SUSTAINABILITY TODAY

A Compass for the Future

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Introduction

The Birth of Sustainability

The Context

As we enter the dawn of the twenty-first century, a new movement is beginning to take hold in the United States and the world — sustainability.

The purpose of this paper is to help those within this movement, as well as people presently outside, better understand where sustainability has been, and where it might be going.

This project will unfold in several steps.

In the introduction, we will first lay out a "pre-history" of the sustainability movement, paying special attention to its relationship with its main pre-cursor, the environmental movement of the 1960s and '70s.

Next, we will outline what we see as the emergence of the sustainability movement *per se* in the 1980s, and the dimensions of its extraordinary flowering in the 1990s.

Then, we will lay out the reasons for using the methodology we are employing to grasp the profound and fruitful diversity of the sustainability movement at this time.

Once we have laid out this rationale, we will then be in position to outline, in the body of the thesis, a multi-dimensional portrait of the sustainability movement in its current manifold variety.

Environmentalism: The Precursor to Modern Sustainability

At the foundation of modern sustainability lies the human connection with nature, expressed first in America through the New England Transcendentalist Movement[1] of the 1800s.

Transcendentalists such as Bronson Alcott,[2] Margaret Fuller,[3] George Ripley[4] — and especially Henry David Thoreau[5] and Ralph Waldo Emerson[6] — pointed to the significance of nature as a mystery full of symbols and spirituality.

As Emerson stated, "The Transcendentalist adopts the whole connection of spiritual doctrine. He believes in miracle, in the perpetual openness of the human mind to new influx of light and power; he believes in inspiration, and in ecstasy."[7]

In his book *Nature* (1836), Emerson viewed the natural world as a source of guidance and as a mirror which reflects back the soul. He described our relationship with nature as being

comprised of seven facets: commodity, beauty, language, discipline, idealism, spirits, and prospects.[8]

Each of these facets, in turn, supports the intuition and inspiration of the individual.

Emerson's description of the natural world as a mirror was enhanced by the work of his friend and contemporary, Henry David Thoreau.

In *Walden* (1854), Thoreau described his experience of living a simple existence in a hut next to Walden Pond, near Concord, Massachusetts. Thoreau's observations of nature served to highlight the virtues of libertarianism and individualism.

As he stated, "I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived."[9]

The works of Thoreau and Emerson helped to establish the Transcendentalist Movement's view of **nature as a teacher**, which was subsequently enhanced by similarly inclined writers and naturalists in the twentieth century.

One of these was early 20th century American inventor, writer, naturalist and conservationist John Muir,[10] who played a pivotal role in bringing attention to the importance of preserving America's wildlands.

Unlike the Transcendentalists — who saw nature as a way to reflect the divine aspect within themselves — Muir stressed the systematic character of the natural world, and, consequently, the importance of protecting such vital resources as forests and water supply.

He also stressed the crucial role of wilderness for recreation and uplifting the human spirit: "Everybody needs beauty as well as bread, places to play in and pray in, where nature may heal and give strength to body and soul alike."[11]

In books like *Our National Parks* (1901) and *The Yosemite* (1912), Muir traced the impact on America's wildlands of activities like sheep and cattle grazing. In this way, he influenced his contemporaries, including President Theodore Roosevelt among other officials, to establish a series of conservation programs, and to create Yosemite National Park.[12]

Muir was also involved in establishing Sequoia,[13] Mount Rainier,[14] Petrified Forest[15] and Grand Canyon[16] national parks.

In 1892, Muir and his colleagues founded the Sierra Club,[17] which has had a lasting influence on conservation issues to "do something for wildness and make the mountains glad."[18]

Following Muir's conservation efforts, the 1940s American conservationist Aldo Leopold[19] extended the notion of nature — not merely as a mirror and teacher — but as an ecosystem directly tied to our survival and well-being.

For Leopold, environmental conservation called for an ethical approach, based on respect for the environment.

In his essay, "The Land Ethic" in *A Sand County Almanac*, he stated:

> An ethic may be regarded as a mode of guidance for meeting ecological situations so new or intricate, or involving such deferred reactions, that the path of social expediency is not discernible to the average individual. Animal instincts are modes of guidance for the individual in meeting such situations. Ethics are possibly a kind of community instinct in-the-making.[20]

Although written over fifty years ago, Leopold's vision still stands as an important milestone, whose general sensibility and specific concern with ethics, underlies and informs the sustainability movement today.[21]

Following Leopold's writings, American writer and naturalist Rachel Carson's[22] publication of *Silent Spring* in 1962 set off an alarm heard through all levels of society.

Carson's depiction of the devastating impact of toxins and pollutants in the environment caused the general public and government agencies to re-evaluate the limits of ecosystems. Her description of the dangers of agricultural pesticides on animal and human health made clear that our survival is linked to the viability of ecological systems.

In this way, seminal works such as Leopold's *Sand County Almanac* and Carson's *Silent Spring,* became icons in the environmental field, adopted by the sustainability movement because of their powerful melding of environmental and ethical considerations.

The ecological awareness raised by Carson and other environmentalists in the 1960s culminated in 1970 with the first Earth Day.[23] This event attracted over 20 million people to enthusiastic and peaceful rallies throughout the United States. [24]

Earth Day served to educate the general public about the impact of industrial society on the environment. It also began the process that led the U. S. Government to pass laws protecting the environment — e.g., the Clean Air Act[25] and the Clean Water Act[26] — and establish regulatory agencies — e.g., the Environmental Protection Agency (EPA)[27] — whose purpose was to monitor more closely the environmental impact of business and industry.

In this way, "pre-sustainability" environmentalism created significant constituencies at both the popular and official levels that united four dominant concerns: 1) an awareness of the profound spiritual links between human beings and the natural world; 2) a deep understanding of the biological interconnection between **ALL** parts of nature, including human beings; 3) an abiding concern with the potential damage of human impact on the environment; and 4) a strongly-held commitment to make ethics an integral part of all environmental activism.

Contemporary Environmentalism: The Roots of Sustainability

A landmark event in the history of contemporary environmentalism occurred in 1972 when Maurice Strong[28] headed the United Nation's Conference on the Human Environment[29] in Stockholm, Sweden.

This gathering internationalized the concerns aired during the American Earth Day events, focusing on the regional pollution, and especially acid rain problems, of northern Europe.

Even more important, Stockholm marked the first step in the emergence of what we see today as the sustainability movement — a global forum that began the process of attempting to link environmental concerns with a positive orientation towards economic issues like development, growth and employment.[30]

As a result of the Stockholm conference, numerous national environmental protection agencies were established, as well as the United Nations Environment Programme (UNEP),[31] whose mission is to "provide leadership and encourage partnerships in caring for the environment by inspiring, informing and enabling nations and people to improve their quality of life without compromising that of future generations."[32]

By 1981, the term **"sustainability"** itself began to garner wider public attention, chiefly as a result of the publication by The Worldwatch Institute[33] of Lester Brown's *Building A Sustainable Society*.

In this landmark work, Brown began with an incisive analysis of the **economic** predicament facing the world as a result of its theretofore careless inattention to, and disregard for, fundamental **ecological** limitations.

He then outlines a comprehensive strategy for moving from what he calls "**un-**sustainable" practices to a global relationship with nature that completely re-configures not only the human relation with the earth and its biological diversity — but also the entire structure of values with which people approach the interaction of ecological and economic issues.

Following the publication of *Building A Sustainable Society,* The Worldwatch Institute published its first *State of The World* annual report in 1984. This report provided a global

perspective in evaluating the relation between the world's resource base, and the dynamics of economic development: "We are living beyond our means, largely by borrowing against the future."[34]

Subsequent Worldwatch annual reports helped create a global consciousness about the interconnection among ecological, economic and social issues — an awareness soon thrust into international prominence with the establishment of the Brundtland Commission.

The Emergence of Sustainability — Brundtland (1987) and Rio (1992)

The emergence of sustainability in its contemporary form stems from the UN's creation in 1983 of the World Commission on Environment and Development (WCED), headed by Gro Harlem Brundtland,[35] former Prime Minister of Norway.

The General Assembly asked the commission:

- to propose long-term environmental strategies for achieving sustainable development by the year 2000 and beyond;
- to recommend ways concern for the environment may be translated into greater co-operation among developing countries and between countries at different stages of economic and social development and lead to the achievement of common and mutually supportive objectives that take account of the interrelationships between people, resources, environment, and development;
- to consider ways and means by which the international community can deal more effectively with environmental concerns; and
- to help define shared perceptions of long-term environmental issues and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the environment, a long-term agenda for action during the coming decades, and aspirational goals for the world community.[36]

In 1987, the WCED, known as The Brundtland Commission,[37] published its landmark report, *Our Common Future*.

The most well-remembered quote from the Brundtland report defined sustainable development as ". . . development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[38]

While this oft-heard formulation is undoubtedly significant, we believe the Brundtland report in fact marks a crucial moment in the evolving self-definition of the sustainability movement in two further, and even more significant, ways.

Institutionally, it created the first framework for governments and other organizations to take concerted action to protect the earth's life support systems in ways that **simultaneously** promoted economic goals (development, growth and employment) and "social justice" objectives (greater equality both **within** and **among** nation-states).

Conceptually, it contained the first articulation of what we see as the key characteristic of contemporary sustainability — evaluating **any** proposed action or initiative with reference to the simultaneous structural interaction of those three fundamental criteria: **ecological** or environmental; **economic**, especially employment; and, finally, **equality** or equity — what have become known today as the **Three E's**.

"Ecology and economy are becoming ever more interwoven — locally, regionally, nationally, and globally — into a seamless net of causes and effects."[39]

"Sustainable development requires meeting the **basic needs of all**, **and extending to all**, the opportunity to fulfill their aspirations for a better life. **A world in which poverty is endemic will always be prone to ecological and [economic] catastrophes**."[40]
"Hence, our inability to promote the common interest in sustainable development is often a product of the relative neglect of economic and social justice within and amongst nations."[41]

In these and several other places, the Brundtland report made clear that while sustainability was very much about the interaction of ecological and economic (especially employment) considerations — it would be incomplete without commensurate concern for the so-called "social justice" issue of equality (or equity).

In 1992, five years after the publication of the Brundtland report, the United Nations Conference on Environment and Development (UNCED),[42] known as the "Earth Summit," took place in Rio de Janeiro, Brazil.

The Earth Summit brought together more than 182 world leaders — delegates from UN agencies and international organizations — as well as world media, and hundreds of

nongovernmental organizations (NGO's), to build on the 1972 Stockholm Conference and the 1987 Brundtland report.

Upon its conclusion, those attending the Earth Summit agreed to the 27 principles on environment and development of the Rio Declaration[43] — which "made it plain that we can no longer think of environment and economic and social development as isolated fields" — and adopted a global program for action on sustainable development through Agenda 21:[44]

> A comprehensive blueprint for a global partnership [that] strives to reconcile the . . . requirements of a high quality environment and a healthy economy for **all** people of the world, while identifying key areas of responsibility, as well as offering preliminary cost estimates for success.[45]

The Earth Summit also generated: 1) the Statement of Principles on the Management, Conservation and Sustainable Development of All Types of Forests; 2) the UN Framework Convention on Climate Change; 3) the UN Convention on Biological Diversity; and 4) a recommendation for an international convention on desertification.[46]

Following the Earth Summit, President Bill Clinton in 1993 established the President's Council on Sustainable Development (PCSD),[47] headed by Ray Anderson,[48] Chairman and CEO of Interface, Inc.[49]

The Council provided a domestic agenda for sustainable development by building upon the work of the Earth Summit. The mission of the PCSD was to:

- Forge consensus on Policy by bringing together diverse interests to identify and develop innovative economic, environmental and social policies and strategies;
- Demonstrate Implementation of policy that fosters sustainable development by working with diverse interests to identify and demonstrate implementation of sustainable development;
- Get the word out about sustainable development; and
- Evaluate and report on progress by recommending national, community, and enterprise level frameworks for tracking sustainable development.[50]

In 1999, after three years of work and over 40 public meetings and workshops, the Council completed its third and final report, Towards A Sustainable America: Advancing Prosperity, Opportunity, and A Healthy Environment for the 21st Century.[51]

The report recommended 140 actions that aimed to "improve our economy, protect our environment, and improve our quality of life. Many of these actions address important current issues like sprawl, climate change, urban renewal, and corporate environmental responsibility."[52]

In this way, we can see how the sustainability movement came to assume its current form — a diverse, world-wide, multi-cultural and multi-perspectival movement, built around what have come to be known as the **Three E's**: **1) Ecology**/Environment; **2) Economy**/Employment; and **3) Equality**/Equity.

In this context, we are now in a position to examine these Three E's in detail — as well as the nature of their structural interaction — while also introducing what might be considered the Fourth E: **Education**.

The Core of Contemporary Sustainability — The Three E's Plus One

Before we explore both the **Three E's** — and, more importantly, the profoundly simultaneous nature of their structural interaction — we might pause to alert the reader that, from here on out, we will be using the term "sustainability" in two senses — often, although not always, at the same time.

On the one hand, we will use the term to refer to a diverse, world-wide, multi-cultural and multi-perspectival **movement**, whose participants all subscribe (to a greater or lesser extent) to this notion of the **Three E's** and their simultaneous interaction.

On the other hand, we will also use the term to refer to the ever-evolving body of ideas, observations, hypotheses, etc. that together constitute the **thinking** of that movement about the myriad of challenges — ecological, economic and equity-related — to which the movement sees itself as a creative and open response.

In this dual context, the key innovation of sustainability over environmentalism is its expansion of the earlier discourse from a discussion about the preservation and management of **ecology**/environment (the first E) to insist upon the inclusion on an equal basis of issues related to **economy**/employment (second E) and **equality**/equity (third E).

In this way, sustainability as a movement offers the possibility of a much broader coalition for positive change both within and among societies.

That is, rather than pitting "tree huggers" against lumberjacks — so often the trope of environmental discourse — sustainability attempts to find a context in which the legitimate interests of all parties can be satisfied (to a greater or lesser extent) — and always in the framework of a concern with ethics and equality for all involved.

Similarly, at the global level, sustainability is oriented towards solutions to systemic problems that do not doom the developing world to a permanently secondary place in the world economy — all under the rubric of "environmental protection."

If, for example, the advanced industrial world wants Brazil to stop the tragically catastrophic decimation of the Amazon rainforest, it is up to the First World to help it find an alternative path of economic development — preferably one that will simultaneously contribute to the eradication of the brutal *favelas* in which so many poor Brazilians live.

With all this understood, we can now turn to a brief examination of the internal character of each of the **Three E's**.

The First E: Ecology / Environment

Within this first E, there are three crucial issues: 1) short-term vs. long-term time perspective; 2) piecemeal vs. systemic appreciation of the indispensability of ecosystems for the viability of human existence; and 3) the notion that ecosystems have built-in limits on the nature and amount of human impact they can sustain.

In this context, environmental sustainability abandons the philosophy of short-term gains in exchange for the long-term viability of our resource use — especially in areas like resource extraction, agriculture, transportation, manufacturing and building materials.

At the same time, any idea of civilized human existence necessarily includes such basics as clean air and water, heating and cooling needs, and food that is safe to eat — all of which are dependent on the successful functioning of major ecosystems.

In this context, the notion of **ecosystem services** becomes significant. Broadly speaking, these can be defined as "the conditions and process through which natural ecosystems, and the species that comprise them, sustain and fulfill human life . . . Examples include purification of air and water; mitigation of floods and droughts; detoxification and decomposition of wastes; pollination of crops and natural vegetation" etc. etc.[53]

The notion of limits on ecosystems, finally, can be simply illustrated with reference to the decimation of oceans from overfishing, forests from clear-cutting, and fresh water

from toxins and pollutants — all of which ended up creating not simply ecological crisis, but long-term economic dislocation as well.

The Second E: Economy / Employment

Economic sustainability speaks to the relationship between employment needs and environmental protection.

Economic sustainability departs from traditional environmentalism in its recognition of the importance of providing secure, long-term employment without jeopardizing the health of ecosystems.

Having a healthy environment, free of pollution and toxic waste — while simultaneously providing the basis for a dynamic economy that will endure for an extended period — all these are viewed in sustainability as **complementary**, rather than **conflicting**, endeavors.

In this context, sustainability thinks it crucial to point out that what Paul Hawken[54] and the Lovinses[55] call "natural capital, made up of resources, living systems and ecosystem services" is as important for economic development as the more conventionally recognized forms of capital — e.g., human, financial, and manufactured.[56]

By pointing out this key — if often ignored — aspect of economic development, sustainability can thus legitimately claim a more realistic assessment of the dynamics of

long-term economic activity than conventional economics — an intellectual achievement made all the more powerful and appealing by its simultaneous awareness of social justice considerations as well.

The Third E: Equality / Equity[57]

This third aspect of sustainability attempts to add a sense of community to the existing mix of ecologically-minded, long-term economic development.

The community-building aspect of sustainability recognizes the importance of cooperation and concern for one's neighbor.

At a fundamental level, members of a sustainable community understand that the well-being of the individual is ultimately dependent on the well-being of the larger community — and, of course, vice-versa.

In this context, social cohesion, and virtues such as compassion and tolerance, are more likely to thrive in an environment where all members of the community feel that their contribution to the whole is recognized and appreciated, and where a fair and equitable distribution of resources is recognized as essential for the long-term viability of the group as a whole.

At the level of the nation-state, this equality/equity notion addresses the fair distribution of such resources as food and nutrition, affordable housing, decent health care, education, job training and professional opportunities.

Globally, inequities such as famine and homelessness are fundamentally seen as problems of distribution, rather than a lack of resources.

In this sense, sustainability argues that just and equitable resource allocation is not simply ethical or moral, but essential for the well-being of the larger community — in this case, the entire world.

The Three E's Plus One: Education[58]

As we consider these Three E's, and their mutual interaction, we cannot forget that they are all made even more powerful when joined by an active commitment to public awareness and **education**.

Education is the root catalyst for helping everyone understand the dynamic nature of the inter-relationship among the environmental, economic, and equality aspects of sustainability.

Through education, we gain a knowledge base from which to help people overcome the cognitive and normative — and hence emotional — obstacles to understanding the observation and analysis of the global dilemma put forward by sustainability.

In this way, sustainability attempts to locate itself firmly within the existing value-structure of societies, while simultaneously helping that value-structure to evolve in a direction more congenial with what it sees as a most promising, long-term approach to system-wide global problems.

The Methodology of This Thesis

It is in this context of the **Three E's Plus One** that we turn to the question of how to construct a nuanced, dynamic and multi-dimensional picture of the sustainability movement as it exists today.

In our view, this can best be undertaken through an analysis of the **fundamental principles** that each organization identifying itself as part of sustainability lays out at the beginning of their public self-definition — whether in brochures, booklets and other standard media, or the more "cutting-edge" form of Websites in cyberspace.

Why focus on **"fundamental principles"?**

By definition, a principle refers to "a guiding sense of the requirements and obligations of right conduct."[59]

As this definition makes clear, a statement of principles provides us with the "guiding sense," or basic direction, that any organization — be it individual or collective — will use in orienting themselves to the world in general, and making specific decisions with reference to concrete situations.

In this way, principles play a key role in setting the context for moral and ethical choices that organizations make.

In our view, this focus on principle can be of significant value in helping us make sense of sustainability in the wake of the explosion of groups identifying themselves with the movement in the years since the publication of the Brundtland report in 1987.

The flowering of thousands of such organizations worldwide claiming adherence to sustainability illustrates the popularity of such a self-identification.

An Internet search on any aspect of sustainability, for example, yields thousands of individuals, organizations and government agencies who claim allegiance to sustainable practices.

In this context, a significant issue becomes: how can we use the enunciation of these different viewpoints to help us develop the sort of nuanced, multi-dimensional picture of sustainability referred to before?

In our view, the best way to gain the most well-rounded perspective on these multiple viewpoints is to focus on the fundamental principles these groups articulate.

In this framework, we see five reasons to focus on these self-determined and publicly-articulated fundamental principles:

(1) A statement of principles is almost always one of the first messages that these groups present, and therefore, would seem very important to these entities themselves.

(2) Although in some cases there are gaps between the actions and the principles stated, there is a critical structural connection — which is crucial for the intentions outlined — between these principles and the actions these groups attempt to take.

(3) From a methodological point of view, any "objective" analysis, as will be discussed later, must be rooted in examining the material as stated by its author(s). These principles, therefore, represent the authors' perspectives as stated by them.

(4) Examining the statement of principles is a convenient and concise tool for laying out a multi-dimensional analysis of sustainability as a whole.

(5) This is the first comprehensive, analytical study of these statements of principle — i.e., no one has done anything like this before (to the best of our knowledge).

(5+1) As a result of all these reasons, this study is one of the first designed significantly, albeit not exclusively, for dissemination through the Internet — and, consequently, is linked directly to the statements of principle found on the websites of a myriad of the institutions pledging allegiance to sustainability.

In this context, then, we believe that a focus on these statements of principle provide by far the most useful way of analyzing the state of sustainability at the dawn of the 21st century.

Criteria for Selecting Principles[60]

In this framework of assumptions, we have used five criteria for selecting the organizations and individuals whose **fundamental principles** we are examining.

The criteria for selecting the principles of sustainability include:

(1) Obtaining a representation of a wide range of viewpoints on sustainability;

(2) Including perspectives from individuals, trade organizations, and government agencies;

(3) Incorporating cross-cultural viewpoints on sustainability by examining work done by international, transnational and domestic groups from a variety of different cultures and nation-states;

(4) Examining industries which have a close association with our basic human needs (i.e., food, shelter, energy), and natural resources (such as petroleum, wood, fisheries); and

(5) Including sustainability perspectives applicable at various levels — i.e., local, regional, national, global — and from diverse fields of endeavor, including science, philosophy, business and architecture.

Based on these criteria, we have developed five basic categories for analyzing these fundamental principles of organizations concerned with sustainability and

(1) Community,

(2) Commerce,

(3) Resource Extraction,

(4) Ecological Design, and

(5) the Biosphere

Although Sustainability and Education was originally designated as a distinct category, it has subsequently been integrated into all the other groups.

As mentioned earlier, education lies at the foundation of **all** sustainability, since it provides a way to evaluate and understand the perspectives portrayed in all of the principles.

Before embarking on our examination of these principles, however, it might be beneficial to look at this approach through the lens of the Australian Aboriginal culture.

Principles as Songlines

A useful metaphor in our analysis of the principles of sustainability is the role of Songlines[61] in the Aboriginal culture of Australia.

For millennia, the Aborigines have relied on a system of Songlines, or tracks, created by their ancestors that defined the physical landscape, and served as guideposts during their travels.

These landmarks conjure stories illustrating the laws the Aborigines try to follow for living with nature, and navigating their barren and seemingly inhospitable land.

They refer to the songlines as the 'Way of the Law,' or the 'Footprints of the Ancestors' — providing both a land ethic and compass for connecting in a harmonious way with both the land and their communities, both current and past:

> ...Each totemic ancestor, while travelling through the country, was thought to have scattered a trail of words and musical notes along the line of his footprints, and how these dreaming tracks lay over the land as ways of communication between the most far flung tribes.... A song...was both a map and direction-finder. Providing you knew the song you could always find your way across country.... In theory at least the whole of Australia could be read as a musical score. There was hardly a rock or creek in the country that could not or had not been sung. One should perhaps visualize the Songlines as a spaghetti of Iliads and Odysseys, writhing this way and that, in which every 'episode' was readable in terms of geology.[62]

In our view, principles of sustainability are like the Songlines of the Aborigines.

They represent the footprints of the various groups that make up the sustainability movement — simultaneously tracking where we have been before, while also serving as a guide for actions in the future.

Like Songlines, these statements of principles articulate a group's values, archive its history, and indicate the potential future direction of its actions.

In this sense, understanding these statements of principle can help shed light into the underlying motivations of the various groups in the sustainability movement, providing us a way of tracking the evolution of their core values through time.

Like Songlines, then, statements of principle act both as a tracking device — describing the route we have already traveled, and a compass — pointing the way to the future.

