*, February 10: A1, A16.
- Kuyper, A. (1943) *Lectures on Calvinism*, (Grand Rapids, MI: Wm. B. Eerdmans Publishing Co.)
- Leibniz, G. (1969) *Philosophical Papers and Letters*, 2nd edition, translated by L. Loemker (Dordrecht: Reidel).
- Leopold, A. (1949) *A Sand County Almanac, And Sketches Here and There*, (New York: Oxford University Press).
- Lewis, C.S. (1953) *The Abolition of Man*, (New York: The Macmillan Co.).
- Ligouri Publications (1994) *Catechism of the Catholic Church*, (Ligouri, Mo.: Liguori Publications).
- Merton, T. (1963a) *Lecture: St. Thomas: The Importance of Creation in God's View*, April 3. (Louisville, Kentucky: Thomas Merton Studies Center), tape 95A.
- \_\_\_\_\_ (1963b) *Letter to Rachel Carson*, January 12 (Louisville, Kentucky: Thomas Merton Studies Center).
- Nickerson, C. (1994) "Stripping the sea's life," *The Boston Globe*, April 17: 1, 24, 25.
- Pascal, B. (1966) *Pensees*, translated by A. Krailsheimer (London: Penguin).
- Passmore, J. (1974) *Man's Responsibility For Nature: Ecological Problems and Western Traditions* (New York: Charles Scribner's Sons).
- Pope John Paul II (1990) *World Day of Peace Message*, "Peace with God the Creator, Peace with all of Creation," *Origins* 19:28 (December 14, 1989), 465-468.
- \_\_\_\_\_ (1991) *Encyclical Letter Centesimus Annus* (Boston, MA. Pauline Books & Media).
- \_\_\_\_\_ (1999) *Apostolic Exhortation, a Statement of Mission for the Church in the Americas*.
- Population Action International (1996) *Why Population Matters*, (Washington DC: Population Action International).
- Reid, W. (1988) "How many species will there be?" in S. Kawano, J.H. Connell and T. Hidaka (eds.) *Evolution and Coadaptation in Biotic Communities* (University of Tokyo Press: Tokyo).

- Sirico, R. (1994) "The greening of American faith," *National Review*, August 29: 47.
- \_\_\_\_\_ (1999) "Beware grafting environmental ideology on to orthodox faith," *The Detroit News*, March 4: A10.
- Stackhouse, M. (2001) personal communication.
- Stammer, L. (1997) "Harming the environment is sinful, prelate says," *Los Angeles Times*, November 9: 1-A.
- Steinfels, P. (1996) "Evangelical group defends endangered-species laws as a modern Noah's ark," *The New York Times*, January 31: C19.
- Stipp, D. (1997) "The cost of cooling it," *Fortune*, December 8: 128-129.
- Thomas, W. (2002) "Business and the journey towards sustainable development: Reflections on progress since Rio," *Environmental Law Reporter*, June.
- US Dept. of Agriculture (1995) *Summary Report, 1992 - National Resources Inventory* (Washington DC: Natural Resources Conservation Service).
- US Environmental Protection Agency (1992) *1990 Toxic Release Inventory*, Report No. 700-S-92-002. (Washington DC: US Environmental Protection Agency).
- US Office of Science and Technology Policy (1997) *Climate Change: State of Knowledge* (Washington DC: Executive Office of the President).
- Washington Post* (1998) "A spiritual lens on the environment," *The Washington Post*, February 3: A1.
- Weis, M. (1992) "Living beings call us to reflective living," *Merton Seasonal*, Autumn: 4-9.
- White, L. (1967) "The historical roots of our ecological crisis," *Science*, 155 (March 10): 1203-1207.
- Williams, R. (1980) *Problems in Materialism and Culture* (London: Verso).
- Wilson, E. (1992) *The Diversity of Life* (Cambridge, MA: Harvard University Press).
- Woodward, K. & R. Nordland (1992) "New rules for an old faith," *Newsweek*, November 30: 71.
- World Business Council on Sustainable Development (1997) *Exploring Sustainable Development: WBCSD Global Scenarios* (London: World Business Council on Sustainable Development).
- World Resources Institute (1994) *World Resources, 1994-1995* (New York: Oxford University Press).