NOTES

[1] Note: Underlined words indicate hypertext links.
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CHAPTER ONE

Sustainability and Community

The Sustainability and Community principles represent one of the most direct applications of the three E's (Ecology, Economy, Equality) in all policy frameworks. By addressing sustainability issues at all levels, these principles are tailored for the local, state (regional), national and international communities. The Sustainability and Community principles grapple with the difficult problems such as pollution, employment, urban sprawl, etc., which require a systemic approach incorporating ecological, economic, and social concerns to seek long-term solutions.

The sustainability principles we will explore include: The Netherlands' National Environmental Policy Plan[1] (NEPP) (national); Minnesota Planning Environmental Quality Board's Principles of Sustainable Development for Minnesota[2] (state); Ontario Round Table on Environment and Economy's (ORTEE) Model Principles[3] (local); and the Earth Charter Commission's Earth Charter[4] (international).

The NEPP illustrates one of the most successful examples to date of a **nation's** commitment for embracing and successfully implementing sustainable development policies. In some respects, the Dutch goal of achieving sustainability (though still in progress) is reminiscent of the American commitment, and NASA's successful landing on

the moon in the 1960s. The partnership of the public and private sectors is a model of cooperation based on an integrated approach that considers the intricate relationship of the three E's.

The Minnesota Principles, developed several years after the NEPP, also stand at the forefront of innovative **statewide / regional / provincial** green plans. Under the leadership of former Governor Arne H. Carlson, Minnesotans successfully articulate a vision for sustainable development and develop implementation and tracking methods, such as the Progress Indicators, to carry out their strategy. [5]

Although less comprehensive in scope than the NEPP and the Minnesota frameworks, the ORTEE principles represent a conceptual blueprint for **local** communities to develop strategies for sustainable development. ORTEE, though vague on specific implementation methods, outlines some of the common topics, including: growth, environmental limits, energy demands, etc., that local communities inevitably confront in striving for sustainable development.

Finally, the Earth Charter illustrates the **international** community's attempt to draft a document outlining sustainability themes that will achieve consensus by all United Nations members. The result is a well-intentioned utopian, yet conceptually diffuse, vision of international harmony relying on international agreements for its implementation. The Charter's broad stroke look at the sustainability issues from an

international perspective may be a necessary first step for nations to agree on common goals, yet it would greatly benefit from the framework of the NEPP and Minnesota principles for its practicality.

The principles in the Sustainability and Community section were devised as part of documents created by working groups and task forces whose aim was to create a strategy for implementing sustainable solutions to pressing environmental, economic and social problems. These principles act as guideposts for specific actions undertaken by the various stakeholders. They also demonstrate effective partnerships of government and private industries, schools, as well as private citizens.

The Netherlands National Environmental Policy Plan (NEPP)

The sustainability principles we have selected are incorporated into Dutch environmental policy through the NEPP. The Dutch environmental policy plan, or green plan, is a series of evolving strategies for integrating the three E's of sustainability:

> This 'green plan' is much more than a series of regulations— it is a comprehensive strategy for sustainable development that explores the economic and social concerns of maintaining a healthy environment. The NEPP looks not only at specific pollution sources, but their relationship to relevant ecological, social, and economic systems.[6]

The NEPP is part of a growing number of national green plans currently under development including: New Zealand's Resource Management Act,[7] Canada's Green

Plan,[8] and the Mexican Environmental Program (MEP).[9] All of these plans look at national strategies for achieving sustainable development.

The Dutch NEPP was enacted in 1989 and has been updated every four years. The most recent NEPP4[10] will be presented to the Dutch Parliament in January 2001, and will "focus mainly on areas where people perceive a real relationship between quality of life and the environment, and where in addition Dutch actions can impact the quality of life in other countries. Quality of life will be the guiding principle in making policy."[11]

A summary of the principles from the NEPP shows a comprehensive approach for outlining key concerns of an industrial society.

The Major Principles from the NEPP[12]

• **Intergenerational equity**: The current generation is responsible for providing a sustainable environment for the next generation.

• **The precautionary principle**: In light of uncertainties, it is best not to make decisions that may involve serious environmental risks.

• **The standstill principle**: As an absolute minimum, environmental conditions shall not further deteriorate.

• **Abatement at source**: Harmful environmental actions should be prevented at their source.

• **The polluter pays principle**: Internalization of environmental costs through such means as licensing fees or environmental taxes.

• **Use of the best applicable technology** to control pollution and other environmental harms.

• **Prevention** of all unnecessary waste.

• **Isolation, management, and control** of wastes that cannot be processed.

• **Internalization**: Environmental considerations are to be integrated into the actions of all responsible groups.

• **Integrated lifecycle management**: Manufacturers are responsible for all environmental impacts of their products, from manufacture to use to disposal. Waste flows and pollution should be reduced at all stages.

• **Environmental space**: Recognizes a limit to the level of resources each person can consume if society is to be environmentally sustainable. This concept was first introduced by the environmental group Milieudefensie (the Dutch version of Friends of the Earth) and was incorporated into the second NEPP.

Many of the principles in the NEPP examine the potential damage caused by unwise or ignorant decisions by the industrial sector.

The Precautionary Principle, for example, calls for no action if there is any doubt as to the potential consequences.[13] Therefore, past environmental disasters such as the use of DDT may have been avoided by following the precautionary principle. Adhering to the Precautionary Principle with respect to nuclear power may have also resulted in avoiding the current nuclear waste disposal problem we face around the world.

The “standstill principle” — whereby we commit ourselves to doing nothing that will further deteriorate the environment — also recognizes the potential devastating effects of our actions. Therefore, the standstill principle encourages intervention only if it will improve a situation, such as an environmental restoration project.

The “abatement at source” principle calls for elimination of damaging effects (i.e., pollution, or waste) from industrial production, for example, at its source. This form of “source reduction” deals with waste **by not creating it in the first place**.

“Integrated lifecycle management” also aims to reduce waste by making manufacturers responsible for the full life of their products. Thus automobile makers would be required to take back and recycle their vehicles at the end of their lives. Some European automobile manufacturers, namely BMW, have already implemented aspects of the integrated lifecycle management principle.

The NEPP principles also focus on ways of reducing the impact of pollution. The “polluter pays” principle and the “use of the best applicable technology to control pollution and other environmental harms” clause highlights a firm commitment by the Dutch government to control pollution.

Environmental taxes, for example, provide an appropriate method for controlling pollution by targeting companies that are directly involved in environmentally damaging activities. Encouraging the invention and use of technology for pollution prevention also creates a climate for innovation and cost-effective solutions to flourish.

The NEPP principles address the social aspects of sustainability through the "Intergenerational equity" and "Environmental space" clauses. Intergenerational equity re-emphasizes a common theme of our responsibility for "providing a sustainable environment to future generations."

The "environmental space" clause addresses posting "… a limit to the level of resources each person can consume if society is to be environmentally sustainable." This notion of personal consumption raises numerous questions: Who is to decide what the limit of personal consumption should be? And what criteria should be used to set a limit?

One of the tools devised to gauge personal and national consumption, is the "Ecological Footprint."[14] The Ecological Footprint "… accounts for the flows of energy and matter to and from any defined economy and converts these into corresponding land/water area required from nature to support these flows."[15]

The power of the "environmental space" clause is that it brings the issues of sustainability to the personal level, and shows us how each our consumption decisions have an impact on sustainability.

NEPP: The Vanguard of National Green Plans

The NEPP principles reflect the fact that The Netherlands is a highly industrialized society. The principles dealing with pollution and waste management underscore the

issues facing the Dutch. The Netherlands has the second highest population density in the world (after Bangladesh), and about one third of its land is reclaimed from the sea and lies below sea level.[16] The Dutch people are very much aware of environmental limits, and in partnership with government agencies have developed a green plan that is making a difference in finding lasting sustainable solutions.

As part of a comprehensive green plan, the NEPP principles have set an international standard due to the effective cooperation and consensus between the public and private sectors and the involvement of citizens for making changes towards sustainability. The NEPP shows how principles can be the markers that guide a nation's environmental policy.

Similar to the NEPP, the Minnesota Principles, tackle the complex sustainability issues by illustrating a comprehensive vision which considers the ecological, economic and equity concerns.

Minnesota Sustainable Development Plan

The Principles of Sustainable Development for Minnesota were developed in 1998 by the Minnesota Round Table on Sustainable Development; a group of 30 community leaders appointed by former Governor Arne H. Carlson to:

> … Consider how Minnesotans can safeguard their long-term environmental, economic, and social well-being [and] … serve as a catalyst for sustainable

> development, to foster public and private partnerships and reach out to Minnesotans across the state, and to stimulate interest in and communicate the importance of achieving sustainable development."[17]

As the guide for these objectives, the following principles were devised:

Principles of Sustainable Development For Minnesota[18]

The Minnesota Round Table on Sustainable Development offers five principles as guideposts along the path of sustainable development. They are:

1. **Global interdependence**. Economic prosperity, ecosystem health, liberty and justice are linked, and our long-term well-being depends on maintaining all four. Local decisions must be informed by their regional and global context.

2. **Stewardship**. Stewardship requires the recognition that we are all caretakers of the environment and economy for the benefit of present and future generations. We must balance the impacts of today's decisions with the needs of future generations.

3. **Conservation**. Minnesotans must maintain essential ecological processes, biological diversity and life-support systems of the environment; harvest renewable resources on a sustainable basis; and make wise and efficient use of our renewable and non-renewable resources.

4. **Indicators**. Minnesotans need to have and use clear goals and measurable indicators based on reliable information to guide public policies and private actions toward long term economic prosperity, community vitality, cultural diversity and healthy ecosystems.

5. **Shared responsibility**. All Minnesotans accept responsibility for sustaining the environment and economy, with each being accountable for his or her decisions and actions, in a spirit of partnership and open cooperation. No entity has the right to shift the costs of its behavior to other individuals, communities, states, nations or future generations. Full-cost accounting is essential for assuring shared responsibility.

The goal of the Minnesota Principles is to maintain a strong economy while simultaneously preserving the environment. As the report states: "The Round Table's recommendations are based on the recognition that Minnesotans do not need or want to

choose between good jobs, vital communities and a healthy environment. They want all three."[19]

These principles represent one of the first **statewide** initiatives for achieving a sustainable development plan in the United States.[20] As a leader in this area, Minnesota has developed a blueprint for bringing together the various **stakeholders** to discuss the relevant issues and work towards reaching consensus for a workable sustainability plan.

One of the key elements in the Minnesota Principles involves the notion of "global interdependence." Global interdependence highlights the significance of context when dealing with sustainability issues. This clause points out the importance of looking at the regional and global context when making local decisions. Local traffic patterns, for example, are often connected to the regional infrastructure, which, in turn may be dependent upon employees working for transnational corporations with global interests.

The Minnesota Principles also incorporate tools for measuring progress. The use of measurable indicators are described as a tool to "guide public policies and private actions toward long-term economic prosperity, community vitality, cultural diversity and healthy ecosystems." The mention of sustainability indicators in these principles speaks to the implementation strategy for the sustainability plan.

As an educational message, including indicators as part of the principles will help residents understand a tool used to see if the goals are being achieved. **Nevertheless, indicators are an assessment tool that should not be confused with guiding principles**. In fact, indicators rely on principles for their criteria in obtaining relevant data. The Principles of Sustainable Development for Minnesota refer to The Bellagio Principles,[21] which serve as a guide for choosing and interpreting indicators.

The "shared responsibility" section of the Minnesota Principles provides a refreshing outlook on the importance of personal responsibility and cooperation and partnership when seeking sustainable development solutions. This section squarely challenges the NIMBY (Not In My Back Yard) attitude often encountered in regional issues.

In this way, the costs of solving environmental, economic, and social problems are to be passed on neither to other entities, (be they state institutions or national government agencies), nor to future generations. "Full-cost accounting" encourages a collaborative spirit of sharing responsibility and resources.

The Minnesota Principles, like many of the others we have discussed, also point to (a) the conservation of biodiversity, (b) the use of renewable resources, and (c) a long-term view to provide a healthy ecosystem for future generations.

The Minnesota Principles as a Statewide Model for Sustainability

As a pioneering statewide plan for sustainable development, The Principles of Sustainable Development for Minnesota represent an important contribution to promote sustainable values beyond the local level.[22]

State institutions can have a significant impact in facilitating local communities to implement their sustainability programs in areas such as energy, transportation, and waste disposal. The Minnesota principles also explore the ecological, economic, and equity issues associated with sustainability.

The themes explored by the Minnesota Principles at the ***state*** or regional level take a new meaning at the ***local*** community level. The ORTEE Principles attempt to provide a framework for local communities to develop their sustainable development goals.

Ontario Round Table on Environment and Economy's (ORTEE) Model Principles

The Ontario Round Table on Environment and Economy's (ORTEE) Model Principles represent a Canadian framework of sustainability ideals for use by ***local*** communities. Their objective is for these principles to act as a touchstone for any community interested in developing sustainability initiatives.

ORTEE Model Principles

A sustainable community is one which:

1. Recognizes that growth occurs within some limits and is ultimately limited by the carrying capacity of the environment;

2. Values cultural diversity;

3. Has respect for other life forms and supports biodiversity;

4. Has shared values amongst the members of the community (promoted through sustainability education);

5. Employs ecological decision-making (e.g., integration of environmental criteria into all municipal government, business and personal decision-making processes);

6. Makes decisions and plans in a balanced, open and flexible manner that includes the perspectives from the social, health, economic and environmental sectors of the community;

7. Makes best use of local efforts and resources (nurtures solutions at the local level);

8. Uses renewable and reliable sources of energy;

9. Minimizes harm to the natural environment;

10. Fosters activities which use materials in continuous cycles. And, as a result, a sustainable community:

11. Does not compromise the sustainability of other communities (a geographic perspective);

12. Does not compromise the sustainability of future generations by its activities (a temporal perspective).

The ORTEE principles highlight the ecological concerns in relation to the “limits to growth,… carrying capacity,… biodiversity, [and] ecological decision-making.” These principles articulate the significant role of ecological factors in the decision-making process that all communities must undergo in their planning process. The carrying

capacity of the land is tied to the health of species, as well as human settlements with regards to, for example, food production, water consumption and other resources.

The ORTEE principles also point to the importance of seeking solutions at the local level, whereby a community "makes best use of local efforts and resources (nurtures solutions at the local level)." The implied aspect of this clause involves the benefit of local knowledge in solving problems, and also the benefit of working directly with stakeholders for their empowerment.

These principles also acknowledge the potential impact of local decisions on neighboring communities by stating that a sustainable community "Does not compromise the sustainability of other communities." This clause thus illustrates the interdependence of neighboring communities.

Nevertheless, in examining the potential **detrimental** effects on neighboring communities, we must also investigate the potential **benefits** of working with one's neighbors. Sharing resources such as energy and water demands close cooperation between neighboring communities which, when successfully executed, can prove to be an effective strategy for all parties concerned.

The ORTEE principles, like many previously discussed, look at the impact of local decisions on future generations. This "temporal perspective" underscores a frequent

theme in sustainable principles. The creation of "shared values" in the local community, promoted through "sustainability education" also speaks to a long-term process of garnering consensus among local residents.

The ORTEE principles provide a flexible framework for outlining sustainability values at a wide range — from a local level such as a small town, up to a large metropolitan city. One of the success stories of the ORTEE framework, for example, was its use by the City of Ottawa[23] for its Official Plan.

Whereas the ORTEE principles create a basis for local communities to achieve consensus on sustainable development values, the Earth Charter attempts to portray common ground on sustainability ideals for the world's multicultural societies.

The Earth Charter

The Earth Charter principles provide a comprehensive, multidimensional approach to present values for worldwide acceptance. Although the principles cover a wide breadth of sustainability issues, they fall short on practical implementation strategies. Nevertheless, the importance of the Earth Charter lies in its attempt to achieve global consensus on sustainability matters.

Completed in 2000, the Earth Charter represents the culmination of a decade's work by individuals and organizations whose objectives include:

• to promote a worldwide dialogue on shared values and global ethics;
• to circulate the Earth Charter throughout the world as a people's treaty, promoting awareness, commitment, and implementation of earth charter values;
• to seek endorsement of the Earth Charter by the United Nations general assembly by the year 2002.[24]

The Earth Charter presents sustainability ideals in the form of a declaration. The Preamble section outlines the hope for the charter: "… to bring forth a sustainable society founded on respect for nature, universal human rights, economic justice, and a culture of peace." The next sections: *Respect and Care for the Community of Life, Ecological Integrity, Social and Economic Justice,* and *Democracy, Nonviolence and Peace* cover the ecological, economic and equity aspects of sustainability.

Finally, "The Way Forward" section seeks to clarify a vision of sustainability for all peoples to embrace: "As never before in history, common destiny beckons us to seek a new beginning. Such a renewal is the promise of these Earth Charter principles."

An abbreviated version of the Earth Charter follows:[25]

The Earth Charter

Preamble

We stand at a critical moment in Earth's history, a time when humanity must choose its future. As the world becomes increasingly interdependent and fragile, the future at once holds great peril and great promise. To move forward we must recognize that in the midst of a magnificent diversity of cultures and life forms we are one human family and one Earth community with a common destiny. We must join together to bring forth a sustainable global society founded on respect for nature, universal human rights, economic justice, and

a culture of peace. Towards this end, it is imperative that we, the peoples of Earth, declare our responsibility to one another, to the greater community of life, and to future generations.

Earth, Our Home

Humanity is part of a vast evolving universe. Earth, our home, is alive with a unique community of life. The forces of nature make existence a demanding and uncertain adventure, but Earth has provided the conditions essential to life's evolution. The resilience of the community of life and the well-being of humanity depend upon preserving a healthy biosphere with all its ecological systems, a rich variety of plants and animals, fertile soils, pure waters, and clean air. The global environment with its finite resources is a common concern of all peoples. The protection of Earth's vitality, diversity, and beauty is a sacred trust.

The Global Situation

The dominant patterns of production and consumption are causing environmental devastation, the depletion of resources, and a massive extinction of species. Communities are being undermined. The benefits of development are not shared equitably and the gap between rich and poor is widening. Injustice, poverty, ignorance, and violent conflict are widespread and the cause of great suffering. An unprecedented rise in human population has overburdened ecological and social systems. The foundations of global security are threatened. These trends are perilous—but not inevitable.

The Challenges Ahead

The choice is ours: form a global partnership to care for Earth and one another or risk the destruction of ourselves and the diversity of life. Fundamental changes are needed in our values, institutions, and ways of living. We must realize that when basic needs have been met, human development is primarily about being more, not having more. We have the knowledge and technology to provide for all and to reduce our impacts on the environment. The emergence of a global civil society is creating new opportunities to build a democratic and humane world. Our environmental, economic, political, social, and spiritual challenges are interconnected, and together we can forge inclusive solutions.

Universal Responsibility

To realize these aspirations, we must decide to live with a sense of universal responsibility, identifying ourselves with the whole Earth community as well as our local communities. We are at once citizens of different nations and of one world in which the local and global are linked. Everyone shares responsibility for the present and future well-being of the human family and the larger living world. The spirit of human solidarity and kinship with all life is strengthened when we live with reverence for the mystery of being, gratitude for the gift of life, and humility regarding the human place in nature.

We urgently need a shared vision of basic values to provide an ethical foundation for the emerging world community. Therefore, together in hope we affirm the following interdependent principles for a sustainable way of life as a common standard by which the conduct of all individuals, organizations, businesses, governments, and transnational institutions is to be guided and assessed.

The report continues,

I. Respect and Care for the Community of Life

1. Respect Earth and life in all its diversity.
2. Care for the community of life with understanding, compassion, and love.
3. Build democratic societies that are just, participatory, sustainable, and peaceful.
4. Secure Earth's bounty and beauty for present and future generations.

In order to fulfill these four broad commitments, it is necessary to:

II. Ecological Integrity

5. Protect and restore the integrity of Earth's ecological systems, with special concern for biological diversity and the natural processes that sustain life.
6. Prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach.
7. Adopt patterns of production, consumption, and reproduction that safeguard Earth's regenerative capacities, human rights, and community well-being.
8. Advance the study of ecological sustainability and promote the open exchange and wide application of the knowledge acquired.

III. Social and Economic Justice

9. Eradicate poverty as an ethical, social, and environmental imperative.
10. Ensure that economic activities and institutions at all levels promote human development in an equitable and sustainable manner.
11. Affirm gender equality and equity as prerequisites to sustainable development and ensure universal access to education, health care, and economic opportunity.

12. Uphold the right of all, without discrimination, to a natural and social environment supportive of human dignity, bodily health, and spiritual well-being, with special attention to the rights of indigenous peoples and minorities.

IV. Democracy, Nonviolence and Peace

13. Strengthen democratic institutions at all levels, and provide transparency and accountability in governance, inclusive participation in decision making, and access to justice.

14. Integrate into formal education and life-long learning the knowledge, values, and skills needed for a sustainable way of life.

15. Treat all living beings with respect and consideration.

16. Promote a culture of tolerance, nonviolence, and peace.

The Way Forward

As never before in history, common destiny beckons us to seek a new beginning. Such renewal is the promise of these Earth Charter principles. To fulfill this promise, we must commit ourselves to adopt and promote the values and objectives of the Charter.

This requires a change of mind and heart. It requires a new sense of global interdependence and universal responsibility. We must imaginatively develop and apply the vision of a sustainable way of life locally, nationally, regionally, and globally. Our cultural diversity is a precious heritage and different cultures will find their own distinctive ways to realize the vision. We must deepen and expand the global dialogue that generated the Earth Charter, for we have much to learn from the ongoing collaborative search for truth and wisdom.

Life often involves tensions between important values. This can mean difficult choices. However, we must find ways to harmonize diversity with unity, the exercise of freedom with the common good, short-term objectives with long-term goals. Every individual, family, organization, and community has a vital role to play. The arts, sciences, religions, educational institutions, media, businesses, nongovernmental organizations, and governments are all called to offer creative leadership. The partnership of government, civil society, and business is essential for effective governance.

In order to build a sustainable global community, the nations of the world must renew their commitment to the United Nations, fulfill their obligations under existing international agreements, and support the implementation of Earth Charter principles with an international legally binding instrument on environment and development.

Let ours be a time remembered for the awakening of a new reverence for life, the firm resolve to achieve sustainability, the quickening of the struggle for justice and peace, and the joyful celebration of life.

The Earth Charter incorporates a multidisciplinary, holistic approach to outlining a set of universal values for adoption by all citizens of the world. The Earth Charter highlights basic values of sustainability such as respect for life, protection of the environment, social justice, and democratic values. The Charter emphasizes environmental conservation and protection for future generations. It also advocates biodiversity and the "Precautionary Principle" which we have already mentioned in the NEPP principles.

Integrating Sustainability Values at All Community Levels

The Sustainability and Community principles provide important policy guidelines for stakeholders to identify and implement their vision of sustainable development. These principles aim to satisfy a wide range of viewpoints by encouraging the interested parties to establish strategies for integrating their common interests.

The successful application of these principles rests on forging consensus on sustainable values of universal appeal that can be applied at the local, state, national and international levels.

Whereas the Sustainability and Community principles illustrate the role of government agencies to promote sustainability ideals, in the next chapter we will examine the relationship of sustainability and commerce.

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CHAPTER TWO

Sustainability and Commerce

The Sustainability and Commerce principles highlight the fundamental relationship between economic activities, employment, and the environment.

This dynamic relationship embodies the three E's of sustainability that we experience daily through business and economic developments.

In many respects, businesses have a greater economic impact than governments, schools, and other institutions. Therefore, the principles in this category are particularly significant because they have the power to set standards and trends with long-lasting, and far-reaching effects.

These Sustainability and Commerce principles articulate the classic challenges of maximizing profits and environmental limitations faced by the business community. They describe an alternative approach for business practices in order to achieve expected returns while simultaneously safeguarding the environment and social equality.

In the Sustainability and Commerce section, we will focus on four principles: the Principle of Precautionary Action or Precautionary Principle,[1] The Natural Step's Four

System Conditions,[2] the Houston Principles,[3] and the Coalition for Environmentally Responsible Economies, or CERES Principles.[4]

The Precautionary Principle aims to prevent environmental harm by challenging our technological research and development process. In essence, it counsels us to evaluate the potential ramifications of our actions, and if in doubt, not move forward. The Precautionary Principle presents a departure from the "business as usual" approach by challenging organizations to evaluate and assume responsibility for the potential effects of their planning decisions: from the impact on the environment, to human health issues, etc.

While the Precautionary Principle emphasizes policy-based decisions, the Natural Step's System Conditions provide a methodology to act as a guide for achieving sustainability. The Natural Step, a framework based in part on the laws of thermodynamics, serves as a powerful guide for businesses to achieve sustainable practices by assessing the impact of actions through a scientific lens.

The Houston Principles represent the forging of a new alliance of **labor** and **environmental** groups to promote common sustainability ideals. These principles mark the unity of the labor and environmentalist sectors, and describe the significant issues they share. The bond between these historically opposed groups is the realization that they share concern for sustainability, which integrates employment, equality, and ecological concerns, namely the three E's.

The CERES principles stem from the business community's desire to promote corporate environmental responsibility by establishing mutually agreeable standards. CERES also incorporate the three E's in a setting that accommodates the integration of sustainable practices by businesses. CERES provides a forum for businesses subscribe to sustainable actions and monitor their members' actions.

The Precautionary Principle

The origin of the Precautionary Principle dates back to the mid-1970s as one of Germany's basic principles of environmental policy.[5] German national law, known as *Vorsorgeprinzip* translated as the "precaution" or "foresight" principle stated:

> Environmental policy is not fully accomplished by warding off imminent hazards and the elimination of damage which has occurred. Precautionary environmental policy requires furthermore that natural resources are protected and demands on them are made with care.[6]

The Precautionary Principle was further defined when a group of scientists, government officials, lawyers, and environmental representatives met at Wingspread in Racine, Wisconsin in 1998. The group came up with the Wingspread Statement that augments and expands the Precautionary Principle as follows:

Wingspread Statement on the Precautionary Principle[7]

The release and use of toxic substances, resource exploitation, and physical alterations of the environment have had substantial unintended consequences on human health and the environment. Some of these concerns are high rates of learning deficiencies, asthma,

cancer, birth defects and species extinctions; along with global climate change, stratospheric ozone depletion; and worldwide contamination with toxic substances and nuclear materials.

We believe existing environmental regulations and other decisions, particularly those based on risk assessment, have failed to adequately protect human health and the environment, as well as the larger system of which humans are but a part.

While we realize that human activities may involve hazards, people must proceed more carefully than has been the case in recent history. Corporations, government entities, organizations, communities, scientists and other individuals must adopt a precautionary approach to all human endeavors.

Therefore it is necessary to implement the Precautionary Principle: Where an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context, the **proponent** of an activity, rather than the **public**, bears the burden of proof.[8]

The process of applying the Precautionary Principle must be open, informed and democratic, and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action.

The Precautionary Principle articulates that:

1. People have a duty to take anticipatory action to prevent harm. (As one participant at the Wingspread meeting summarized the essence of the precautionary principle, "If you have a reasonable suspicion that something bad might be going to happen, you have an obligation to try to stop it.")

2. The burden of proof of harmlessness of a new technology, process, activity, or chemical lies with the proponents, not with the general public.

3. Before using a new technology, process, or chemical, or starting a new activity, people have an obligation to examine "a full range of alternatives" including the alternative of doing nothing.

4. Decisions applying the precautionary principle must be "open, informed, and democratic" and "must include affected parties." [9]

One of the key points in the Precautionary Principle is the shift in the burden of proof regarding the potential damaging effects of an activity from the general public to the initiator. Thus, it is up to a company, or a geneticist, chemist, or engineer, to prove that an invention will not cause harm. If there is any doubt, the Precautionary Principle requires "an obligation to examine 'a full range of alternatives' including the alternative of doing nothing."

The Precautionary Principle challenges the process of technological innovation by calling for a thorough evaluation of the potential harm from our discoveries. In the case of cigarettes, for example, the Precautionary Principle would have required cigarette manufacturers to prove that they did not cause a health hazard. Had this principle been applied when cigarettes were first manufactured, potentially thousands of lives would have been saved by not waiting for the U. S. Government to prove the cause of cancer from smoking which happened years after the introduction of cigarettes.

Opponents of the Precautionary Principle stress that it is impossible to scientifically anticipate **ALL** of the potential effects of a new technology or discovery. Nevertheless, in the pharmaceutical industry, the U.S. Food and Drug Administration (FDA) demands a much higher level of scrutiny from drug manufacturers by requiring studies that prove the safety of new drugs and treatments.

Biotechnology is a rapidly evolving field where the Precautionary Principle would have a significant impact in its growth. In the development of genetically modified plants and animals, for example, the Precautionary Principle would place the responsibility of health and environmental safety on the manufacturers. So the recent introduction of genetically modified salmon would only be allowed to proceed once extensive studies would prove that it poses no threat to human health and other marine organisms.[10]

Precautionary Principle and the New Economy

The Precautionary Principle challenges us to take a step back and assess the potential impact of our inventions and scientific discoveries.

Companies in the new economy operate on a relentless fast pace in order to establish a leadership position and dominate the marketplace. Therefore, the pressures of the market economy which rewards speed and market dominance pose a barrier to the Precautionary Principle. Nevertheless, the themes of the Precautionary Principle have been incorporated into environmental plans and international treaties including: the Rio Declaration (principle 15, 1992),[11] the Helsinki Convention (1992),[12] and the Framework Convention on Climate Change (1992).[13]

While the Precautionary Principle calls for a shift in the burden of responsibility, The Natural Step program's "system conditions" provide sustainable practice guidelines for

organizations. The Natural Step encourages corporate responsibility by outlining a set of guidelines that address ecological, economic and social concerns.

The Natural Step

The Natural Step was founded in 1989 by Swedish oncologist Dr. Karl-Henrik Robèrt.[14] Dr. Robèrt's concern for the environmental impact on his cancer patients led him to examine the environmental movement where he discovered that the debate looked mainly at the peripheral details of environmental issues rather than the root causes of problems that are systemic. He used the analogy of bickering about the leaves of a tree rather than focusing on the trunk which is the supporting structure.

Dr. Robèrt, along with fifty of his Swedish colleagues, focused on developing a framework that outlines the conditions for achieving sustainability. After countless revisions, The Natural Step evolved and defined the Four System Conditions for Sustainability, which are based on the laws of thermodynamics and natural cycles.[15] In 1995, The Natural Step was brought to the United States by Paul Hawken[16] and has since established offices in Australia, Canada, Japan, Sweden, and the United Kingdom.

Paul Hawken is one of the leaders in promoting new paradigms for alternative business practices. As an entrepreneur, lecturer, educator and best-selling author of *Growing A Business* (1987), *The Ecology of Commerce* (1993),[17] and more recently co-author of *Natural Capitalism* (1999),[18] Hawken is a leading voice in articulating the possibilities for

implementing sustainable corporate practices. The Natural Step's Four System

Conditions frames many of the concerns Hawken discusses in his work.

The Natural Step's Four System Conditions[19]

1. In order for a society to be sustainable, nature's functions and diversity are not systematically subject to increasing concentrations of substances extracted from the earth's crust.

In a sustainable society, human activities such as the burning of fossil fuels, and the mining of metals and minerals will not occur at a rate that causes them to systematically increase in the ecosphere. There are threshholds beyond which living organisms and ecosystems are adversely affected by increases in substances from the earth's crust. Problems may include an increase in greenhouse gases leading to global warming, contamination of surface and ground water, and metal toxicity which can cause functional disturbances in animals. In practical terms, the first condition requires society to implement comprehensive metal and mineral recycling programs, and decrease economic dependence on fossil fuels.

2. In order for a society to be sustainable, nature's functions and diversity are not systematically subject to increasing concentrations of substances produced by society.

In a sustainable society, humans will avoid generating systematic increases in persistent substances such as DDT, PCBs, and freon. Synthetic organic compounds such as DDT and PCBs can remain in the environment for many years, bioaccumulating in the tissue of organisms, causing profound deleterious effects on predators in the upper levels of the food chain. Freon, and other ozone depleting compounds, may increase risk of cancer due to added UV radiation in the troposphere. **Society needs to find ways to reduce economic dependence on persistent human-made substances.**[20]

3. In order for a society to be sustainable, nature's functions and diversity are not systematically impoverished by physical displacement, overharvesting or other forms of ecosystem manipulation.

In a sustainable society, humans will avoid taking more from the biosphere than can be replenished by natural systems. In addition, people will avoid systematically encroaching

upon nature by destroying the habitat of other species. Biodiversity, which includes the great variety of animals and plants found in nature, provides the foundation for ecosystem services which are necessary to sustain life on this planet. Society's health and prosperity depends on the enduring capacity of nature to renew itself and rebuild waste into resources.

4. In a sustainable society resources are used fairly and efficiently in order to meet basic human needs globally.

Meeting the fourth system condition is a way to avoid violating the first three system conditions for sustainability. Considering the human enterprise as a whole, we need to be efficient with regard to resource use and waste generation in order to be sustainable. If one billion people lack adequate nutrition while another billion have more than they need, there is a lack of fairness with regard to meeting basic human needs. Achieving greater fairness is essential for social stability and the cooperation needed for making large-scale changes within the framework laid out by the first three conditions.

To achieve this fourth condition, humanity must strive to improve technical and organizational efficiency around the world, and to live using fewer resources, especially in affluent areas. System condition number four implies an improved means of addressing human population growth. If the total resource throughput of the global human population continues to increase, it will be increasingly difficult to meet basic human needs as human-driven processes intended to fulfill human needs and wants are systematically degrading the collective capacity of the Earth's ecosystems to meet these demands.

One of the strengths of The Natural Step lies in the legitimacy of its scientifically based framework which supports measurable results.[21] System Condition #1 describes how the extraction of fossil fuels and other minerals must not exceed the rate at which they are replenished.

This condition ties into the First Law of Thermodynamics[22] whereby “All mass and energy in the universe is conserved.”[23] Therefore, the burning of fossil fuels simply

creates other gases in the atmosphere. The corrective action for System Condition #1 encourages us to "implement metal and mineral recycling programs and decrease economic dependence on fossil fuels."

System Condition #2 describes how human generated substances such as DDT, PCBs accumulate through the food chain with damaging effects to species, and the use of freon depletes the ozone. This system condition is based on the Second Law of Thermodynamics, or the Law of Entropy[24] in which "Energy and matter tend to spread spontaneously; everything has a tendency to disperse."[25]

This system condition challenges us to "find ways to reduce economic dependence on **persistent human-made substances**." We are thus made aware of the concept of bioaccumulation, whereby substances that are absorbed into ecosystems, and progress through the food web with increasing dosages, are potentially harmful to other species including humans. Examples abound ranging from mercury and lead poisoning to water pollution and toxic waste sites.

The notion of maintaining the integrity of ecosystems including species biodiversity is underscored by System Condition #3. [26] Specifically, species, habitats and natural resources must not be "systematically impoverished" through "physical displacement, over-harvesting" and other land-use practices. This system condition emphasizes the need for humans to value the functions of living systems, including water and air purification,

pollination, climate regulation, etc., and allow for its renewal by practicing sustainable methods of agriculture, forestry, fishing and urban-growth.

This system condition calls for a "systems thinking" approach to resource management and biological conservation. By understanding the value of the relationships in an ecosystem (rather than merely its component parts) we will be better positioned to make wise decisions.

Finally, System Condition #4 speaks to the issue of equity. This condition, though not scientifically based, provides an essential **ethical** aspect of The Natural Step.

This condition calls for fair and efficient use of resources: "Achieving greater fairness is essential for social stability and the cooperation needed for making large-scale changes within the framework laid out by the first three conditions."

Thus, system condition #4 gives meaning and relevance to system conditions 1, 2 and 3. This system condition calls for a more equitable distribution of resources from more affluent areas to poorer ones (e.g. from Northern Hemisphere's industrialized societies to their Southern counterparts) and for "improved means of addressing human population growth."

The population issue mentioned by system condition #4 addresses a very complex, yet critical problem facing the world. Although, The Natural Step framework suggests no specific solutions, a more even distribution of resources lays the foundation to begin tackling the population problem.

The Natural Step as a Viable Tool

The scientific background of the Natural Step lends it legitimacy particularly among the business community. By working closely with businesses using **ecological auditing**, **backcasting**, and **systems thinking** methods, The Natural Step provides a viable tool for businesses to strive for sustainable practices. Companies such as, Ikea,[27] Interface,[28] Scandic Hotels AB,[29] and the University of Texas - Houston[30] have benefited from implementing The Natural Step in their business practices.

The Natural Step also utilizes compelling graphics to emphasize the dilemma of consumption and limited available resources. The increasing demands on the environment is illustrated as a funnel where "societal demands for resources is one wall and resource availability is the other side."[31] As aggregate societal demand increases, and the capacity to meet those demands decreases, it is as if we are moving as a society into the narrower portion of the funnel. The funnel metaphor effectively presents the sustainability issues in a simple and powerful style.

While larger corporations are successfully implementing The Natural Step's framework, there is a need to promote the methodology in mid and small size businesses. There is also an opportunity for The Natural Step to be adopted by educational institutions from high schools through universities. In fact, the educational community may be one of the most successful arenas for promoting The Natural Step.

The integration of seemingly disparate perspectives — science and management — in The Natural Step is paralleled by the blending of the labor and environmental movements in the Houston Principles.

The Houston Principles

The Houston Principles arose in 1999 from the opposition by the Alliance for Sustainable Jobs and the Environment to the clear-cutting of ancient redwoods in Northern California by The Pacific Lumber Company,[32] owned by Maxxam Corporation. The Alliance for Sustainable Jobs and the Environment represents a coalition of environmental and labor groups committed to holding corporations like Maxxam, which also owns Kaiser Aluminum,[33] accountable for their "impact on working people, communities, and the environment."

Houston Principles of the Alliance for Sustainable Jobs and the Environment[34]

Preamble:
On May 19, 1999, environmental and labor leaders confronted CEO Charles Hurwitz in Houston to demand that his Maxxam Corporation, which owns Kaiser Aluminum and

Pacific Lumber Company, be held accountable for its impact on working people, communities and the environment.

By clear-cutting ancient redwoods in Northern California, and by locking-out striking steelworkers in five cities, the Maxxam corporation has become an icon of corporate irresponsibility.

Recognizing that we have a common interest in making corporations more accountable for their behavior world-wide, environmental and labor leaders have formed the Alliance for Sustainable Jobs and the Environment and circulated the following statement, dubbed the "Houston Principles."

Whereas:
The spectacular accumulation of wealth by corporations and America's most affluent during the past two decades has come with a huge price tag.

Corporations have become more powerful than the government entities designed to regulate them.

The goal of a giant, global corporation is to maximize wealth and to wield political power on its own behalf. Too often, corporate leaders regard working people, communities, and the natural world as resources to be used and thrown away.

Recognizing the tremendous stakes, labor unions and environmental advocates are beginning to recognize our common ground. Together we can challenge illegitimate corporate authority over our country's and communities' governing decisions.

While we may not agree on everything, we are determined to accelerate our efforts to make alliances as often as possible.

We believe that:
A healthy future for the economy and the environment requires a dynamic alliance between labor, management, and environmental advocates.

The same forces that threaten economic and biological sustainability undermine the democratic process.

The drive for short-term profits without regard for long-term sustainability hurts working people, communities, and the earth.

Labor, environmental and community groups need to take action to organize as a counter-balance to abusive corporate power.

The environmental and labor advocates who have signed these principles resolve to work together to:
Remind the public that the original purpose behind the creation of corporations was to serve the public interest - namely working people, communities, and the earth.

Seek stricter enforcement of labor laws and advocate for new laws to guarantee working people their right to form unions and their right to bargain collectively.

Make workplaces, communities and the planet safer by reducing waste and greenhouse gas emissions.

Demand that global trade agreements include enforceable labor and environmental standards.

Promote forward-thinking business models that allow for sustainability over the long term while protecting working people, communities, and the environment.

This ground-breaking alliance of labor and environmentalists invites all people to join with us in a spirit of creative cooperation. Together, we can forge a partnership that protects people and the planet.

The Houston principles represent a new, powerful alliance between the labor and environmental movements that have historically been at odds with each other. As the document points out: “A healthy future for the economy and the environment requires a dynamic alliance between labor, management, and environmental advocates.”

The labor and environmental issues in the Houston Principles highlight the interdependence of ecological, economic and equality concerns — namely, the three E’s of sustainability. Thus, these principles illustrate a convergence of concerns that have

historically divided these two groups. The labor movement's advocacy of jobs is now understood as linked to the environmentalists' fight for healthy ecosystems:

> The same forces that threaten economic and biological sustainability undermine the democratic process.
>
> The drive for short-term profits without regard for long-term sustainability hurts working people, communities, and the earth.

The labor and environmental alliance supported by the Houston Principles challenges corporate business practices motivated by short-term profits and greed. These groups have banded together to "challenge illegitimate corporate authority over our countries' and communities governing decisions."

The Houston Principles call for a shift from corporate power, where decisions are often made in boardrooms by executives living in different states, sometimes in other countries, to local involvement in determining the fate of their community. This grievance is as much about the impact of these decisions as about the decision-making process, which undercuts the democratic rights of citizens. Therefore, The Alliance for Sustainable Jobs and the Environment is committed to "organize as a counter-balance to abusive corporate power."

One of the strengths of the Houston Principles lies in outlining a strategic process for implementing its goals. These include: (1) the enforcement of labor laws and ability to form unions and practice collective bargaining; (2) the reduction of waste and greenhouse gases; (3) the enforcement of labor and environmental standards in international trade agreements; and (4) promoting business models that support sustainability values.

Houston Principles: Bridging the Gaps

By forging the labor and environmental movements, the Houston Principles bring the organization and unity of labor which the environmental movement has lacked. As the links between these two groups mature, sustainability becomes the common ground for these movements.

The Houston principles call for accountability for companies and organizations that expend jobs and livelihoods in pursuit of profits. International agencies such as the World Trade Organization (WTO)[35] and the International Monetary Fund (IMF)[36] are primary targets of the Houston Principles because their practices often disrupt the viability of local economies. The large public demonstrations at the WTO Conference in Seattle in 1999 and the IMF Conference in Washington D.C. in 2000 showed that the combined force of the labor and environmental movements is formidable. Moreover, the concerns of workers and environmentalists are being heard and respected by these institutions and by the international community.

The Houston Principles' call for corporate accountability is echoed, though in a less confrontational fashion, in the CERES Principles by providing a framework for organizations to work towards sustainable practices.

The CERES Principles

The significance of the CERES Principles lies in establishing a sustainability dialogue in the business community.

The principles and CERES Reports provide a standard for corporations to complete their environmental reporting. CERES use a model of cooperation for companies to evaluate their managerial styles and adopt sustainable management practices.

The CERES Principles provide a standard, through the CERES Report,[37] from which to measure a business' sustainability practices.

As stated in the document: "These principles establish an environmental ethic with criteria by which investors and others can assess the environmental performance of companies."

An important aspect of the CERES Principles involves the voluntary approach to elicit responses from participating members. Rather than following a legal course of

compliance, CERES aids in establishing a dialogue and working with organizations to meet sustainability goals in a measured fashion.

The CERES Principles, formerly known as The Valdez Principles, evolved out of the environmental disaster caused by the 1989 Exxon Valdez oil spill in Alaska. As a non-profit organization advocating corporate environmental responsibility, CERES is made up of 50 investor, environmental, religious, labor and social justice groups and over 50 corporate endorsers from various industries including nine Fortune 500 firms.[38]

The endorsing company statement and principles state:

The CERES Principles[39]

Endorsing Company Statement
By adopting these Principles, we publicly affirm our belief that corporations have a responsibility for the environment, and must conduct all aspects of their business as responsible stewards of the environment by operating in a manner that protects the Earth. We believe that corporations must not compromise the ability of future generations to sustain themselves.

We will update our practices constantly in light of advances in technology and new understandings in health and environmental science. In collaboration with CERES, we will promote a dynamic process to ensure that the Principles are interpreted in a way that accommodates changing technologies and environmental realities. We intend to make consistent, measurable progress in implementing these Principles and to apply them to all aspects of our operations throughout the world.

The CERES Principles

Protection of the Biosphere
We will reduce and make continual progress toward eliminating the release of any substance that may cause environmental damage to the air, water, or the earth or its inhabitants. We will safeguard all habitats affected by our operations and will protect open spaces and wilderness, while preserving biodiversity.

Sustainable Use of Natural Resources
We will make sustainable use of renewable natural resources, such as water, soils and forests. We will conserve non-renewable natural resources through efficient use and careful planning.

Reduction and Disposal of Wastes
We will reduce and where possible eliminate waste through source reduction and recycling. All waste will be handled and disposed of through safe and responsible methods.

Energy Conservation
We will conserve energy and improve the energy efficiency of our internal operations and of the goods and services we sell. We will make every effort to use environmentally safe and sustainable energy sources.

Risk Reduction
We will strive to minimize the environmental, health and safety risks to our employees and the communities in which we operate through safe technologies, facilities and operating procedures, and by being prepared for emergencies.

Safe Products and Services
We will reduce and where possible eliminate the use, manufacture or sale of products and services that cause environmental damage or health or safety hazards. We will inform our customers of the environmental impacts of our products or services and try to correct unsafe use.

Environmental Restoration
We will promptly and responsibly correct conditions we have caused that endanger health, safety or the environment. To the extent feasible, we will redress injuries we have caused to persons or damage we have caused to the environment and will restore the environment.

Informing the Public
We will inform in a timely manner everyone who may be affected by conditions caused by our company that might endanger health, safety or the environment. We will regularly seek advice and counsel through dialogue with persons in communities near our facilities. We will not take any action against employees for reporting dangerous incidents or conditions to management or to appropriate authorities.

Management Commitment
We will implement these Principles and sustain a process that ensures that the Board of Directors and Chief Executive Officer are fully informed about pertinent environmental issues and are fully responsible for environmental policy. In selecting our Board of Directors, we will consider demonstrated environmental commitment as a factor.

Audits and Reports
We will conduct an annual self-evaluation of our progress in implementing these Principles. We will support the timely creation of generally accepted environmental audit procedures. We will annually complete the CERES Report, which will be made available to the public.

Disclaimer
These Principles establish an environmental ethic with criteria by which investors and others can assess the environmental performance of companies. Companies that endorse these Principles pledge to go voluntarily beyond the requirements of the law. The terms "may" and "might" in Principles one and eight are not meant to encompass every imaginable consequence, no matter how remote. Rather, these Principles obligate endorsers to behave as prudent persons who are not governed by conflicting interests and who possess a strong commitment to environmental excellence and to human health and safety. These Principles are not intended to create new legal liabilities, expand existing rights or obligations, waive legal defenses, or otherwise affect the legal position of any endorsing company, and are not intended to be used against an endorser in any legal proceeding for any purpose.

The CERES Principles cover many of the areas mentioned in the other sections, including: protection of the biosphere, energy conservation, environmental restoration, waste reduction and sustainable use of resources. However, these principles also focus on issues of primary concern to employees, namely personal health and safety.

The Risk Reduction clause, for example, stipulates that CERES members will "minimize environmental health and safety risks to our employees and communities in which we operate." This phrase highlights the need for corporate responsibility to the local community and the well-being of every employee.

Tied to the commitment to Risk Reduction is the notion of public notification in which CERES members agree to informing the public in a timely fashion of any activities that "might endanger health, safety, or the environment."

Although most current business practices and the "business as usual" approach have had a negative impact on the environment and on local communities, the CERES Principles provide a model for companies to address their impact on employees, local communities and the environment.

Two additional commerce-oriented frameworks include the International Chamber of Commerce's (ICC) Business Charter for Sustainable Development [40] and the International Standard Organization's (ISO) 14000 family[41] of International Standards on environmental management.

The significance of the ICC's Charter comes from its thousands of member companies and associations from over 130 countries.[42] Although the Charter lacks enforcement and

assessment mechanisms, it provides a useful framework of principles that enhance environmental management systems. The ISO 14000 family of standards, including ISO 14001, ISO 14004 and ISO 14031, focus on environmental management systems and environmental management tools that assist an organization in "realizing its environmental policy, objectives, and targets."[43] Thus, unlike the ICC Charter, the ISO 14000 standards provide a strategic management system and technical tools for implementing an organization's environmental policy.

A New Business Model

The Precautionary, Natural Step, Houston and CERES Principles indicate a new force prevalent in the business community.

These principles point to a renewed sense of corporate responsibility to their employees, their communities and the environment. In addition, the ecological, economic and equality components of sustainability are no longer viewed as distinct but rather as complimentary— the choice is not economic growth at the expense of the environment, but a vibrant economy, equitable resource distribution, and environmental protection. In addition, these principles outline guidelines that show companies how they can make a profit through socially just policies and safeguarding the environment.

While the Sustainability and Commerce principles paint a portrait of the general guidelines of sustainable practices for a wide range of commercial interests, in the next

chapter we will examine principles articulated by resource extraction industries. The Sustainability and Resource Extraction principles highlight the challenges of devising sustainable practices for industries, such as oil, lumber, fisheries, and agriculture that have a direct impact on the Earth.

NOTES

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CHAPTER THREE

Sustainability and Resource Extraction

The Contradictions of Resource Extraction

The Sustainability and Resource Extraction principles reflect the challenges faced by industries that attempt to implement sustainable practices while depending directly on the Earth's natural resources for their survival. This situation presents a series of conflicting and contradictory interests.

Unlike other industries which rely on processed goods, resource extraction industries are directly responsible for obtaining and managing primary resources including: minerals, oil and gas, timber, and fisheries, as well as land necessary for agriculture. Traditionally, humans have managed to harvest these resources in a sustainable fashion. However, in the Industrial and Post-industrial Period — with increased demands and limited supplies — we have dramatically increased our appetite for resources plunging many of the world's ecosystems into decline.

Two factors stand out as key variables involved in evaluating sustainability aspects of the resource extraction principles: (1) resource renewal vs. non-renewal, and (2) short-term vs. long-term time horizon. The first calls for assessing whether the resource is renewable or not. In the case of non-renewable fossil fuels and minerals, for example, it is a daunting

challenge for industries to claim sustainable practices. In effect, it requires the promotion of recycling of existing materials, and a shift to renewable alternatives. In the case of renewable resources, industries must devise sustainable practices while remaining competitive.

The time horizon factor highlights the tendency for industries to focus on short-term profits whereby extraction activities often result in cases of deforestation, collapsed fish stocks, etc. Long-term time horizons, which are compatible with sustainable practices, require a comprehensive strategy that minimizes the impact of market-driven economic pressures by adopting an extended time period for desired results.

Many of the principles in Sustainability and Resource Extraction claim to value the integrity of the land and its resources. However, the actions of the mining, lumber, fishing and agribusiness among other industries point to a significant credibility gap. The track record of many of the firms in these industries contradicts their intentions as expressed in their principles.

Although concerns about biodiversity and ecological health (the first E) are mentioned, the consequences of these industries' actions, now beyond the "preservation" phase, still do not emphasize the need to repair and restore the damage already done. In addition, the need to search and develop alternative renewable sources of energy is also excluded from these principles.

The activities by these industries such as oil drilling, clear-cutting, overfishing and industrial farming have historically destroyed the environment. What is left out of many of the Resource Extraction principles is the notion of **ecological restoration**. Therefore, recognition of the environmental damage and renewed attention to sustainable approaches and ecological restoration would serve to instill a refreshing policy direction.

In Sustainability and Resource Extraction we will focus on the principles from industries with a direct impact on environmental resources, namely: petroleum, lumber, fisheries, and agriculture.

We will examine: The American Petroleum Institute's (API) General Principles[1] which represent a segment of the energy industry concerned with oil and natural gas extraction and refining; Forestcare's Guiding Principles[2] for the lumber industry; the Food and Agriculture's (FAO) Fisheries Department's General Principles,[3] and the International Alliance for Sustainable Agriculture's (IASA) Seven Challenges[4] for the agricultural industry.

API's General Principles focus primarily on the safety and operational aspects of the oil industry, including facility operations, manufacturing processes, waste management, etc. Forestcare's Guiding Principles take a comprehensive approach to harvesting practices and their relationship to ecosystems and local communities. As an international

organization, FAO's General Principles highlight the global issues concerning fisheries management and conservation. Finally, IASA's Seven Challenges underscore the tremendous impact of agribusiness on family farms and local communities, and call for the establishment of sustainable farming practices.

American Petroleum Institute's (API) Guiding Principles

The API principles aim to continue existing extraction practices while attempting to safeguard the environment. As stated in its Mission Statement, API members are dedicated to "continuous efforts to improve the compatibility of our operations with the environment, while economically developing energy resources and supplying high quality products and services to consumers."

This clause highlights a key challenge for the oil industry: continuously juggling the delicate balance of environmental protection and resource extraction. The effects from oil spills and drilling operations often have a high public profile and devastating effects on the environment. Therefore, companies in the oil industry attempt to reconcile this fundamental incompatibility by (a) promoting the need for fossil fuels for economic growth and (b) projecting a caring attitude towards the environment through public relations campaigns.

As a Washington D.C.-based trade association, the American Petroleum Institute (API) represents "the entire petroleum industry: exploration and production, transportation,

refining, and marketing."[5] API was first established in 1919 to set standards for drilling and production equipment. Presently, API is responsible for public policy concerns affecting the industry.

API's mission statement and guidelines state:

API's Environmental, Health and Safety Mission and Guiding Principles[6]

Mission:
The members of the American Petroleum Institute are dedicated to continuous efforts to improve the compatibility of our operations with the environment while economically developing energy resources and supplying high quality products and services to consumers. We recognize our responsibility to work with the public, the government, and others to develop and to use natural resources in an environmentally sound manner while protecting the health and safety of our employees and the public. To meet these responsibilities, API members pledge to manage our businesses according to the following principles using sound science to priortize risks and to implement cost-effective management practices:

Principles:
To recognize and to respond to community concerns about our raw materials, products and operations.

To operate our plants and facilities, and to handle our raw materials and products in a manner that protects the environment, and the safety and health of our employees and the public.

To make safety, health and environmental considerations a priority in our planning, and our development of new products and processes.

To advise promptly, appropriate officials, employees, customers and the public of information on significant industry-related safety, heath and environmental hazards, and to recommend protective measures.

To counsel customers, transporters and others in the safe use, transportation and disposal of our raw materials, products and waste materials.

To economically develop and produce natural resources and to conserve those resources by using energy efficiently.

To extend knowledge by conducting or supporting research on the safety, health and environmental effects of our raw materials, products, processes and waste materials.

To commit to reduce overall emission and waste generation.

To work with others to resolve problems created by handling and disposal of hazardous substances from our operations.

To participate with government and others in creating responsible laws, regulations and standards to safeguard the community, workplace and environment. To promote these principles and practices by sharing experiences and offering assistance to others who produce, handle, use, transport or dispose of similar raw materials, petroleum products and wastes.

The safety and health concerns, emphasized in the API Principles, underscore the dangers in the manufacturing of petroleum products and for the local residents living near refineries. The principles aim “to make safety, health, and environmental considerations a priority in our planning, and our development of new products and processes.” The safety message illustrates the industry’s efforts to improve its poor track record marked by public concern over refinery accidents, oil spills and related accidents.

One of the motivating factors for stressing safety, health and environmental protection involves the repercussions from legal action. Companies in the oil industry are responsible for mandated legal compliance standards and are also susceptible to law suits from employees working at refineries and residents from neighboring communities who are exposed to health hazards from refinery activities and accidents.

The safe disposal of waste materials and waste reduction remains another key factor addressed by the API principles. The disposal issue covers the safe handling and disposal of hazardous substances, which is particularly relevant to oil refineries and other manufacturing plants dealing with toxic waste products. In addition, API calls for the reduction of overall emissions and waste generation.

The API principles also loosely promote the conservation of resources asking members, "to economically develop and produce natural resources and to conserve those resources by using energy efficiently."

API's Slow Shift to Renewables

One of the essential elements missing from the API principles is a strong call for a reduction of energy consumption and a shift away from fossil fuels to renewable energy sources. The limited world supply of petroleum and declining production forecasts makes the shift to renewable energy a logical trend. Nevertheless, the emphasis of the industry remains lodged in extraction and production practices.

The API principles are tailored to the management and operations of the manufacturing processes in the petroleum industry. The principles cover the safety and disposal of raw materials and products and promote "responsible laws, regulations and standards to safeguard the community, workplace, and environment."

Another aspect absent from the API principles is the notion of equity. The equitable distribution of resources to those in need is overlooked by this set of principles.

In addition, the voluntary adoption of the API principles by its members leaves no room for the **accountability and progress reports** of the member organizations. In essence, the API principles provide a statement with limited perspective of the industry's impact and responsibility to society.

Whereas the oil industry seeks to promote sustainable practices of a non-renewable resource, the lumber industry attempts to project sustainable practices of its renewable forest resource. Next, we examine the guidelines of the lumber industry through the Forestcare Guiding Principles.

Forestcare

The Forestcare Guiding Principles emphasize fostering the relationship between the logging industry's practices, their employees and the local communities. This attitude stands in contrast to a predominant group of transnational corporations who have neglected the role of local communities in their decision-making process.[7]

The Forestcare Guiding Principles[8] represent a group of Canadian companies from the Alberta Forest Products Association[9] committed to "help our industry contribute strongly to the province's prosperity today and tomorrow, while protecting the forest,

the environment, and the community."[10] The regional perspective of Forestcare's objective highlights a systemic approach placing the lumber practices within the context of the greater economic landscape.

The Forestcare Guiding Principles and Codes of Practice aim to "sustain the forest resource base, consider the needs of other forest users, operate their facilities in a responsible manner, and promote the continued well-being of our business, employees, and communities." Thus, Forestcare has adopted a comprehensive approach for examining the needs of the logging industry, the communities, and the environment.

Forestcare Guiding Principles

1. Member companies will ensure that harvest levels do not exceed the capacity of the forest, that all harvested areas are reforested, and that harvest and reforestation methods foster a healthy new forest, supporting a diversity of species.

2. Member companies will manage their activities on forest lands for multiple uses and values, including timber growth and harvest, watershed protection, wildlife and aquatic habitat and recreational and aesthetic benefits.

3. Member companies will manage their forest and manufacturing operations in a manner that protects the environment, placing special emphasis on the quality of air, water, soil and habitat.

4. Member companies will operate in a manner that protects the health and safety of employees, contractors and the general public.

5. Member companies will be open and responsive to community views and questions regarding the industry.

6. Member companies will conduct operations to ensure that the renewable forest resource provides economic activity and employment now and in the future, while conserving other forest values.

One of the core points raised by the Forestcare Principles focuses on promoting sustainable forest practices by ensuring that "… harvest levels do not exceed the capacity of the forest, that all harvested areas are reforested, and that harvest and reforestation methods foster a healthy new forest, supporting a diversity of species."

In addition, these principles call for protecting the "quality of air, water, soil, and habitat." These phrases emphasize the significance of maintaining a healthy ecosystem in which the lumber practices enhance its diversity and productivity.

In promoting ecosystem health, the Forestcare Principles acknowledge **the seemingly conflicting interests** of the timber industry's growth and recreational forest use with watershed and wildlife protection and the aesthetic value of forests. In essence, this dichotomy brings up the challenge of providing "economic activity and employment now and in the future, while conserving other forest values."

The balance of these competing interests rests with a long-term program promoting sustainable forest management and employment opportunities. Clearly, some forestry companies adhere to this strategy, while others (including The Pacific Lumber Company profiled in The Houston Principles),[11] rely on unsustainable practices and short-term profits.

These principles also take into consideration a sense of openness and responsibility from the lumber companies to the needs and viewpoints of the communities impacted by their operations. Thus, “member companies will be open and responsive to community views and questions regarding the industry.” This attitude by the industry illustrates a desire for communicating with local residents and listening to the communities’ needs.

A New Forest Ethic

In contrast to the American Petroleum Institute’s Principles, the Forestcare Principles wrestle with the notion of equity/employment by promoting the role of local communities in the decisions made by logging companies. The intention to involve local communities in the logging decisions illustrates a commitment to the residents of communities often dependent on the logging company’s jobs for their livelihood.

These principles provide a vision for maintaining logging jobs and the health of the forest. Therefore, they affirm that through wise management, economic vitality and sustainable forest practices can co-exist. In addition, Forestcare’s Codes of Practice[12] provide a publicly reported monitoring mechanism to evaluate the members' adoption of the principles. The codes specifically address care for the forest, the environment, and the community.

Many of the concerns expressed in Forestcare's Codes of Practice, become more complex when dealing with the international nature of the fisheries industry as described in the United Nations Food and Agriculture Organization's (FAO) Fisheries General Principles.

Responsible Fisheries General Principles

The challenge of the Fisheries Principles lies in the implementation of the Code of Conduct. Disagreements over fishing rights by countries including the United States, Canada, and Iceland highlight the global economic significance of the fishing industry. In fact, approximately 1 billion people worldwide rely on fish as their primary source of protein.[13] Implementing these noble principles remains a challenge as our world becomes increasingly interconnected into a global economy.

Although the Code of Conduct for Responsible Fisheries is voluntary, its basis stems from an international agreement, The United Nations Convention on the Law of the Sea.[14] The global nature of the fisheries industry makes it particularly challenging to enforce the Code of Conduct since fish stocks are not restricted by national boundaries.

These principles outline the responsibility of all nations to conserve the fisheries. Many of the statements in the Code of Conduct refer to "States" underscoring the appeal to nation states to subscribe to these principles. Underlying this premise is the international cooperation of nations and the critical dependence on fisheries for the economy of developing nations. The fivefold increase in the world's oceanic fish catch, from 19

million tons in 1950 to over 90 million tons in 1997, is a stark reminder that we have reached or possibly crossed over the catch limit.[15]

In 1995, the United Nations Food and Agriculture Organization (FAO) adopted the General Principles as part of establishing the Code of Conduct (the Code) for Responsible Fisheries. The General Principles are an integral component of the Code which "provides a necessary framework for national and international efforts to ensure sustainable exploitation of aquatic living resources in harmony with the environment."[16]

The Responsible Fisheries Principles illustrate the challenge of forging international consensus to promote sustainable fishing practices on a global level.

Code of Conduct for Responsible Fisheries General Principles[17]

6.1 States and users of living aquatic resources should conserve aquatic ecosystems. The right to fish carries with it the obligation to do so in a responsible manner so as to ensure effective conservation and management of the living aquatic resources.

6.2 Fisheries management should promote the maintenance of the quality, diversity and availability of fishery resources in sufficient quantities for present and future generations in the context of food security, poverty alleviation and sustainable development. Management measures should not only ensure the conservation of target species but also of species belonging to the same ecosystem or associated with or dependent upon the target species.

6.3 States should prevent overfishing and excess fishing capacity and should implement management measures to ensure that fishing effort is commensurate with the productive capacity of the fishery resources and their sustainable utilization. States should take measures to rehabilitate populations as far as possible and when appropriate.

6.4 Conservation and management decisions for fisheries should be based on the best scientific evidence available, also taking into account traditional knowledge of the resources and their habitat, as well as relevant environmental, economic and social factors. States should assign priority to undertake research and data collection in order to improve scientific and technical knowledge of fisheries including their interaction with the ecosystem. In recognizing the transboundary nature of many aquatic ecosystems, States should encourage bilateral and multilateral cooperation in research, as appropriate.

6.5 States and subregional and regional fisheries management organizations should apply a precautionary approach widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment, taking account of the best scientific evidence available. The absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species and non-target species and their environment.

6.6 Selective and environmentally safe fishing gear and practices should be further developed and applied, to the extent practicable, in order to maintain biodiversity and to conserve the population structure and aquatic ecosystems and protect fish quality. Where proper selective and environmentally safe fishing gear and practices exist, they should be recognized and accorded a priority in establishing conservation and management measures for fisheries. States and users of aquatic ecosystems should minimize waste, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species.

6.7 The harvesting, handling, processing and distribution of fish and fishery products should be carried out in a manner which will maintain the nutritional value, quality and safety of the products, reduce waste and minimize negative impacts on the environment.

6.8 All critical fisheries habitats in marine and fresh water ecosystems, such as wetlands, mangroves, reefs, lagoons, nursery and spawning areas, should be protected and rehabilitated as far as possible and where necessary. Particular effort should be made to protect such habitats from destruction, degradation, pollution and other significant impacts resulting from human activities that threaten the health and viability of the fishery resources.

6.9 States should ensure that their fisheries interests, including the need for conservation of the resources, are taken into account in the multiple uses of the coastal zone and are integrated into coastal area management, planning and development.

6.10 Within their respective competences and in accordance with international law, including within the framework of subregional or regional fisheries conservation and management organizations or arrangements, States should ensure compliance with and

enforcement of conservation and management measures and establish effective mechanisms, as appropriate, to monitor and control the activities of fishing vessels and fishing support vessels.

6.11 States authorizing fishing and fishing support vessels to fly their flags should exercise effective control over those vessels so as to ensure the proper application of this Code. They should ensure that the activities of such vessels do not undermine the effectiveness of conservation and management measures taken in accordance with international law and adopted at the national, subregional, regional or global levels. States should also ensure that vessels flying their flags fulfil their obligations concerning the collection and provision of data relating to their fishing activities.

6.12 States should, within their respective competences and in accordance with international law, cooperate at subregional, regional and global levels through fisheries management organizations, other international agreements or other arrangements to promote conservation and management, ensure responsible fishing and ensure effective conservation and protection of living aquatic resources throughout their range of distribution, taking into account the need for compatible measures in areas within and beyond national jurisdiction.

6.13 States should, to the extent permitted by national laws and regulations, ensure that decision making processes are transparent and achieve timely solutions to urgent matters. States, in accordance with appropriate procedures, should facilitate consultation and the effective participation of industry, fishworkers, environmental and other interested organizations in decision making with respect to the development of laws and policies related to fisheries management, development, international lending and aid.

6.14 International trade in fish and fishery products should be conducted in accordance with the principles, rights and obligations established in the World Trade Organization (WTO) Agreement and other relevant international agreements. States should ensure that their policies, programmes and practices related to trade in fish and fishery products do not result in obstacles to this trade, environmental degradation or negative social, including nutritional, impacts.

6.15 States should cooperate in order to prevent disputes. All disputes relating to fishing activities and practices should be resolved in a timely, peaceful and cooperative manner, in accordance with applicable international agreements or as may otherwise be agreed between the parties. Pending settlement of a dispute, the States concerned should make every effort to enter into provisional arrangements of a practical nature which should be without prejudice to the final outcome of any dispute settlement procedure.

6.16 States, recognising the paramount importance to fishers and fishfarmers of understanding the conservation and management of the fishery resources on which they

depend, should promote awareness of responsible fisheries through education and training. They should ensure that fishers and fishfarmers are involved in the policy formulation and implementation process, also with a view to facilitating the implementation of the Code.

6.17 States should ensure that fishing facilities and equipment as well as all fisheries activities allow for safe, healthy and fair working and living conditions and meet internationally agreed standards adopted by relevant international organizations.

6.18 Recognizing the important contributions of artisanal and small-scale fisheries to employment, income and food security, States should appropriately protect the rights of fishers and fishworkers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to a secure and just livelihood, as well as preferential access, where appropriate, to traditional fishing grounds and resources in the waters under their national jurisdiction.

6.19 States should consider aquaculture, including culture-based fisheries, as a means to promote diversification of income and diet. In so doing, States should ensure that resources are used responsibly and adverse impacts on the environment and on local communities are minimized.

One of the interesting points raised by the Fisheries Principles involves a systems approach for promoting conservation by balancing scientific data with traditional knowledge, and the three E's of sustainability: "Conservation and management decisions for fisheries should be based on the best scientific evidence available, also taking into account traditional knowledge of the resources and their habitat, as well as relevant environmental, economic, and social factors." This holistic approach places scientific findings within the context of other factors such as local knowledge and economic and social concerns. The question remains open as to whether this approach will happen, given the global economic pressure to maximize the fish catch.

Another key aspect of the Fisheries Principles lies in its relationship to international trade, specifically the World Trade Organization (WTO). The Code of Conduct claims adherence to the "principles, rights, and obligations" established by the WTO Agreement in relation to the international fish trade. In addition, the document goes on stating that "trade in fish and fishery products do not result in obstacles to this [WTO] trade, environmental degradation or negative social, including nutritional, impacts."

The local economies from developing countries are thus subject to the unpredictable prices of the **international marketplace** and loose control of their local resources. The strong support of the WTO Agreement, whose policies are dominated by relatively few developed countries, has had a dramatic effect on local fishing economies. Although industrial countries account for over 80 percent of all fish imports, developing countries are increasingly making up most of the exports. Whereas in 1970 developing countries were responsible for 37 percent of all fish exports, by 1997, their exports had risen to 49 percent.[18]

The international fisheries consumption is also having a negative effect on the fish stocks. In fact, according to the FAO, 11 out of the 15 major fishing grounds and 70 percent of the major fish species are either fully or overexploited.[19] WTO policies have also been found to be in conflict with national environmental protection measures, as for example, in the case of the sea turtles (protected under U. S. law) caught by shrimp fishing fleets.[20]

The Fisheries Principles also include the Precautionary Principle[21] which calls for organizations to "apply a precautionary approach widely to conservation management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment…"[22] When applied to fisheries, the Precautionary Principle would, for example, call for a fishing moratorium when there is doubt due to inconclusive scientific data regarding the viability of fish stocks.

This cautionary approach is particularly challenging to enforce since so much of the world's population depends on fish as their primary source of protein. Nevertheless, a long-term perspective would ensure potential devastating effects of overfishing which have already been experienced in many regions of the world.

Finally, the Fisheries Principles include a temporal perspective in its document vowing to protect the "quality, diversity, and availability of fishery resources." The process to achieve this long-term view expressed in other principles examined, includes using safe fishing gear and protecting aquatic habitats such as wetlands, reefs, lagoons, and aquaculture programs.

Many of the issues raised by the Fisheries Principles confront the sustainable agriculture community in their quest to survive the impact of agribusiness.

The Asilomar Declaration's Seven Challenges

The Asilomar Declaration represents a sentiment within the sustainability movement to establish sustainable farming into the mainstream of society.

The Seven Challenges call for increased education and participation by government agencies, educational and international institutions to promote sustainable farming values. This Declaration questions the benefits of the global economy and in particular the agribusiness interests of industrial agriculture on local farmers and their communities.

One of the most sweeping points made by the Asilomar Declaration calls for a shift from United States industrial agriculture to sustainable agriculture. In this scenario, the United States would take a leadership position in encouraging global institutions such as the Agency for Internatiomnal Development (USAID),[23] the World Bank,[24] and other institutions (i.e., World Trade Organization (WTO),[25] International Monetary Fund (IMF)[26] to promote sustainable farming practices.

As one of the key world food producers, the United States' leadership in promoting sustainable farming is a logical choice. The spread of farmers markets,[27] Community Supported Agriculture (CSA)[28] programs, and Local Employment Trading System (LETS)[29] in the US and Europe shows strong public support for local farmers and communities. The Europeans have also had a tremendous impact in leading strong opposition to genetically altered foods.[30]

The Seven Challenges[31] in the Asilomar Decalration for Sustainable Agriculture stem from efforts, beginning in the early 1980s, by the International Alliance for Sustainable Agriculture (IASA).[32] IASA envisions "the worldwide realization of sustainable agriculture—food systems which are ecologically sound, economically viable, socially just and humane."[33]

IASA's definition of sustainable agriculture encompass the three E's (Ecology, Economy, Equality) of sustainability within a framework which poses the challenges for our society to achieve sustainable agriculture.

The Asilomar Declaration for Sustainable Agriculture[34]

The present system for American agriculture cannot long endure. Our farms have succeeded in producing abundant food and fiber. But the costs and fragility of that success are becoming each day more evident.

Sustainable alternatives already prove their value. Not only are they more efficient in their use of energy, biological sources of fertility and pest management, they also enhance rural communities and encourage families to remain on the land. We commit ourselves to hastening the broad adoption of an agriculture that is ecologically sound, economically viable, fair, and humane.

A sustainable agriculture will require and support a sustainable society. Our challenge is [to] meet human needs without denying our decendants' birthright to the natural inheritance of this planet. We must revere the earth, sustaining and regenerating both nature and our communities. People are a part of nature, not separate from it. Sustainable agriculture is as attainable as it is necessary. Though we recognize difficulties in this transformation, we can state with confidence that in every region there are farm families profitably growing healthy food through a practical partnership with nature.

A sustainable agriculture that provides nourishing food, protects those who work the land, helps stabilize the earth's climate, and safeguards soil and water depends on our ability to meet a number of challenges. We must address those challenges without delay.

Seven Challenges

Promote and sustain healthy rural communities.
Healthy rural communities are attractive and equitable for farmers, farm workers, and their families. The continuation of traditional values and farming wisdom depends on a stable, multi-generational population. Absentee or corporate land ownership and the ever-increasing size of farms diminish rural life.

Expand opportunities for new and existing farmers to prosper using sustainable systems.
We must devise ways to help people get started in sustainable farming. Reliable information on sustainable agriculture needs to be readily available to farmers, extension agents, bankers, and others. Training and apprenticeship programs should be provided for entry-level farmers and established conventional farmers interested in making the transition. Tax forgiveness and other incentives should be devised to ease the financial stress of new and transitional farmers.

Inspire the public to value safe and healthy food.
The biological quality of food is known to affect the health and well-being of those who eat it. Food quality is a key factor in disease prevention. Approaches which are striving to be sustainable -- such as organic farming -- avoid hazardous pesticide use and maintain nutrient balance. Consumers' understanding of these facts will increase their willingness to pay prices that reflect the true costs of production.

Foster an ethic of land stewardship and humanness in the treatment of farm animals.
Sustainable agriculture recognizes that the gifts of nature upon which it depends -- soil, water, plants, animals, both wild and domestic -- are to be treated with loving care and humility. The greatest calling of the farmer is to leave those gifts in better condition than when they were received. Such a responsible agriculture can only be achieved when nature is both mentor and model, and when natural systems are the standard against which success is measured. Farm animals often contribute to ecologically sound agricultural systems and they deserve human care.

Expand knowledge access to information about sustainable agriculture.
American farmers are innovators. Given scientifically validated techniques, farmers will adopt sustainable agricultural practices. Seeing these practices in the field will speed

adoption. We need demonstration farms, farmer-to-farmer field tours, and studies of alternative farms of all sizes. University teaching, research, and extension must be redirected toward understanding the whole farm ecology and away from chemical dependence in farm management.

Reform the relationship among government, industry, and agriculture.
Government must use resources such as subsidies, grants, and loans to convert significant portions of industrial agriculture to a sustainable system. Undue rewards to concentrated interests should be replaced with fair returns to farmers who sustainably provide food and fiber.

Redefine the role of U.S. agriculture in the global community.
The present global agriculture trade is placing unnecessary pressures on the sustainability of the earth's resource base. The United States has a unique opportunity to change that situation. The people of many other countries look to us for agricultural leadership. We can honor that respect by restricting our trade in dangerous substances. We can encourage the Agency for International Development, The World Bank, and international research institutions to convert to sustainable programs. The international programs of universities can become centers of sustainability training and research.

One of the main points outlined by the Asilomar Declaration speaks to preserving and promoting the farming lifestyle and rural communities. This fundamental way of life, currently threatened by large corporations purchasing family farms, is one of the most visible signs of the influence of corporate America on the farming industry. Small farmers cannot compete with the large agribusiness farms, and therefore the declaration states that "Undue rewards to concentrated interests should be replaced with fair returns to farmers who sustainably provide food and fiber."

Another aspect of sustainable agriculture touched upon by the Asilomar Declaration includes sustainability education for farmers and the public. This point aims to support sustainable farming through training and apprenticeship programs. These programs would

expand organic farming thereby reducing the cost of organic produce. Public education about organic farming will encourage consumers to pay the "true costs" of agricultural products, since many current government subsidies do not reflect the actual costs of growing and transporting food.

The understanding of the true cost of goods of, for example, food products requires a systemic perspective that examines the numerous steps required in the preparation, production, packing, shipping and final delivery of food. In the case of vegetables, for example, it means the farmer's cost of preparing the soil, controlling pests, irrigating and harvesting them; then there are the costs in the energy required to package the produce, the energy (and air pollution) expended in transporting it to the local market where it is kept until it is purchased.

Developed nations such as the United States import a wide range of "off-season" food items, including apples from Chile and mussels from New Zealand, that are transported thousands of miles by air and then trucked nationwide to local supermarkets. These trade items are resource-intensive goods that also disrupt local economies by committing them to the price fluctuations of international markets. In effect, international trade agreements and the global transportation network mask the true **ecological**, **economic and social cost** of these items.

The Asilomar Declaration also calls for demonstration farms and cooperation with university research and extension programs that will broaden the understanding of sustainable farming practices.

In describing a new farming ethic, the Asilomar Declaration emphasizes the notion of land stewardship and the treatment of farm animals. This aspect of sustainable farming takes a **systems approach** whereby the interrelationships of sunlight, water, soil, plants and wild and domestic animals are considered by the farmer.

In addition, this farming ethic involves having respect for the lessons we can learn from nature: “Such a responsible agriculture can only be achieved when nature is both mentor and model, and when natural systems are the standard against which success is measured.” By adopting nature as a standard, farmers rely on the success of processes that have evolved over billions of years. Therefore, like the Biomimicry Principles,[35] (which we will discuss later in Sustainability and the Biosphere chapter) nature can provide us with the knowledge and wisdom for implementing sustainable farming practices.

Resource Extraction at a Crossroads

The Resource Extraction principles are grounded in industries that have a direct and often damaging impact on the Earth. The effects of these industries range from air pollution from the petroleum industry, to clear-cutting of forests, overfishing, and pesticide use on

crops. These principles hint at the changes necessary for sustainable practices in these extraction industries.

These principles highlight the necessary changes for moving from a fossil fuel economy to a sustainable economy. The petroleum, logging, fisheries and agriculture industries have traditionally had a major impact in the economic development of nations. However, we are now at a crossroads and need to shift from fossil fuels to renewable energy sources, and from unsustainable to sustainable logging, fishing, and farming practices.

Whereas the API and Fisheries principles are primarily focused on operational and health and safety issues, the Forestcare and Asilomar statements, by contrast, include a vision of stewardship and a land ethic as a means to commit to a renewed appreciation and respect for the Earth.

In the next chapter, we will examine the use of renewable resources in Sustainability and Ecological Design.

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CHAPTER FOUR

Sustainability and Ecological Design

Each of the principles in Sustainability and Ecological Design explore the relationship between the built environment and the natural world. The principles examine the interdependence between human environments and ecosystems, and point to the far-reaching effects that design decisions have on the environment.

The principles in the area of ecological design are heavily weighed towards the design parameters' relationship to the natural world — the interaction between architecture, its occupants and nature.

Although the Sustainability and Ecological Design principles effectively bring up the environmental integration into the design process (the first E of sustainability), with the exception of the Sandborn Principles, the Economic/Employment (second E) aspect such as affordable housing, and Equality/Equity (third E) issues are not thoroughly investigated. The Economic/Employment and Equality/Equity aspects are overshadowed by the Ecology/Environment aspect of sustainability.

The Sustainability and Ecological Design principles emphasize the importance of designing with nature. They recognize the inevitable interdependence between design and

the natural world. These principles recognize the environmental impact (both positive and negative) of design and therefore use it as an indicator of good design. Finally, these principles take a broad perspective of design that incorporates the cultural, spiritual, and historical traditions into the process.

In our analysis of sustainability and ecological design, we will explore the general implications of the principles, and then look at the significant points in each of the specific groups: William McDonough Architects' Hannover Principles,[1] Ecological Design Institute's (EDI) Five Principles of Ecological Design,[2] John and Nancy Jack Todd's Principles of Ecological Design,[3] and The Bigelow Group's Sandborn Principles.[4]

The Hannover Principles provide a set of guidelines with a holistic perspective on the various tasks and responsibilities of architects; EDI's Five Principles of Ecological Design illustrate simple ways of integrating nature into the design process; John and Nancy Jack Todd's Principles of Ecological Design bring an innovative fusion of biological and engineering viewpoints to their design solutions; and the Bigelow Group's Sandborn Principles show an innovative approach to meshing the natural and cultural resources with the built environment.

Hannover Principles

The framework for the Hannover Principles is based on the elements of Earth, Air, Fire, Water, and Spirit. The design decisions are to be made within the context of these elements while taking sustainability into consideration.

Among the essential points outlined by the Hannover Principles is the notion that humans must co-exist with nature. Implicit in this relationship is our interdependence with the natural world. This point also raises the consequences of design with respect to the viability of ecosystems. The use of non-renewable resources, for example, illustrates shortsightedness in the design process. In addition, the elimination of waste is a key factor in sound design. These are important issues in understanding the life-cycle of products and processes and efficient energy use.

The Hannover Principles also point to the consideration of "all aspects of human settlement." This perspective takes a broad view that includes the needs of the community, the dwelling place, and people's daily activities. Therefore, the design concept goes beyond the physical structure and examines the interactions and activities of people in their built environment and in nature.

The Hannover Principles were developed by William McDonough Architects[5] for the City of Hannover,[6] Germany's hosting of EXPO 2000,[7] the World's Fair for the year

2000. The theme for EXPO 2000 “Humanity, Nature, and Technology” incorporates many of the elements that comprise ecological design.

The Hannover principles were conceived “to inform the international design community of the issues inherent in the consideration of sustainable design, rather than to provide an ecological check list for construction.” [8]

The Hannover Principles[9]

1. **Insist on rights of humanity and nature to co-exist** in a healthy, supportive, diverse and sustainable condition.

2. **Recognize interdependence.** The elements of human design interact with and depend upon the natural world, with broad and diverse implications at every scale. Expand design considerations to recognizing even distant effects.

3. **Respect relationships between spirit and matter.** Consider all aspects of human settlement including community, dwelling, industry and trade in terms of existing and evolving connections between spiritual and material consciousness.

4. **Accept responsibility for the consequences of design** decisions upon human well-being, the viability of natural systems and their right to co-exist.

5. **Create safe objects of long-term value.** Do not burden future generations with requirements for maintenance or vigilant administration of potential danger due to the careless creation of products, processes or standards.

6. **Eliminate the concept of waste.** Evaluate and optimize the full life-cycle of products and processes, to approach the state of natural systems, in which there is no waste.

7. **Rely on natural energy flows.** Human designs should, like the living world, derive their creative forces from perpetual solar income. Incorporate this energy efficiently and safely for responsible use.

8. **Understand the limitations of design.** No human creation lasts forever and design does not solve all problems. Those who create and plan should practice humility in the

face of nature. Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled.

9. **Seek constant improvement by the sharing of knowledge.** Encourage direct and open communication between colleagues, patrons, manufacturers and users to link long term sustainable considerations with ethical responsibility, and re-establish the integral relationship between natural processes and human activity.

The Hannover Principles should be seen as a living document committed to the transformation and growth in the understanding of our interdependence with nature, so that they may adapt as our knowledge of the world evolves.

The notion of “long term value” outlines the challenge and responsibility for designers to design structures, products and standards that broaden rather than restrict the possibilities for future generations. The limitation of design and of ourselves is addressed by the Hannover Principles with respect to nature: “Practice humility in the face of nature.” This phrase highlights our need to learn about the natural processes through observation and practice.

Although tailored for EXPO 2000, the Hannover Principles provide an innovative framework for sustainable design concepts with broad applications. The sense of humility and sharing of knowledge illustrate the need for cooperation and partnership to seek lasting solutions to design problems.

This realistic appraisal provides a refreshing look at the design industry. As William McDonough Architects state: “The Hannover EXPO is based on ideas of restraint,

awareness, and concern for solving the world's problems, not hiding them behind a wall of promising machines.[10]

The Educational Design Institute's (EDI) Five Principles of Ecological Design represents another architecturally-driven effort to promoting the importance of local features in developing sustainable design concepts.

The Five Principles of Ecological Design[11]

Sim Van der Ryn's Five Principles of Ecological Design highlight the importance of understanding the local setting and designing structures that compliment natural processes.

One of the essential points raised by Van der Ryn deals with the "sense of place." The knowledge and understanding of a proposed site plays a critical role in shaping the design process. Therefore, by becoming familiar with the particular nuances of a particular place, the solutions reveal themselves.

These principles also reiterate the importance of integrating design with nature to regenerate rather than deplete the ecosystem. This means, for example, understanding the land's drainage patterns, temperature variations, sun and shaded areas, etc. In "making the natural cycles visible," Van der Ryn challenges us to work with sunlight, water, temperature fluctuations, and seasonal variations in our design structures. The more these

processes are seamlessly integrated into the design, the less our activities will detract from the health of nature's processes. Our awareness of the short and long-term impacts of design upon nature will determine the ecologically sound design possibilities.

The Five Principles of Ecological Design stem from Sim Van der Ryn[12] and Stuart Cowan's[13] landmark book *Ecological Design* (1995). In this work, Van der Ryn and Cowan explore the integration of sustainability concepts and ecological design. These principles are being implemented in the work of the Ecological Design Institute (EDI)[14] and Sim Van der Ryn Architects.[15]

The Five Principles clearly articulate the interdependence of design, functionality, and nature.

EDI's Five Principles of Ecological Design[16]

1. **Solutions grow from place.** Ecological design begins with the intimate knowledge of a place. It is small scale and direct, responsive to local conditions and people. If we are sensitive to the nuances of place, we can inhabit without destroying

2. **Make nature visible.** Making natural cycles and processes visible brings the design environment back to life. Effective design helps inform us of our place within nature

3. **Design with nature.** By working with living processes, we respect the needs of all species. Engaging processes that regenerate rather than deplete, we become more alive. Making natural cycles and processes more visible brings the designed environment back to life. Effective design helps inform us of our place within nature.

4. **Ecological accounting informs design.** Trace the environmental impacts of design and use this information to determine the ecologically sound design possibilities.

5. **Everyone is a designer.** Listen to every voice in the design process. As people work together to heal their places, they also heal themselves.

Underlying EDI's Five Principles is a call for respecting nature and for what we can learn from observing its natural processes. In addition, like the Hannover Principles, EDI points to the importance of becoming acquainted with the nuances of a particular site and integrate its local characteristics into the design process.

Van der Ryn also emphasizes cooperation from a variety of individuals: "listen to every voice in the design process." This phrase emphasizes the value of multidisciplinary perspectives in seeking sustainable design solutions. Finally, the EDI principles link the well-being of nature with ourselves: "As people work together to heal their places, they also heal themselves." The multiple perspectives of oneself, one's place, and the natural processes bring together many of the key concepts in sustainable ecological design.

The search for lasting design solutions, stemming from a biological perspective, is exemplified through the work of John and Nancy Jack Todd.

The Todd's Principles of Ecological Design

The Todd's principles provide a biological framework that places nature at the center of the design process. As the "matrix for all design," the living or natural world is designated as the reservoir for ecological designers. Nature is both the teacher and the source and inspiration for design. In addition, the Todd's emphasize that design must "follow the

laws of life" — in other words, design must be in alignment with nature's fundamental laws and processes.

The Todd's principles mention the concept of "biological equity" with respect to design. This concept of protecting non-human life, which is covered widely by the principles outlined in the Sustainability and The Biosphere chapter, focuses on the impact of design decisions on other species. **The built environment, which arises from design decisions, often has catastrophic impact on the environment**. Therefore, this principle reiterates the importance of making sound design decisions which take into consideration the well-being of all species.

John and Nancy Jack Todd's[17] Principles of Ecological Design[18] stem from their book, *From Eco-cities to Living Machines* (1994). The Todd's co-founded the New Alchemy Institute and later Ocean Arks International[19] and Living Technologies.[20] Their work in ecological design incorporates aspects of energy, architecture, food production and waste management. The living machines use microorganisms and plants to purify and reclaim water.

The Todd's have established a biological foundation for their principles of ecological design:

Principles of Ecological Design[21]
Emerging precepts of biological design:

1. The living world is the matrix for all design.

2. Design should follow, not oppose the laws of life.

3. Biological equity must determine design.

4. Design must reflect bioregionality.

5. Projects should be based on renewable energy sources.

6. Design should be sustainable through the integration of living systems.

7. Design should be coevolutionary with the natural world.

In stating that design must "reflect bioregionality" and be "coevolutionary with the natural world," the Todd's touch upon the significance of the local ecosystem in the design process. The bioregion in many respects paints the local characteristics which, if carefully studied and observed, will point to an efficient design. The coevolution of design and nature illustrates the importance of creating a synergistic alliance between the designed environment and nature. As nature evolves so must the built environment in order to accommodate unforeseen changes.

A review of the Todd's principles yields similarities with the Hannover Principles and EDI's Five Principles of Ecological Design. In reference to nature as the "matrix for all design," the Todd's reiterate the natural world as the source for design. Like Hannover's "recognize interdependence," and EDI's "design with nature" principle, the Todd's repeatedly emphasize how nature provides the underlying structure as the "matrix," the "laws of life" and as "biological equity" for the design process.

The biological base of the Todd's Principles of Ecological Design outlines the connections between design and the natural world. The concepts of bioregions and coevolution articulate the language necessary for ecological designers to integrate into their work. Thus, with a firm biological lexicon, designers can strive to devise design solutions that enhance rather than detract from the biological diversity in the natural world.

The Sandborn Principles apply design values discussed by the Todd's and EDI, and integrate them into the practical needs of a community.

The Sandborn Principles

The Sandborn Principles successfully integrate social and ecological needs. These principles highlight the significance of site and building design, which is integrated with the processes of the local ecosystems. Like EDI's "design with nature" clause and the Todd's assertion that design must follow the "laws of nature," the Sandborn Principles make a case for a close examination of the site and natural processes in devising design solutions. The Hannover Principles' reference to respecting the "relationship between spirit and matter" is reiterated by the Sandborn Principles by supporting culturally creative and aesthetically pleasing structures.

The Sandborn Principles[22] for Building Design and Construction were developed by Perry Bigelow, and The Bigelow Group[23] home builders, and were presented at the

Winter Cities Conference, Winnipeg, Canada (1996). The Sandborn Principles provide a comprehensive viewpoint of ecological design noting the building structure, its impact on the environment, and the social, economic, and aesthetic implications.

The Sandborn Principles[24]

1. Healthy Indoor Environments for Occupants

Create a living environment that will be healthy for all its occupants.
Buildings shall be of appropriate human scale.
In a non-sterile, aesthetically pleasing environment.

Building design will respond to:
— Toxicity of materials
— EMF
— Lighting efficiency and quality
— Comfort requirements
— Attention to the Principles of Feng Shui

2. Ecologically Healthy
The design of human habitat shall recognize that all resources are limited and will respond to the patterns of the natural ecology.

Land plans and building designs will include only those technologies with the least disruptive impact upon the natural ecology of the earth.

Density must be most intense near neighborhood centers where facilities are most accessible.

Buildings will be organic, integrate art, natural materials, sunlight, green plants, water, energy efficiency, low noise levels, and will not cost more than current conventional buildings.

The Features of Buildings and Their Surroundings Will Include:

— No waste that cannot be assimilated.
— Thermal Passivity (Responsiveness)
— Reflective Surfaces
— Junglified surroundings

— Access by foot to primary services
— Natural corridors for wildlife
— Individual community gardens
— Local agriculture for local consumption

3. Socially Just
Habitats shall be equally accessible across economic classes.

4. Culturally Creative
Habitats will allow ethnic groups to maintain individual cultural identities and neighborhoods, while integrating into the larger community.

All population groups shall have access to art, theater, and music.

5. Beautiful

6. Physically and Economically Accessible
All sites within the habitat shall be accessible and rich in resources to those living within walkable (wheelchair-able) distance.

Accessible characteristics shall include:
— Radical traffic calming
— Clean, accessible, economical mass transit
— Bicycle paths
— Small neighborhood service businesses
— Places to go where the chances of accidental meeting are high (parks, playgrounds, cafes, sports centers)

7. Evolutionary
Habitats design shall include continuous re-evaluation of premises and values.
Shall be demographically responsive and
Flexible to change over time to support future user needs.

One of the key features in the Sandborn Principles involves the notion of the health for the building occupants and for the environment. The parameters for buildings call for them to be “healthy for all its occupants… of appropriate human scale… and aesthetically pleasing.” In addition, buildings must be responsive to: toxic materials,

Electro-magnetic frequencies (EMF), lighting quality, comfort, and principles of Feng Shui.[25]

These parameters focus on the relationship between peoples' needs and activities and the buildings' capacity for accommodating these requirements. Although comfort and aesthetics are difficult to quantify, building occupants know when a building is a comfortable and pleasant place to live and work.

The health of the ecosystem aspect of the Sandborn Principles focuses on having minimal impact on the "patterns of the natural ecology." This clause, similar to the concepts from Permaculture (discussed in Sustainability and The Biosphere), advocates observing and learning from nature.

The Sandborn Principles also touch upon the notion of social equity in building construction. By stating that "habitats shall be equally accessible across economic classes," these principles imply a commitment to providing affordable housing for everyone.

The principles also promote accessible mass transit, less traffic and the creation of parks, playgrounds and cafes that bring people from the neighborhood together. In addition, the Sandborn Principles aim to maintain the character and cultural identity of ethnic groups within a neighborhood by creating environments that support human interactions.

The notion of *beauty,* mentioned by these principles, is difficult to define, yet speaks to the "quality of life" for individual community members. Moreover, maintaining the quality of life is an important aspect of sustainability. The beauty of buildings is enhanced when they are well integrated with the landscape, and when their functionality is seamlessly meshed with their aesthetic value.

The evolution of buildings is emphasized by the Sandborn Principles in calling for a constant "re-evaluation of premises and values." In advocating flexibility in building design, these principles support building techniques that can be easily modified as new technologies are developed. Thus, buildings become thriving structures able to change over time.

An Interdependent Perspective

The principles in the Sustainability and Ecological Design group — Hannover, EDI Principles, Todd's Principles, and Sandborn Principles — recognize the interdependence of design and nature. The theme of nature as teacher and mentor, discussed later in the Sustainabiliy and the Biosphere section, is also touched upon by the Ecological Design principles.

The Sustainability and Ecological Design principles go one step further in their analysis of interdependency to include the cultural and spiritual values associated with ecological

design. Thus, ecological design is integrated with ecosystem cycles as well as cultural heritage and peoples' daily activities. Design is positioned in alignment with nature and the cultural needs of local residents.

In the next chapter, Sustainability and The Biosphere, we will review the relationship of sustainability principles to the environment.

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CHAPTER FIVE

Sustainability and The Biosphere

As with the principles in the Ecological Design section, the Biosphere principles focus mainly on the Ecological concerns (the first E) and superficially address the economic and equality (second and third E) issues. This uneven treatment of the full spectrum of sustainability, by not including all three E's, makes it particularly challenging to ground these values in every day life.

Each of the selected groups in Sustainability and the Biosphere describes a series of characteristics, principles and laws inherent in nature, and provides guidelines for our interactions with the biosphere. However, the critical links between employment and equity issues with ecological aspects remain vague and inconclusive.

The notion of nature as a valuable teacher that can guide human actions rings throughout this section. Many of the principles point to the quite recent (geologically speaking), appearance of humans on Earth, versus the 3.8 billion years of existence and experience of other life forms on the planet.

Therefore, these principles emphasize that we have much to learn from other species and are one strand in a complex web of life. Moreover, humans and all other species depend

on the ecosystems in the biosphere for survival and must be especially aware of the human impact and responsibility on Earth.

In our analysis of Sustainability and the Biosphere, we will explore the general implications of the principles, and then look at the significant points in each of the specific groups: Deep Ecology Principles,[1] Charter of Rights for the Environment,[2] Biomimicry Principles,[3] and Mollisonian Permaculture Principles.[4]

The Deep Ecology Principles are philosophical and action-oriented; The Charter of Rights for the Environment are policy based; the Biomimicry Principles look at nature as a beneficial model for business and industry; and finally the Mollisonian Permaculture Principles take a systems approach in our relationship with the natural world.

Deep Ecology

One of the most powerful themes in the Deep Ecology principles is the intrinsic value of non-human life on Earth. The notion of appreciation for non-human species counters pervasive attitudes of the Western development model seeking to exploit nature with its multitude of animal and plant species to accommodate human needs. For deep ecologists, the right of other species to exist is independent of human activities.

The Deep Ecology principles stem from the work of Norwegian philosopher and ecologist Arne Naess.[5] For Naess the cornerstones of a deep ecology perspective include

self-realization and **biocentric equality**.[6] Self realization involves the realization of being connected to something, such as other life forces, greater than oneself. Biocentric equality deals with the intrinsic right of all species to exist. This notion points to the antithesis of an anthropocentric view of nature as a resource for human consumption.

Thus, deep ecology emphasizes the importance of all life-forms in the biosphere and asks us to re-examine our role in the web of life.

The following principles of deep ecology were developed by Arne Naess and George Sessions:

Deep Ecology's Basic Principles[7]

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

Naess and Sessions point to the diversity of life as an essential component of the deep ecology framework. Moreover, they believe that humans may "reduce" this diversity only to "satisfy vital needs." **What constitutes a "vital need" is not addressed by the authors**; however, this ambiguity leaves room for the evolution of an ethic revolving around the notion of "how much is enough?" for humans with respect to nature.

The deep ecology philosophy also stresses the significance of "life quality," defined as "dwelling in situations of inherent value," rather than "increasing to a higher standard of living." Again, as with "vital need," the definition of "inherent value" is inconclusive.

This is a subtle, yet profound distinction between the richness of values which characterize life and the desire for increasing consumption — in effect "better not bigger" or as stated, the distinction between great and big.

Additional points in the deep ecology principles point out the importance of reducing human population, and put forth a call for action to those who subscribe to the aforementioned principles.

The reduction in human population speaks to the devastating impact of humans on Earth's ecosystems; the call for action encourages us to engage these ideas and principles through active participation.

Deep Ecology's Reverence for All Species

The deep ecology principles outline the following five key points:

(1) The importance of maintaining the integrity of ecosystems (the value of **ALL** species);

(2) The **diversity** of life may be compromised only to satisfy "**vital needs**.";

(3) The need to reduce human **population** due to its negative impact on nature;

(4) The aspiration for an increased **"quality of life,"** and

(5) The obligation for **action** by those who support these deep ecology principles.

In essence, these principles argue for protecting the integrity of the natural world with all its biodiversity. Deep ecologists advocate a more humble role for humans, involving greater respect for the life of all species. In addition, the deep ecological view stresses the notion of "better not bigger" or "quality over quantity" in terms of the characteristics and values of humans.

Deep Ecology's concern for all species is extended by the principles from The Charter of Rights for the Environment.

Charter of Rights for the Environment

The Charter of Rights for the Environment highlights our interdependence with the natural world. Nature is defined as part of the human community, rather than as a "commodity" subject to resource extraction. Moreover, humans have a stewardship role in protecting the essential aspects of ecosystems such as air, water and soil.

The Charter of Rights for the Environment stems from the Women and Sustainable Development: Canadian Perspectives Conference held in Vancouver, Canada (1994).[8] The Charter represents a legal approach for dealing with issues related to sustainability, and outlines guidelines and priorities in order to achieve a sustainable society.

The Twelve Principles of the Charter of Rights for the Environment

• The biosphere is a community to which we belong rather than a commodity belonging to us.
• All species have inherent value in the biosphere.
• Human beings have stewardship for the quality of water, air and soil of the biosphere.
• The entropic throughput of natural resources should reflect their real costs as a factor in production and consumption.
• The health and well-being of humans and all other species is inseparable from the health and well-being of the biosphere.
• Development must be in harmony with the environment.
• Any production that is not sustainable cannot be counted as capital.
• Optimal allocation of human and natural resources must be in harmony with optimal scale, recognizing the finite limits of the biosphere.
• Human activity must not be conducted at the irreversible expense of other species and ecosystems.
• Diversity is integral to a sustainable society.
• Sustainable development maintains or enhances the integrity of natural resource capital, thereby contributing to the increased well-being of all species.
• The present generation has an obligation to future generations.
• The health of one nation ultimately affects the health of all nations.

As previously discussed in relation to food production, the Charter emphasizes the importance of taking into account the “true costs” or “real costs” of production and consumption. For example, the “real cost” of gasoline production, which is not reflected in the price, includes the environmental destruction in extracting the petroleum, the

pollution and toxins released during refining, the release of carbon dioxide from automobiles which affects, acid rain, global warming, etc., etc. In effect, The “real cost” of gasoline is much greater than the price at the gas station. The rippling effects of “real costs” is particularly relevant to sustainable issues confronting communities and commercial interests.

Together with the “real costs” of production and consumption, the Charter of Rights depicts the importance of observing the limits of the biosphere. These limits, in effect, require optimizing human activities whereby our actions are aligned with the needs of other species. As with the Deep Ecology Principles, the Charter of Rights insists upon the rights of other species and ecosystems and our responsibility in maintaining their well-being.

In the Charter of Rights, the sense of responsibility for ecosystems extends beyond the biosphere towards an “obligation of present generations to future generations.” This long-term perspective underscores a deep commitment to core values which support a responsible outlook to the future.

The Charter as a Guide for Human Interaction with Nature

The twelve principles in the Charter of Rights for the environment provide a concise framework for a harmonious integration of human activities and the environment. The Charter emphasizes particular obligations of humans with respect to extracting resources,

and future generations. In addition, humans have an important role as stewards of the biosphere.

The significance of the limits of the biosphere is portrayed through an affirmation of optimization with regard to human needs. Finally, the Charter of Rights, like the Deep Ecology Principles, accentuates the value of other species.

Biomimicry emphasizes the value of species described in Deep Ecology and The Charter of Rights by including principles which depict characteristics of the natural world.

Biomimicry

In her book, *Biomimicry* (1997), Janine Benyus,[9] describes how nature serves as a viable **model**, as a **measure** and as a **mentor** worthy of imitation by humans. The root of Biomimicry comes from the Greek, *bio* or life, and *mimesis* or imitation.

As a model, nature provides insights in our design and quest for solutions; so, for example, the efficiency of navigation in bats provides the basis for developing new radar technology, and architectural designs are derived from the structure of lily pads and bamboo shoots. As a measure or ecological standard, nature, with its 3.8 billion years of evolution, acts as a guide for humans. And finally, as a mentor, nature teaches humans to treat ecosystems not as a commodity, but instead as a source of knowledge and inspiration.

The Biomimicry Principles focus exclusively on nature's attributes; thereby implying that humans have much to learn from the billions of years of the natural world's evolutionary experience. Benyus portrays the significance of optimization in stating that "nature uses only the energy it needs,. . . nature recycles everything,. . . and nature curbs excesses from within." In effect, nature's optimization stands in sharp contrast to our inefficient use of non-renewable energy sources, our tremendous waste in manufacturing and disposal habits, and the excessive consumption in the Western industrialized nations.

Biomimicry Principles[10]

- Nature runs on sunlight.
- Nature uses only the energy it needs.
- Nature fits form to function.
- Nature recycles everything.
- Nature rewards cooperation.
- Nature banks on diversity.
- Nature demands local expertise.
- Nature curbs excesses from within.
- Nature taps the power of limits.

From an ecosystem perspective, the Biomimicry Principles point out the significance of cooperation— "nature rewards cooperation," and diversity— "nature banks on diversity." Again, these values are the antithesis of the competitive nature of our economic system and our reliance on monocultures, particularly in agribusiness.

Benyus makes an interesting observation with regards to the limits of nature stating: "nature taps the power of limits." This principle recognizes how species maximize the benefits of the constraints of ecosystems in, for example, temperature range, seasonal variations, soil fertility, etc. Within these boundaries, nature flourishes.

By contrast, humans "regard limits as a universal dare, something to be overcome so we can continue our expansion."[11]

Biomimicry: Celebrating Nature's Track Record

In the Biomimicry Principles, we notice that the biocentric approach places tremendous value on the inherent characteristics of ecosystems — their interdependence, cooperation, recognition of limits, diversity, etc. Moreover, the strength of nature lies in its capacity to serve as a model, a measure, and as a mentor or teacher.

Biomimicry's new perspective on nature treats it as a source of knowledge fit for imitation. Benyus points out that humans are relatively new comers onto the world scene, and have much to gain by observing and leaning from nature, instead of continuing the current senseless exploitation and expansion. The numerous examples of Biomimicry projects in: agriculture, health, materials and energy production, and computers indicate a positive outlook on the potential for these inspiring principles.

The lessons derived from Biomimicry through the evolution in nature are integrated and expanded into a comprehensive design strategy in Permaculture.

Permaculture

Like Biomimicry which recognizes the value of learning from nature, Permaculture articulates a comprehensive design strategy based on knowledge gained through observing the patterns in nature.

Founder Bill Mollison,[12] defines permaculture (derived from **perma**nent agri**culture** and **perma**nent **culture**) as:

> The conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems. It is the harmonious integration of landscape and people providing their food, energy, shelter, and other material and non-material needs in a sustainable way. Without permanent agriculture there is no possibility of a stable social order.[13]

Permaculture provides a "systems" approach for implementing: architectural, energy, agricultural, and irrigation designs among others. These strategies focus on understanding basic patterns found in nature. Patterning involves grasping the significance of patterns in natural phenomena by looking at characteristics such as: shapes, branching, pulsing, waves, matrices, form and substance. These patterns furnish a template for designing systems that are interdependent and support each other in beneficial ways.[14]

Another important aspect of Permaculture deals with the social design. These topics range from implementing alternative political systems including bioregional organization, to new property arrangements, finance systems, and striving for right livelihood.

Mollisonian Permaculture Principles[15]

1. Work with nature, rather than against the natural elements, forces, pressures, processes, agencies, and evolutions, so that we assist rather than impede natural developments.
2. The problem is the solution; everything works both ways. It is only how we see things that makes them advantageous or not (if the wind blows cold, let us use both its strength and its coolness to advantage). A corollary of this principle is that everything is a positive resource; it is just up to us to work out *how* we may use it as such.
3. Make the least change for the greatest possible effect.
4. The yield of a system is theoretically unlimited. The only limit on the number of uses of a resource possible within a system is in the limit of the information and the imagination of the designer.
5. Everything gardens, or has an effect on its environment.

The Permaculture Principles stress the importance of efficiency in terms of "working with nature,. . .finding the positive resource of an apparent negative situation, . . . and [making] the least change for the greatest possible effect." Moreover, the notion of efficiency is rooted in allowing nature to lead in our design solutions. Like Biomimicry, Permaculture uses nature as a model to guide our actions; then Permaculture expands upon the scope of Biomimicry by exploring the ways of integrating the concepts into sustainable economic and social endeavors.

Another key point made in the Permaculture Principles involves the critical role of information and imagination. Information is undoubtedly an essential element for

decision-making; however, the wise interpretation of information, not mentioned, is paramount in achieving lasting solutions. The role of imagination brings forth the significance of creativity in searching for ways to work in alignment with nature.

Permaculture as Design Model

The Permaculture Principles present a pragmatic approach for achieving design solutions which rely on careful observations of ecosystems. The incorporation of pattern understanding plays an integral role as a process for assimilating nature's on-going systems into human designs for: building shelters, food and energy production, materials use, and village design.

The systemic approach inherent in the Permaculture concepts illustrates a powerful tool for creating a comprehensive perspective. This holistic point of view which focuses on the relationships among species, natural forces, and human habitation sheds light on the subtle nuances that characterize viable life-support systems. In addition, Permaculture explores the social and economic structures which support the building of communities.

A Biocentric Perspective

The four groups of principles from Sustainability and the Biosphere — Deep Ecology, Charter of Rights for the Environment, Biomimicry, Permaculture — present a biocentric approach to sustainability. That is, nature is recognized as the central entity on which humans depend for survival, knowledge and inspiration.

Recurring themes in the principles from Sustainability and the Biosphere include: the value of non-human species, planning for the well-being of future generations, interdependence and cooperation. Many of these principles outline the need for practical approaches for ways of working and respecting nature's limits.

The strength of the biocentric viewpoints reiterate the importance of nature for maintaining Earth's basic life-support systems. However, many of the principles in this section have limited discussions about the integration of the second (economic) and third E (equality) of sustainability. The inevitable interdependence of ecological issues with economic and equality factors provide a critical perspective for understanding the complexity of sustainability.

In the next chapter, we will review the significance of all the principles examined and evaluate the future of the sustainability movement.

NOTES

[1] Link to: Deep Ecology. Deep Ecology's Basic Principles. 13 Jun. 2000 <http://www.fi.muni.cz/~imladris/zelena/deep.html.cz.us-ascii>.

[2] Link to: International Institute for Sustainable Development (IISD). IISDnet, Sustainable Development Principles: Charter of Rights for the Environment: Twelve Principles. 13 Jun. 2000 <http://iisd1.iisd.ca/sd/principle.asp?pid=26&display=1>.

[3] The New York Times on The Web. Books, Chapter One, Biomimicry, by Janine M. Benyus. 13 Jun. 2000 <http://jcbmac.chem.brown.edu/baird/CHEM-F1/readings/nytimes/biological/Biomimicry.html>.

[4] Link to: Principles of Sustainability, Mollisonian Permaculture Principles, Appendix A.
[5] Bullfrog Films. Crossing the Stones: A Portrait of Arne Naess. 14 Jun. 2000 <http://www.bullfrogfilms.com/catalog/191.html>.
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[9] Link to: Ann Online. Program 300 Janine Benyus. 21 Jun. 2000 http://www.annonline.com/interviews/971211>.
[10] Janine M. Benyus, Biomimicry (New York: William Morrow and Company, Inc., 1997). 7.
[11] Benyus, 7.
[12] Link to: Permaculture Research Institute(PRI). The People of PRI, Bill Mollison. 21 Jun. 2000 <http://www.permaculture.org.au/billmollison.shtml>.
[13] Bill Mollison, Permaculture: A Practical Guide for a Sustainable Future. (Washington D.C.: Island Press, 1990). Ix.
[14] For further discussion on patterns, see: Chapter 4, "Pattern Understanding" in Permaculture: A Practical Guide for a Sustainable Future. (Mollison, 1990) 70-105.
[15] Bill Mollison, Permaculture: A Practical Guide for a Sustainable Future. (Washington D.C.: Island Press, 1990) 35.

Epilogue

Future of Hope

In our investigation of sustainability principles in: Community, Commerce, Resource Extraction, Ecological Design, and the Biosphere, we notice remarkable similarities in the key messages expressed by these groups. Although the three E's (Ecology, Economy, Equality) are emphasized to a greater or lesser extent in each of the principles, on the whole there are several threads that ground a set of common values.

Seven Common Threads

There are seven common themes, or threads, that permeate the sustainability principles we have examined. These include:

1. Stewardship
2. Respect for limits
3. Interdependence
4. Economic restructuring
5. Fair distribution
6. Intergenerational perspective
7. Nature as a model and teacher

Although these themes receive different levels of emphasis within the categories of sustainability principles that we have discussed, together they paint a comprehensive portrait of the conceptual framework of the sustainability movement today.

1. The **stewardship** message covers the importance of establishing an ecological ethic for managing and preserving the biological integrity of ecosystems. This includes safeguarding the health of resources such as water, air, soil and species biodiversity. It also incorporates promoting the use of renewable energy resources such as wind and solar power, and natural building materials.

2. The **respect for limits** message calls for living within nature's means. This value structure includes preventing waste, pollution, and unsustainable resource depletion such as deforestation, overfishing, mining, etc. Inherent in this theme is the protection of biodiversity which contains the fabric of life threatened by the overconsumption of developed nations. The "limits" represent the threshhold of living systems which, when violated, have devastating effects ranging from species extinction to global warming.

3. The theme of **interdependence** not only covers the **ecological** relationships between species and nature, but also the **economic** and **cultural** ties at a regional and international level. In the modern world, we are dependent on ecological, economic and social systems that are inextricably linked to one another. Our elaborate transportation and communications systems, food and energy production, financial transactions and

manufacturing capabilities are dependent on a vast interconnected and interdependent network. At the foundation of this network lies nature's interdependent systems providing clean air, water, fertile soils, etc., which support the infrastructure for our survival.

4. The notion of **economic restructuring** resounds throughout many principles as a need for expanding employment opportunities while safeguarding ecosystems. This new relationship fostering sustainable practices depends on a new economic model based on cooperation and optimal efficiency rather than competition and waste. These new economic practices also apply to government and commercial ventures in calling for their support for the needs of local communities.

5. The **fair distribution** message speaks to the importance of social justice and equality in areas including employment opportunities, education, healthcare, etc. A fair and equitable distribution of resources involves a shift in social values applied through government policies such as tax changes, and through socially responsible corporate practices that address issues faced by low-income communities. The notion of fair distribution involves creating innovative approaches for dealing with the shortcomings of the current economic model.

6. The **intergenerational perspective** in the principles presents a temporal viewpoint that emphasizes a long-term rather than short-term time horizon for making the critical

choices facing society. By thinking about the impact of our actions on subsequent generations, maybe as far out as 150 to 500 years, we learn to prioritize our decisions. In addition, the intergenerational view clarifies the significance of society's decisions by placing them in the context of our children's, grandchildren's, great-grandchildren's, etc., lives.

7. Finally, the notion of **nature as a model and teacher** reiterates the 3.5 billion years of evolution of living systems and its significance as a reservoir of "expertise." As relative newcomers onto the world's stage, humans may greatly benefit from the lessons derived from nature as a living model and teacher. In the field of ecological design this view of nature calls for creating designs in accordance with the needs and cycles of the landscape. In addition, this model of nature includes respecting the rights of all non-human species.

Next, we look at the relationship between these common threads and bold initiatives that demonstrate practical implementation strategies of the sustainable values underlying these principles.

Hopeful Signs

Although many of the creative solutions for ecological, economic and social problems are often overlooked by the mainstream press, the success stories abound. Many of these inspirational stories are highlighted in the alternative press as well as through the Internet.

In community planning, initiatives in Gaviotas[1], Colombia, Curitiba,[2] Brazil, and Kerala,[3] India stand out as beacons of hope.[4] In each of these areas, individuals have united to envision alternative models for solving many of the problems afflicting urban centers. Gaviotas represents a vision for a village setting; Curitiba's urban planning success points to a viable future for metropolitan cities; and Kerala represents the successful integration of socio-economic practices at a regional level.

In Gaviotas, an experiment to develop appropriate technologies has become a model sustainable community in the seemingly inhospitable savanna of eastern Colombia. Founder Paolo Lugari and his colleagues have succeeded in Gaviotas becoming self-sufficient in energy production, and producing nearly all of its agricultural needs. The Gaviotans have also devised ingenious technologies including: water pumps powered by children's seesaws, solar panels that work during the rainy season, and growing food without soil.

The village’s economic base relies, in part, on harvesting the natural resin from the Caribbean pine that is sold for use in manufacturing paint and cosmetic products. The pines, planted by the Gaviotans, have also helped to restore the ecosystem back to its native rainforest. By successfully implementing sustainable development strategies and establishing a thriving community in one of the world's most unforgiving regions, the founders of Gaviotas have proven that such efforts are possible elsewhere.

The city of Curitiba, Brazil has one of the world's most successful urban planning programs. With municipal government funds, visionary planner Jaime Lerner and his staff have made buses more affordable and faster than cars for traveling in a city of 1.6 million residents — carrying over 900,000 passengers a day.[5] In addition, Curitiba has established a 16 square mile "Industrial City" near the central business district that has attracted a variety of industries, increasing employment opportunities. Concern for the residents' quality of life in Curitiba is illustrated by city regulations, which, for example, demand permits before cutting or pruning trees. Also, for every tree cut, two must be planted. A city government program allows residents to trade garbage for food thereby supporting nearby villages and insuring a cleaner urban center. Curitiba recycles 70 percent of the paper and 60 percent of plastic, metals, and glass.[6] The city also provides free medical care to its residents.

On a larger scale than Curitiba, the state of Kerala in Southwestern India, with an area of about 24,000 square miles and a population of approximately 33 million, represents an alternative model that supports low consumption and high quality of life.[7] With a life expectancy of 72 years, one of the lowest infant mortality rates in the developing world; a population growth of 1.7 births per woman (lower than the U.S and Sweden); and a 90 percent literacy rate (similar to that of Singapore and Spain), Kerala approaches Western standards of living at a fractional Gross Domestic per capita income of just $1,000 per year (lower than that of Cambodia and Sudan).[8] How can this be?

The successful health, education standards, and freedom in governance in Kerala stand as proof of a population which lacks the material wealth of industrialized nations, yet retains a high quality of life. A history of social reform programs has instilled a sense of active democratic participation and established a legacy of equitable distribution of resources. Although Kerala does not exist in isolation, and must face the challenges of an economic system linked to the rest of India, it defies the notion that quality of life is dependent on a high per capita income. More significantly, Kerala challenges us to re-evaluate our common-held beliefs about the link between economic development and standard of living.

In an increasingly urbanized world, these examples, at the village, city, and regional levels, illustrate a range of approaches and opportunities for devising successful strategies to transform sustainable values into practical solutions. Next, we explore the factors affecting our current situation and the tools available to meet these challenges.

The General Predicament

The dawn of the new millennium is marked simultaneously by both extraordinary economic productivity **and** an alarming decline of the viability of ecosystems that lie at the foundation of our well-being.

We find ourselves at a time of tremendous advancements in: (a) space technology including the Hubble telescope and Mars probes; (b) the establishment of global

telecommunications networks such as the Internet and wireless technology; and (c) medical breakthroughs in disease treatments and mapping the human genome.

Together with these remarkable achievements, however, we are also experiencing the rapid decline of ecosystems on which we depend for our survival. The foundation of our modern lifestyle, including food and energy production, communications and transportation systems, water availability, etc., relies on the health and services of ecosystems that are increasingly being stretched beyond their limits. The impact of our activities is reflected in issues ranging from global climate change to species extinction.

According to the Worldwatch Institute the trends contributing to our situation include: "population growth, rising temperature, falling water tables, shrinking cropland per person, collapsing fisheries, shrinking forests, and the loss of plant and animal species."[9]

Of these trends, the first two, population and rising temperature, are pivotal in making progress on all other environmental fronts:

> The overriding challenges facing our global civilization as the new century begins are to stabilize climate and stabilize population. Success on these two fronts would make other challenges, such as reversing the deforestation of Earth, stabilizing water tables, and protecting plant and animal diversity much more manageable. If we cannot stabilize climate and we cannot stabilize population, there is not an ecosystem on Earth that we can save. Everything will change. If developing countries cannot stabilize their populations soon, many of them face the prospect of wholesale ecosystem collapse.[10]

The optimistic side of this dire situation is that the solutions for both climate and population stabilization already exist: **the former** by shifting from fossil fuels to solar/hydrogen based energy sources such as hydropower, wind, wood and sunlight, and **the latter**, even though there is considerable socio-cultural resistance, by implementing reproductive services and education of women in developing countries.[11] The lack of political will has made for slow progress in these areas. Despite this, the public discourse revolves around the themes of sustainability and the solutions integrate many of the themes from the principles discussed earlier.

The sustainability movement, therefore, is in an optimal position to provide the context for this dialogue and act as a catalyst for action. Sustainability provides a common language that links the central issues confronting our civilization. As an organizing principle, sustainability reflects the fundamental relationships that underlie ecological, economic and social concerns.

In this context, sustainability offers the possibility of bringing these social change values into the mainstream and pushing the mainstream towards sustainable practices. Next, we examine the changes beginning to shape our new path.

Seeking an Alternative Path

The sustainability movement's actions would benefit from promoting solution-oriented programs with clear and tangible results. Successful programs in the business arena, for

example, depend on demonstrating economic advantages. Pragmatic tools such as The Natural Step, ecological audits, and life-cycle assessments have proved themselves through savings to companies while safeguarding the environment.

In the political arena, promoting tax credits such as rebates for fuel efficient automobiles and home solar energy systems is a useful tool for fostering energy efficiency and waste reduction. Holding companies accountable for the complete life-cycle of their products also encourages wise resource use and recycling.

In the international arena, exchanges in appropriate technology and environmental restoration programs, between the industrialized nations in the Northern Hemisphere and their developing counterparts in the South, are imperative for improving the lives of people and maintaining healthy ecosystems.

One of the keys in promoting sustainable values is to demonstrate its social advantages. In the developed nations, reducing stress, isolation, and increasing family time are some of the desires of people engulfed by the demands of a fast-paced technocratic society. In developing nations attention to many of the basic needs including food, clean drinking water, housing, and basic healthcare are of paramount importance for a significant portion of the population.

Articulating creative metaphors in discussions about sustainability helps us to visualize and understand complex issues. The human body serves as a powerful metaphor for connecting us to the Earth. In the Tibetan culture, for example, the body's veins and arteries are associated with the streams and rivers — so, when one pollutes a river one is in essence polluting one's own blood supply. This analogy reiterates that what we do to the Earth, we do to ourselves.

The criterion of **quality of life** also provides a viable ethical guideline for policymakers in both the developed and developing world. The Netherlands' green plan, or NEPP4, has adopted the theme of "quality of life" as a way of building a vision from which to make decisions. The highly industrialized Dutch culture lends an important insight to developing nations aspiring to reach a comparable standard of living.

The significance of the Dutch experience involves establishing a role model for the world of an industrial society's commitment to maintain its economic viability, while at the same time taking responsibility for the ecological needs. The Dutch also address social equality concerns by implementing policies that maintain a relatively low disparity in the income distribution of its citizens.

In the NEPP4, the 'quality of life' marker is further defined by individuals seeking: **survival**, **healthy life,** and **meaningful life** with varying effects on sustainability

values. Advancing sustainable development calls for taking individual responsibility for our actions on a broad scope of issues:

> All humans seek to survive, to live healthily and to live meaningfully. This still does not add up to a sustainable life, however. A sustainable life involves more: a realization, for example, that humans are not the only living creatures on the planet and must respect all life. And it involves, for example, the shouldering of responsibilities in a range of different roles: as citizen, as producer, as consumer or as citizen of the world. By bearing responsibility for the social, economic and ecological consequences of our actions both now and later, in the Netherlands and elsewhere, we will bring sustainable development closer.[12]

Playing the role of citizen, producer, consumer, citizen of the world, in the context of sustainable development, highlights the importance of metaphors for inspiring people to rally around sustainable values.[13]

One way to expand the effectiveness of the sustainability movement involves building upon the historic alliances of other social change movements.

Beyond Green — A New Vision of the Future

Historically, successful mobilizations such as the Civil Rights, Peace, and Nuclear Freeze movements established alliances with diverse groups that shared a common interest. In the late 1990s, there has been a remarkable alliance between the labor and environmental movements.

This blue/green alliance demonstrated its broad support and gained the respect of international institutions by voicing its opposition to policies of the World Trade

Organization (WTO) during its meeting in Seattle in November 1999, and the International Monetary Fund (IMF) and the World Bank (WB) in April, 2000.

The labor and environment alliance is but one example that can be repeated with other groups including: business, politics, education, and agriculture. The tremendous marketing power of corporations in selling soft drinks, music, sports activities, etc. could do wonders in promoting sustainable values. The worldwide model of Nike Town centers, for example, which currently promote a wide range of clothing products, could be adopted by sustainability groups as showcases for sustainable technologies. Similarly, the marketing drive which creates mass appeal for toys, television shoes, fast food, music, etc. could be tapped for promoting ecological entrepreneur programs in environmental restoration, education, and green products and services.

In the political arena, the German Green party's success in the 1980s in capturing the sentiment of the people's concern for sustainability issues points to the benefits of a more flexible, inclusive platform willing to work with other sectors of society. By moderately emphasizing the economic and social (in addition to the ecological) factors, perhaps the Green party's values would gain wider support in international political circles.

All these social alliances indicate a shift of sustainable values from the peripheral into the mainstream. Sustainability issues are now seen as important elements in the world of politics, labor, and commerce.

The United Nations Compact[14] signed, albeit hesitantly, on July 26, 2000 by 50 multinationals, 12 labor associations and watchdog groups, legitimizes sustainability concerns and forges a commitment from corporations such as Bayer, DuPont, DaimlerChrysler, Nike, and Royal Dutch-Shell to work in partnership to address human rights, labor, and ecological issues.[15]

Although there has been a recent increase of environmental education programs in schools and universities, a more integrated curricula of sustainability (including themes related to Ecology, Economy and Equality) has yet to be widely adopted by educational institutions.[16] The sustainability movement's expansion of ecological literacy[17] programs would challenge us to understand the relationship between the Earth's systems and our well-being in areas ranging from the water we drink to the food that we eat. Our interdependence with the Earth would be enhanced through an interdisciplinary educational approach that establishes sustainability as the context for all learning.

Remarkable human achievements in the eradication of diseases such as smallpox point to the success of a unified vision backed by international cooperation. The 1987 Montreal Protocol on Substances That Deplete the Ozone Layer[18] represents a similar undertaking

— the successful commitment by the world community in phasing out chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl chloroform, which deplete the ozone layer that protects life on Earth from damaging ultraviolet radiation exposure.

The significant aspect of these events lies in the benefit of **awareness** coupled with **action**. The eradication of these diseases and reduction of CFCs involved an **understanding** of the complex forces at work, a **dream** of the future, and a **strategy** for making the vision a reality.

Now, at this pivotal time of unprecedented change, each and every one of us faces a responsibility for acting on a concerted vision greater than ourselves.

Like the Aboriginal Songlines which act as both a land ethic and compass, the principles of sustainability assist us in navigating through the Songlines of the future, with a united vision grounded on the values of the three E's — Ecology, Economy, Equality plus one — Education.

NOTES

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[16] For further information about efforts to promote sustainability education in colleges and universities see, Second Nature: Education for Sustainability. 25 Jul. 2000 <http://www.secondnature.org>.
[17] For further discussion on ecological literacy, refer to David W. Orr in Bibliography. Also contact: The Center for Ecoliteracy, Berkeley, California, <http://www.ecoliteracy.org>. Also link to: Ecological Literacy, by David W. Orr. An Article Review by Patricia Jane Brown. 12 Jul. 2000 <http://www.tamucc.edu/~whatley/padm5370/read12d.htm>.
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APPENDIX A

Principles of Sustainability

Sustainability and Community

A. The Major Principles from the NEPP[1]

URL: http://www.rri.org/envatlas/europe/netherlands/nl-prin.html#motiv

• **Intergenerational equity**: The current generation is responsible for providing a sustainable environment for the next generation.

• **The precautionary principle**: In light of uncertainties, it is best not to make decisions that may involve serious environmental risks.

• **The standstill principle**: As an absolute minimum, environmental conditions shall not further deteriorate.

• **Abatement at source**: Harmful environmental actions should be prevented at their source.

• **The polluter pays principle**: Internalization of environmental costs through such means as licensing fees or environmental taxes.

• **Use of the best applicable technology** to control pollution and other environmental harms.

• **Prevention** of all unnecessary waste.

• **Isolation, management, and control** of wastes that cannot be processed.

• **Internalization**: Environmental considerations are to be integrated into the actions of all responsible groups.

• **Integrated lifecycle management**: Manufacturers are responsible for all environmental impacts of their products, from manufacture to use to disposal. Waste flows and pollution should be reduced at all stages.

• **Environmental space**: Recognizes a limit to the level of resources each person can consume if society is to be environmentally sustainable. This concept was first introduced by the environmental group Milieudefensie (the Dutch version of Friends of the Earth) and was incorporated into the second NEPP.

B. Principles of Sustainable Development For Minnesota[2]
URL: http://www.mnplan.state.mn.us/cgi-bin/byteserver.pl/pdf/inv-v3.pdf

The Minnesota Round Table on Sustainable Development offers five principles as guideposts along the path of sustainable development. They are:

1. **Global interdependence**. Economic prosperity, ecosystem health, liberty and justice are linked, and our long-term well-being depends on maintaining all four. Local decisions must be informed by their regional and global context.

2. **Stewardship**. Stewardship requires the recognition that we are all caretakers of the environment and economy for the benefit of present and future generations. We must balance the impacts of today's decisions with the needs of future generations.

3. **Conservation**. Minnesotans must maintain essential ecological processes, biological diversity and life-support systems of the environment; harvest renewable resources on a sustainable basis; and make wise and efficient use of our renewable and non-renewable resources.

4. **Indicators**. Minnesotans need to have and use clear goals and measurable indicators based on reliable information to guide public policies and private actions toward long term economic prosperity, community vitality, cultural diversity and healthy ecosystems.

5. **Shared responsibility**. All Minnesotans accept responsibility for sustaining the environment and economy, with each being accountable for his or her decisions and actions, in a spirit of partnership and open cooperation. No entity has the right to shift the costs of its behavior to other individuals, communities, states, nations or future generations. Full-cost accounting is essential for assuring shared responsibility.

C. ORTEE Model Principles[3]
URL: http://www.web.net/ortee/scrp/20/23vision.html

A sustainable community is one which:
1. Recognizes that growth occurs within some limits and is ultimately limited by the carrying capacity of the environment;

2. Values cultural diversity;

3. Has respect for other life forms and supports biodiversity;

4. Has shared values amongst the members of the community (promoted through sustainability education);

5. Employs ecological decision-making (e.g., integration of environmental criteria into all municipal government, business and personal decision-making processes);

6. Makes decisions and plans in a balanced, open and flexible manner that includes the perspectives from the social, health, economic and environmental sectors of the community;

7. Makes best use of local efforts and resources (nurtures solutions at the local level);

8. Uses renewable and reliable sources of energy;

9. Minimizes harm to the natural environment;

10. Fosters activities which use materials in continuous cycles. And, as a result, a sustainable community:

11. Does not compromise the sustainability of other communities (a geographic perspective);

12. Does not compromise the sustainability of future generations by its activities (a temporal perspective).

D. The Earth Charter[4]

URL: http://www.earthcharter.org/draft/charter.htm

Preamble

We stand at a critical moment in Earth's history, a time when humanity must choose its future. As the world becomes increasingly interdependent and fragile, the future at once holds great peril and great promise. To move forward we must recognize that in the midst of a magnificent diversity of cultures and life forms we are one human family and one Earth community with a common destiny. We must join together to bring forth a sustainable global society founded on respect for nature, universal human rights, economic justice, and a culture of peace. Towards this end, it is imperative that we, the peoples of Earth, declare our responsibility to one another, to the greater community of life, and to future generations.

Earth, Our Home

Humanity is part of a vast evolving universe. Earth, our home, is alive with a unique community of life. The forces of nature make existence a demanding and uncertain adventure, but Earth has provided the conditions essential to life's evolution. The resilience of the community of life and the well-being of humanity depend upon preserving a healthy biosphere with all its ecological systems, a rich variety of plants and animals, fertile soils, pure waters, and clean air. The global environment with its finite resources is a common concern of all peoples. The protection of Earth's vitality, diversity, and beauty is a sacred trust.

The Global Situation

The dominant patterns of production and consumption are causing environmental devastation, the depletion of resources, and a massive extinction of species. Communities are being undermined. The benefits of development are not shared equitably and the gap between rich and poor is widening. Injustice, poverty, ignorance, and violent conflict are widespread and the cause of great suffering. An unprecedented rise in human population has overburdened ecological and social systems. The foundations of global security are threatened. These trends are perilous—but not inevitable.

The Challenges Ahead

The choice is ours: form a global partnership to care for Earth and one another or risk the destruction of ourselves and the diversity of life. Fundamental changes are needed in our values, institutions, and ways of living. We must realize that when basic needs have been met, human development is primarily about being more, not having more. We have the knowledge and technology to provide for all and to reduce our impacts on the environment. The emergence of a global civil society is creating new opportunities to build a democratic and humane world. Our environmental, economic, political, social, and spiritual challenges are interconnected, and together we can forge inclusive solutions.

Universal Responsibility

To realize these aspirations, we must decide to live with a sense of universal responsibility, identifying ourselves with the whole Earth community as well as our local communities. We are at once citizens of different nations and of one world in which the local and global are linked. Everyone shares responsibility for the present and future well-being of the human family and the larger living world. The spirit of human solidarity and kinship with all life is strengthened when we live with reverence for the mystery of being, gratitude for the gift of life, and humility regarding the human place in nature.

We urgently need a shared vision of basic values to provide an ethical foundation for the emerging world community. Therefore, together in hope we affirm the following interdependent principles for a sustainable way of life as a common standard by which the conduct of all individuals, organizations, businesses, governments, and transnational institutions is to be guided and assessed.

Principles

I. Respect and Care for the Community of Life

1. Respect Earth and life in all its diversity.

a. Recognize that all beings are interdependent and every form of life has value regardless of its worth to human beings.

b. Affirm faith in the inherent dignity of all human beings and in the intellectual, artistic, ethical, and spiritual potential of humanity.

2. Care for the community of life with understanding, compassion, and love.

a. Accept that with the right to own, manage, and use natural resources comes the duty to prevent environmental harm and to protect the rights of people.
b. Affirm that with increased freedom, knowledge, and power comes increased responsibility to promote the common good.

3. Build democratic societies that are just, participatory, sustainable, and peaceful.

a. Ensure that communities at all levels guarantee human rights and fundamental freedoms and provide everyone an opportunity to realize his or her full potential.
b. Promote social and economic justice, enabling all to achieve a secure and meaningful livelihood that is ecologically responsible.

4. Secure Earth's bounty and beauty for present and future generations.

a. Recognize that the freedom of action of each generation is qualified by the needs of future generations.
b. Transmit to future generations values, traditions, and institutions that support the long-term flourishing of Earth's human and ecological communities.

In order to fulfill these four broad commitments, it is necessary to:

II. Ecological Integrity

5. Protect and restore the integrity of Earth's ecological systems, with special concern for biological diversity and the natural processes that sustain life.

a. Adopt at all levels sustainable development plans and regulations that make environmental conservation and rehabilitation integral to all development initiatives.
b. Establish and safeguard viable nature and biosphere reserves, including wild lands and marine areas, to protect Earth's life support systems, maintain biodiversity, and preserve our natural heritage.
c. Promote the recovery of endangered species and ecosystems.
d. Control and eradicate non-native or genetically modified organisms harmful to native species and the environment, and prevent introduction of such harmful organisms.
e. Manage the use of renewable resources such as water, soil, forest products, and marine life in ways that do not exceed rates of regeneration and that protect the health of ecosystems.
f. Manage the extraction and use of non-renewable resources such as minerals and fossil fuels in ways that minimize depletion and cause no serious environmental damage.

6. Prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach.

a. Take action to avoid the possibility of serious or irreversible environmental harm even when scientific knowledge is incomplete or inconclusive.
b. Place the burden of proof on those who argue that a proposed activity will not cause significant harm, and make the responsible parties liable for environmental harm.
c. Ensure that decision making addresses the cumulative, long-term, indirect, long distance, and global consequences of human activities.
d. Prevent pollution of any part of the environment and allow no build-up of radioactive, toxic, or other hazardous substances.
e. Avoid military activities damaging to the environment.

7. Adopt patterns of production, consumption, and reproduction that safeguard Earth's regenerative capacities, human rights, and community well-being.

a. Reduce, reuse, and recycle the materials used in production and consumption systems, and ensure that residual waste can be assimilated by ecological systems.
b. Act with restraint and efficiency when using energy, and rely increasingly on renewable energy sources such as solar and wind.
c. Promote the development, adoption, and equitable transfer of environmentally sound technologies.
d. Internalize the full environmental and social costs of goods and services in the selling price, and enable consumers to identify products that meet the highest social and environmental standards.
e. Ensure universal access to health care that fosters reproductive health and responsible reproduction.
f. Adopt lifestyles that emphasize the quality of life and material sufficiency in a finite world.

8. Advance the study of ecological sustainability and promote the open exchange and wide application of the knowledge acquired.

a. Support international scientific and technical cooperation on sustainability, with special attention to the needs of developing nations.
b. Recognize and preserve the traditional knowledge and spiritual wisdom in all cultures that contribute to environmental protection and human well-being.
c. Ensure that information of vital importance to human health and environmental protection, including genetic information, remains available in the public domain.

III. Social and Economic Justice

9. Eradicate poverty as an ethical, social, and environmental imperative.

a. Guarantee the right to potable water, clean air, food security, uncontaminated soil, shelter, and safe sanitation, allocating the national and international resources required.
b. Empower every human being with the education and resources to secure a sustainable livelihood, and provide social security and safety nets for those who are unable to support themselves.
c. Recognize the ignored, protect the vulnerable, serve those who suffer, and enable them to develop their capacities and to pursue their aspirations.

10. Ensure that economic activities and institutions at all levels promote human development in an equitable and sustainable manner.

a. Promote the equitable distribution of wealth within nations and among nations.
b. Enhance the intellectual, financial, technical, and social resources of developing nations, and relieve them of onerous international debt.

c. Ensure that all trade supports sustainable resource use, environmental protection, and progressive labor standards.
d. Require multinational corporations and international financial organizations to act transparently in the public good, and hold them accountable for the consequences of their activities.

11. Affirm gender equality and equity as prerequisites to sustainable development and ensure universal access to education, health care, and economic opportunity.

a. Secure the human rights of women and girls and end all violence against them.
b. Promote the active participation of women in all aspects of economic, political, civil, social, and cultural life as full and equal partners, decision makers, leaders, and beneficiaries.
c. Strengthen families and ensure the safety and loving nurture of all family members.

12. Uphold the right of all, without discrimination, to a natural and social environment supportive of human dignity, bodily health, and spiritual well-being, with special attention to the rights of indigenous peoples and minorities.

a. Eliminate discrimination in all its forms, such as that based on race, color, sex, sexual orientation, religion, language, and national, ethnic or social origin.
b. Affirm the right of indigenous peoples to their spirituality, knowledge, lands and resources and to their related practice of sustainable livelihoods.
c. Honor and support the young people of our communities, enabling them to fulfill their essential role in creating sustainable societies.
d. Protect and restore outstanding places of cultural and spiritual significance.

IV. Democracy, Nonviolence and Peace

13. Strengthen democratic institutions at all levels, and provide transparency and accountability in governance, inclusive participation in decision making, and access to justice.

a. Uphold the right of everyone to receive clear and timely information on environmental matters and all development plans and activities which are likely to affect them or in which they have an interest.
b. Support local, regional and global civil society, and promote the meaningful participation of all interested individuals and organizations in decision making.
c. Protect the rights to freedom of opinion, expression, peaceful assembly, association, and dissent.
d. Institute effective and efficient access to administrative and independent judicial procedures, including remedies and redress for environmental harm and the threat of such harm.
e. Eliminate corruption in all public and private institutions.

f. Strengthen local communities, enabling them to care for their environments, and assign environmental responsibilities to the levels of government where they can be carried out most effectively.

14. Integrate into formal education and life-long learning the knowledge, values, and skills needed for a sustainable way of life.

a. Provide all, especially children and youth, with educational opportunities that empower them to contribute actively to sustainable development.
b. Promote the contribution of the arts and humanities as well as the sciences in sustainability education.
c. Enhance the role of the mass media in raising awareness of ecological and social challenges.
d. Recognize the importance of moral and spiritual education for sustainable living.

15. Treat all living beings with respect and consideration.

a. Prevent cruelty to animals kept in human societies and protect them from suffering.
b. Protect wild animals from methods of hunting, trapping, and fishing that cause extreme, prolonged, or avoidable suffering.
c. Avoid or eliminate to the full extent possible the taking or destruction of non-targeted species.

16. Promote a culture of tolerance, nonviolence, and peace.

a. Encourage and support mutual understanding, solidarity, and cooperation among all peoples and within and among nations.
b. Implement comprehensive strategies to prevent violent conflict and use collaborative problem solving to manage and resolve environmental conflicts and other disputes.
c. Demilitarize national security systems to the level of a non-provocative defense posture, and convert military resources to peaceful purposes, including ecological restoration.
d. Eliminate nuclear, biological, and toxic weapons and other weapons of mass destruction.
e. Ensure that the use of orbital and outer space supports environmental protection and peace.
f. Recognize that peace is the wholeness created by right relationships with oneself, other persons, other cultures, other life, Earth, and the larger whole of which all are a part.

The Way Forward

As never before in history, common destiny beckons us to seek a new beginning. Such renewal is the promise of these Earth Charter principles. To fulfill this promise, we must commit ourselves to adopt and promote the values and objectives of the Charter.

This requires a change of mind and heart. It requires a new sense of global interdependence and universal responsibility. We must imaginatively develop and apply the vision of a

sustainable way of life locally, nationally, regionally, and globally. Our cultural diversity is a precious heritage and different cultures will find their own distinctive ways to realize the vision. We must deepen and expand the global dialogue that generated the Earth Charter, for we have much to learn from the ongoing collaborative search for truth and wisdom.

Life often involves tensions between important values. This can mean difficult choices. However, we must find ways to harmonize diversity with unity, the exercise of freedom with the common good, short-term objectives with long-term goals. Every individual, family, organization, and community has a vital role to play. The arts, sciences, religions, educational institutions, media, businesses, nongovernmental organizations, and governments are all called to offer creative leadership. The partnership of government, civil society, and business is essential for effective governance.

In order to build a sustainable global community, the nations of the world must renew their commitment to the United Nations, fulfill their obligations under existing international agreements, and support the implementation of Earth Charter principles with an international legally binding instrument on environment and development.

Let ours be a time remembered for the awakening of a new reverence for life, the firm resolve to achieve sustainability, the quickening of the struggle for justice and peace, and the joyful celebration of life.

Sustainability and Commerce

A. Wingspread Statement on the Precautionary Principle[5]

URL: http://www.wajones.org/wingcons.html

The release and use of toxic substances, resource exploitation, and physical alterations of the environment have had substantial unintended consequences on human health and the environment. Some of these concerns are high rates of learning deficiencies, asthma, cancer, birth defects and species extinctions; along with global climate change, stratospheric ozone depletion; and worldwide contamination with toxic substances and nuclear materials.

We believe existing environmental regulations and other decisions, particularly those based on risk assessment, have failed to adequately protect human health and the environment, as well as the larger system of which humans are but a part.

While we realize that human activities may involve hazards, people must proceed more carefully than has been the case in recent history. Corporations, government entities,

organizations, communities, scientists and other individuals must adopt a precautionary approach to all human endeavors.

Therefore it is necessary to implement the Precautionary Principle: Where an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public bears the burden of proof.

The process of applying the Precautionary Principle must be open, informed and democratic, and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action.

B. The Natural Step's Four System Conditions[6]
URL: http://www.naturalstep.org/what/what_cond.html

1. In order for a society to be sustainable, nature's functions and diversity are not systematically subject to increasing concentrations of substances extracted from the earth's crust.

In a sustainable society, human activities such as the burning of fossil fuels, and the mining of metals and minerals will not occur at a rate that causes them to systematically increase in the ecosphere. There are threshholds beyond which living organisms and ecosystems are adversely affected by increases in substances from the earth's crust. Problems may include an increase in greenhouse gases leading to global warming, contamination of surface and ground water, and metal toxicity which can cause functional disturbances in animals. In practical terms, the first condition requires society to implement comprehensive metal and mineral recycling programs, and decrease economic dependence on fossil fuels.

2. In order for a society to be sustainable, nature's functions and diversity are not systematically subject to increasing concentrations of substances produced by society.

In a sustainable society, humans will avoid generating systematic increases in persistent substances such as DDT, PCBs, and freon. Synthetic organic compounds such as DDT and PCBs can remain in the environment for many years, bioaccumulating in the tissue of organisms, causing profound deleterious effects on predators in the upper levels of the food chain. Freon, and other ozone depleting compounds, may increase risk of cancer due

to added UV radiation in the troposphere. Society needs to find ways to reduce economic dependence on persistent human-made substances.

3. In order for a society to be sustainable, nature's functions and diversity are not systematically impoverished by physical displacement, overharvesting or other forms of ecosystem manipulation.

In a sustainable society, humans will avoid taking more from the biosphere than can be replenished by natural systems. In addition, people will avoid systematically encroaching upon nature by destroying the habitat of other species. Biodiversity, which includes the great variety of animals and plants found in nature, provides the foundation for ecosystem services which are necessary to sustain life on this planet. Society's health and prosperity depends on the enduring capacity of nature to renew itself and rebuild waste into resources.

4. In a sustainable society resources are used fairly and efficiently in order to meet basic human needs globally.

Meeting the fourth system condition is a way to avoid violating the first three system conditions for sustainability. Considering the human enterprise as a whole, we need to be efficient with regard to resource use and waste generation in order to be sustainable. If one billion people lack adequate nutrition while another billion have more than they need, there is a lack of fairness with regard to meeting basic human needs. Achieving greater fairness is essential for social stability and the cooperation needed for making large-scale changes within the framework laid out by the first three conditions.

To achieve this fourth condition, humanity must strive to improve technical and organizational efficiency around the world, and to live using fewer resources, especially in affluent areas. System condition number four implies an improved means of addressing human population growth. If the total resource throughput of the global human population continues to increase, it will be increasingly difficult to meet basic human needs as human-driven processes intended to fulfill human needs and wants are systematically degrading the collective capacity of the Earth's ecosystems to meet these demands.

C. Houston Principles of the Alliance for Sustainable Jobs and the Environment[7]
URL: http://csf.colorado.edu/bioregional/99/msg00311.html

Preamble:
On May 19, 1999, environmental and labor leaders confronted CEO Charles Hurwitz in Houston to demand that his Maxxam Corporation, which owns Kaiser Aluminum and Pacific Lumber Company, be held accountable for its impact on working people, communities and the environment.

By clear-cutting ancient redwoods in Northern California, and by locking-out striking steelworkers in five cities, the Maxxam corporation has become an icon of corporate irresponsibility.

Recognizing that we have a common interest in making corporations more accountable for their behavior world-wide, environmental and labor leaders have formed the Alliance for Sustainable Jobs and the Environment and circulated the following statement, dubbed the "Houston Principles".

Whereas:
The spectacular accumulation of wealth by corporations and America's most affluent during the past two decades has come with a huge price tag.

Corporations have become more powerful than the government entities designed to regulate them.

The goal of a giant, global corporation is to maximize wealth and to wield political power on its own behalf. Too often, corporate leaders regard working people, communities, and the natural world as resources to be used and thrown away.

Recognizing the tremendous stakes, labor unions and environmental advocates are beginning to recognize our common ground. Together we can challenge illegitimate corporate authority over our country's and communities' governing decisions.

While we may not agree on everything, we are determined to accelerate our efforts to make alliances as often as possible.

We believe that:
A healthy future for the economy and the environment requires a dynamic alliance between labor, management, and environmental advocates.

The same forces that threaten economic and biological sustainability undermine the democratic process.

The drive for short-term profits without regard for long-term sustainability hurts working people, communities, and the earth.

Labor, environmental and community groups need to take action to organize as a counter-balance to abusive corporate power.

The environmental and labor advocates who have signed these principles resolve to work together to:
Remind the public that the original purpose behind the creation of corporations was to serve the public interest - namely working people, communities, and the earth.

Seek stricter enforcement of labor laws and advocate for new laws to guarantee working people their right to form unions and their right to bargain collectively.

Make workplaces, communities and the planet safer by reducing waste and greenhouse gas emissions.

Demand that global trade agreements include enforceable labor and environmental standards.

Promote forward-thinking business models that allow for sustainability over the long term while protecting working people, communities, and the environment.

This ground-breaking alliance of labor and environmentalists invites all people to join with us in a spirit of creative cooperation. Together, we can forge a partnership that protects people and the planet.

D. The CERES Principles[8]

URL: http://www.ceres.org/about/principles.html

Endorsing Company Statement
By adopting these Principles, we publicly affirm our belief that corporations have a responsibility for the environment, and must conduct all aspects of their business as responsible stewards of the environment by operating in a manner that protects the Earth. We believe that corporations must not compromise the ability of future generations to sustain themselves.

We will update our practices constantly in light of advances in technology and new understandings in health and environmental science. In collaboration with CERES, we will promote a dynamic process to ensure that the Principles are interpreted in a way that

accommodates changing technologies and environmental realities. We intend to make consistent, measurable progress in implementing these Principles and to apply them to all aspects of our operations throughout the world.

The CERES Principles

Protection of the Biosphere
We will reduce and make continual progress toward eliminating the release of any substance that may cause environmental damage to the air, water, or the earth or its inhabitants. We will safeguard all habitats affected by our operations and will protect open spaces and wilderness, while preserving biodiversity.

Sustainable Use of Natural Resources
We will make sustainable use of renewable natural resources, such as water, soils and forests. We will conserve non-renewable natural resources through efficient use and careful planning.

Reduction and Disposal of Wastes
We will reduce and where possible eliminate waste through source reduction and recycling. All waste will be handled and disposed of through safe and responsible methods.

Energy Conservation
We will conserve energy and improve the energy efficiency of our internal operations and of the goods and services we sell. We will make every effort to use environmentally safe and sustainable energy sources.

Risk Reduction
We will strive to minimize the environmental, health and safety risks to our employees and the communities in which we operate through safe technologies, facilities and operating procedures, and by being prepared for emergencies.

Safe Products and Services
We will reduce and where possible eliminate the use, manufacture or sale of products and services that cause environmental damage or health or safety hazards. We will inform our customers of the environmental impacts of our products or services and try to correct unsafe use.

Environmental Restoration
We will promptly and responsibly correct conditions we have caused that endanger health, safety or the environment. To the extent feasible, we will redress injuries we have caused to persons or damage we have caused to the environment and will restore the environment.

Informing the Public
We will inform in a timely manner everyone who may be affected by conditions caused by our company that might endanger health, safety or the environment. We will regularly seek advice and counsel through dialogue with persons in communities near our facilities. We will not take any action against employees for reporting dangerous incidents or conditions to management or to appropriate authorities.

Management Commitment
We will implement these Principles and sustain a process that ensures that the Board of Directors and Chief Executive Officer are fully informed about pertinent environmental issues and are fully responsible for environmental policy. In selecting our Board of Directors, we will consider demonstrated environmental commitment as a factor.

Audits and Reports
We will conduct an annual self-evaluation of our progress in implementing these Principles. We will support the timely creation of generally accepted environmental audit procedures. We will annually complete the CERES Report, which will be made available to the public.

Disclaimer
These Principles establish an environmental ethic with criteria by which investors and others can assess the environmental performance of companies. Companies that endorse these Principles pledge to go voluntarily beyond the requirements of the law. The terms "may" and "might" in Principles one and eight are not meant to encompass every imaginable consequence, no matter how remote. Rather, these Principles obligate endorsers to behave as prudent persons who are not governed by conflicting interests and who possess a strong commitment to environmental excellence and to human health and safety. These Principles are not intended to create new legal liabilities, expand existing rights or obligations, waive legal defenses, or otherwise affect the legal position of any endorsing company, and are not intended to be used against an endorser in any legal proceeding for any purpose.

Sustainability and Resource Extraction

A. American Petroleum Institute's Environmental, Health and Safety Mission and Guiding Principles[9]

URL: http://www.api.org/step/principl.htm

Mission:
The members of the American Petroleum Institute are dedicated to continuous efforts to improve the compatibility of our operations with the environment while economically developing energy resources and supplying high quality products and services to consumers. We recognize our responsibility to work with the public, the government, and others to develop and to use natural resources in an environmentally sound manner while protecting the health and safety of our employees and the public. To meet these responsibilities, API members pledge to manage our businesses according to the following principles using sound science to priortize risks and to implement cost-effective management practices:

Principles:
To recognize and to respond to community concerns about our raw materials, products and operations.

To operate our plants and facilities, and to handle our raw materials and products in a manner that protects the environment, and the safety and health of our employees and the public.

To make safety, health and environmental considerations a priority in our planning, and our development of new products and processes.

To advise promptly, appropriate officials, employees, customers and the public of information on significant industry-related safety, heath and environmental hazards, and to recommend protective measures.

To counsel customers, transporters and others in the safe use, transportation and disposal of our raw materials, products and waste materials.

To economically develop and produce natural resources and to conserve those resources by using energy efficiently.

To extend knowledge by conducting or supporting research on the safety, health and environmental effects of our raw materials, products, processes and waste materials.

To commit to reduce overall emission and waste generation.

To work with others to resolve problems created by handling and disposal of hazardous substances from our operations.

To participate with government and others in creating responsible laws, regulations and standards to safeguard the community, workplace and environment. To promote these principles and practices by sharing experiences and offering assistance to others who

produce, handle, use, transport or dispose of similar raw materials, petroleum products and wastes.

B. Forestcare Guiding Principles[10]
URL: **http://www.abforestprod.org/issue/forestcare**

1.Member companies will ensure that harvest levels do not exceed the capacity of the forest, that all harvested areas are reforested, and that harvest and reforestation methods foster a healthy new forest, supporting a diversity of species.

2.Member companies will manage their activities on forest lands for multiple uses and values, including timber growth and harvest, watershed protection, wildlife and aquatic habitat and recreational and aesthetic benefits.

3.Member companies will manage their forest and manufacturing operations in a manner that protects the environment, placing special emphasis on the quality of air, water, soil and habitat.

4.Member companies will operate in a manner that protects the health and safety of employees, contractors and the general public.

5.Member companies will be open and responsive to community views and questions regarding the industry.

6.Member companies will conduct operations to ensure that the renewable forest resource provides economic activity and employment now and in the future, while conserving other forest values.

C. Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries General Principles[11]
URL: http://www.fao.org/waicent/faoinfo/fishery/agreem/codecond/ficondef.htm#6

6.1 States and users of living aquatic resources should conserve aquatic ecosystems. The right to fish carries with it the obligation to do so in a responsible manner so as to ensure effective conservation and management of the living aquatic resources.

6.2 Fisheries management should promote the maintenance of the quality, diversity and availability of fishery resources in sufficient quantities for present and future generations in the context of food security, poverty alleviation and sustainable development.

Management measures should not only ensure the conservation of target species but also of species belonging to the same ecosystem or associated with or dependent upon the target species.

6.3 States should prevent overfishing and excess fishing capacity and should implement management measures to ensure that fishing effort is commensurate with the productive capacity of the fishery resources and their sustainable utilization. States should take measures to rehabilitate populations as far as possible and when appropriate.

6.4 Conservation and management decisions for fisheries should be based on the best scientific evidence available, also taking into account traditional knowledge of the resources and their habitat, as well as relevant environmental, economic and social factors. States should assign priority to undertake research and data collection in order to improve scientific and technical knowledge of fisheries including their interaction with the ecosystem. In recognizing the transboundary nature of many aquatic ecosystems, States should encourage bilateral and multilateral cooperation in research, as appropriate.

6.5 States and subregional and regional fisheries management organizations should apply a precautionary approach widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment, taking account of the best scientific evidence available. The absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species and non-target species and their environment.

6.6 Selective and environmentally safe fishing gear and practices should be further developed and applied, to the extent practicable, in order to maintain biodiversity and to conserve the population structure and aquatic ecosystems and protect fish quality. Where proper selective and environmentally safe fishing gear and practices exist, they should be recognized and accorded a priority in establishing conservation and management measures for fisheries. States and users of aquatic ecosystems should minimize waste, catch of non-target species, both fish and non-fish species, and impacts on associated or dependent species.

6.7 The harvesting, handling, processing and distribution of fish and fishery products should be carried out in a manner which will maintain the nutritional value, quality and safety of the products, reduce waste and minimize negative impacts on the environment.

6.8 All critical fisheries habitats in marine and fresh water ecosystems, such as wetlands, mangroves, reefs, lagoons, nursery and spawning areas, should be protected and rehabilitated as far as possible and where necessary. Particular effort should be made to protect such habitats from destruction, degradation, pollution and other significant

impacts resulting from human activities that threaten the health and viability of the fishery resources.

6.9 States should ensure that their fisheries interests, including the need for conservation of the resources, are taken into account in the multiple uses of the coastal zone and are integrated into coastal area management, planning and development.

6.10 Within their respective competences and in accordance with international law, including within the framework of subregional or regional fisheries conservation and management organizations or arrangements, States should ensure compliance with and enforcement of conservation and management measures and establish effective mechanisms, as appropriate, to monitor and control the activities of fishing vessels and fishing support vessels.

6.11 States authorizing fishing and fishing support vessels to fly their flags should exercise effective control over those vessels so as to ensure the proper application of this Code. They should ensure that the activities of such vessels do not undermine the effectiveness of conservation and management measures taken in accordance with international law and adopted at the national, subregional, regional or global levels. States should also ensure that vessels flying their flags fulfil their obligations concerning the collection and provision of data relating to their fishing activities.

6.12 States should, within their respective competences and in accordance with international law, cooperate at subregional, regional and global levels through fisheries management organizations, other international agreements or other arrangements to promote conservation and management, ensure responsible fishing and ensure effective conservation and protection of living aquatic resources throughout their range of distribution, taking into account the need for compatible measures in areas within and beyond national jurisdiction.

6.13 States should, to the extent permitted by national laws and regulations, ensure that decision making processes are transparent and achieve timely solutions to urgent matters. States, in accordance with appropriate procedures, should facilitate consultation and the effective participation of industry, fishworkers, environmental and other interested organizations in decision making with respect to the development of laws and policies related to fisheries management, development, international lending and aid.

6.14 International trade in fish and fishery products should be conducted in accordance with the principles, rights and obligations established in the World Trade Organization (WTO) Agreement and other relevant international agreements. States should ensure that their policies, programmes and practices related to trade in fish and fishery products do not result in obstacles to this trade, environmental degradation or negative social, including nutritional, impacts.

6.15 States should cooperate in order to prevent disputes. All disputes relating to fishing activities and practices should be resolved in a timely, peaceful and cooperative manner, in accordance with applicable international agreements or as may otherwise be agreed between the parties. Pending settlement of a dispute, the States concerned should make every effort to enter into provisional arrangements of a practical nature which should be without prejudice to the final outcome of any dispute settlement procedure.

6.16 States, recognising the paramount importance to fishers and fishfarmers of understanding the conservation and management of the fishery resources on which they depend, should promote awareness of responsible fisheries through education and training. They should ensure that fishers and fishfarmers are involved in the policy formulation and implementation process, also with a view to facilitating the implementation of the Code.

6.17 States should ensure that fishing facilities and equipment as well as all fisheries activities allow for safe, healthy and fair working and living conditions and meet internationally agreed standards adopted by relevant international organizations.

6.18 Recognizing the important contributions of artisanal and small- scale fisheries to employment, income and food security, States should appropriately protect the rights of fishers and fishworkers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to a secure and just livelihood, as well as preferential access, where appropriate, to traditional fishing grounds and resources in the waters under their national jurisdiction.

6.19 States should consider aquaculture, including culture-based fisheries, as a means to promote diversification of income and diet. In so doing, States should ensure that resources are used responsibly and adverse impacts on the environment and on local communities are minimized.

D. The Asilomar Declaration for Sustainable Agriculture[12]

URL: http://www.mtn.org/iasa/asilo.htm

The present system for American agriculture cannot long endure. Our farms have succeeded in producing abundant food and fiber. But the costs and fragility of that success are becoming each day more evident.

Sustainable alternatives already prove their value. Not only are they more efficient in their use of energy, biological sources of fertility and pest management, they also enhance rural communities and encourage families to remain on the land. We commit ourselves to

hastening the broad adoption of an agriculture that is ecologically sound, economically viable, fair, and humane.

A sustainable agriculture will require and support a sustainable society. Our challenge is [to] meet human needs without denying our decendants' birthright to the natural inheritance of this planet. We must revere the earth, sustaining and regenerating both nature and our communities. People are a part of nature, not separate from it. Sustainable agriculture is as attainable as it is necessary. Though we recognize difficulties in this transformation, we can state with confidence that in every region there are farm families profitably growing healthy food through a practical partnership with nature.

A sustainable agriculture that provides nourishing food, protects those who work the land, helps stabilize the earth's climate, and safeguards soil and water depends on our ability to meet a number of challenges. We must address those challenges without delay.

Seven Challenges

Promote and sustain healthy rural communities.
Healthy rural communities are attractive and equitable for farmers, farm workers, and their families. The continuation of traditional values and farming wisdom depends on a stable, multi-generational population. Absentee or corporate land ownership and the ever-increasing size of farms diminish rural life.

Expand opportunities for new and existing farmers to prosper using sustainable systems.
We must devise ways to help people get started in sustainable farming. Reliable information on sustainable agriculture needs to be readily available to farmers, extension agents, bankers, and others. Training and apprenticeship programs should be provided for entry-level farmers and established conventional farmers interested in making the transition. Tax forgiveness and other incentives should be devised to ease the financial stress of new and transitional farmers.

Inspire the public to value safe and healthy food.
The biological quality of food is known to affect the health and well-being of those who eat it. Food quality is a key factor in disease prevention. Approaches which are striving to be sustainable -- such as organic farming -- avoid hazardous pesticide use and maintain nutrient balance. Consumers' understanding of these facts will increase their willingness to pay prices that reflect the true costs of production.

Foster an ethic of land stewardship and humanness in the treatment of farm animals.

Sustainable agriculture recognizes that the gifts of nature upon which it depends -- soil, water, plants, animals, both wild and domestic -- are to be treated with loving care and humility. The greatest calling of the farmer is to leave those gifts in better condition than when they were received. Such a responsible agriculture can only be achieved when nature is both mentor and model, and when natural systems are the standard against which success is measured. Farm animals often contribute to ecologically sound agricultural systems and they deserve human care.

Expand knowledge access to information about sustainable agriculture.
American farmers are innovators. Given scientifically validated techniques, farmers will adopt sustainable agricultural practices. Seeing these practices in the field will speed adoption. We need demonstration farms, farmer-to-farmer field tours, and studies of alternative farms of all sizes. University teaching, research, and extension must be redirected toward understanding the whole farm ecology and away from chemical dependence in farm management.

Reform the relationship among government, industry, and agriculture.
Government must use resources such as subsidies, grants, and loans to convert significant portions of industrial agriculture to a sustainable system. Undue rewards to concentrated interests should be replaced with fair returns to farmers who sustainably provide food and fiber.

Redefine the role of U.S. agriculture in the global community.
The present global agriculture trade is placing unnecessary pressures on the sustainability of the earth's resource base. The United States has a unique opportunity to change that situation. The people of many other countries look to us for agricultural leadership. We can honor that respect by restricting our trade in dangerous substances. We can encourage the Agency for International Development, The World Bank, and international research institutions to convert to sustainable programs. The international programs of universities can become centers of sustainability training and research.

Sustainability and Ecological Design

A. The Hannover Principles[13]

URL: http://repo-nt.tcc.virginia.edu/classes/tcc315/Resources/ALM/Environment/hannover.html

1. Insist on rights of humanity and nature to co-exist in a healthy, supportive, diverse and sustainable condition.

2. Recognize interdependence. The elements of human design interact with and depend upon the natural world, with broad and diverse implications at every scale. Expand design considerations to recognizing even distant effects.

3. Respect relationships between spirit and matter. Consider all aspects of human settlement including community, dwelling, industry and trade in terms of existing and evolving connections between spiritual and material consciousness.

4. Accept responsibility for the consequences of design decisions upon human well-being, the viability of natural systems and their right to co-exist.

5. Create safe objects of long-term value. Do not burden future generations with requirements for maintenance or vigilant administration of potential danger due to the careless creation of products, processes or standards.

6. Eliminate the concept of waste. Evaluate and optimize the full life-cycle of products and processes, to approach the state of natural systems, in which there is no waste.

7. Rely on natural energy flows. Human designs should, like the living world, derive their creative forces from perpetual solar income. Incorporate this energy efficiently and safely for responsible use.

8. Understand the limitations of design. No human creation lasts forever and design does not solve all problems. Those who create and plan should practice humility in the face of nature. Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled.

9. Seek constant improvement by the sharing of knowledge. Encourage direct and open communication between colleagues, patrons, manufacturers and users to link long term sustainable considerations with ethical responsibility, and re-establish the integral relationship between natural processes and human activity.

The Hannover Principles should be seen as a living document committed to the transformation and growth in the understanding of our interdependence with nature, so that they may adapt as our knowledge of the world evolves.

B. EDI's Five Principles of Ecological Design[14]

1. Solutions grow from place. Ecological design begins with the intimate knowledge of a place. It is small scale and direct, responsive to local conditions and people. If we are sensitive to the nuances of place, we can inhabit without destroying

2. Make nature visible. Making natural cycles and processes visible brings the design environment back to life. Effective design helps inform us of our place within nature

3. Design with nature. By working with living processes, we respect the needs of all species. Engaging processes that regenerate rather than deplete, we become more alive. Making natural cycles and processes more visible brings the designed environment back to life. Effective design helps inform us of our place within nature.

4. Ecological accounting informs design. Trace the environmental impacts of design and use this information to determine the ecologically sound design possibilities.

5. Everyone is a designer. Listen to every voice in the design process. As people work together to heal their places, they also heal themselves.

C. Principles of Ecological Design[15]

Emerging precepts of biological design:

1. The living world is the matrix for all design.

2. Design should follow, not oppose the laws of life.

3. Biological equity must determine design.

4. Design must reflect bioregionality.

5. Projects should be based on renewable energy sources.

6. Design should be sustainable through the integration of living systems.

7. Design should be coevolutionary with the natural world.

D. The Sandborn Principles[16]

URL: http://iisd.ca/sd/principle.asp?pid=3&display=1

1. Healthy Indoor Environments for Occupants
Create a living environment that will be healthy for all its occupants.
Buildings shall be of appropriate human scale.

In a non-sterile, aesthetically pleasing environment.

Building design will respond to:
— Toxicity of materials
— EMF
— Lighting efficiency and quality
— Comfort requirements
— Attention to the Principles of Feng Shui

2. Ecologically Healthy
The design of human habitat shall recognize that all resources are limited and will respond to the patterns of the natural ecology.

Land plans and building designs will include only those technologies with the least disruptive impact upon the natural ecology of the earth.

Density must be most intense near neighborhood centers where facilities are most accessible.

Buildings will be organic, integrate art, natural materials, sunlight, green plants, water, energy efficiency, low noise levels, and will not cost more than current conventional buildings.

The Features of Buildings and Their Surroundings Will Include:

— No waste that cannot be assimilated.
— Thermal Passivity (Responsiveness)
— Reflective Surfaces
— Junglified surroundings
— Access by foot to primary services
— Natural corridors for wildlife
— Individual community gardens
— Local agriculture for local consumption

3. Socially Just
Habitats shall be equally accessible across economic classes.

4. Culturally Creative
Habitats will allow ethnic groups to maintain individual cultural identities and neighborhoods, while integrating into the larger community.

All population groups shall have access to art, theater, and music.

5. Beautiful

6. Physically and Economically Accessible
All sites within the habitat shall be accessible and rich in resources to those living within walkable (wheelchair-able) distance.

Accessible characteristics shall include:
— Radical traffic calming
— Clean, accessible, economical mass transit
— Bicycle paths
— Small neighborhood service businesses
— Places to go where the chances of accidental meeting are high (parks, playgrounds, cafes, sports centers)

7. Evolutionary
Habitats design shall include continuous re-evaluation of premises and values.
Shall be demographically responsive and
Flexible to change over time to support future user needs.

Sustainability and The Biosphere

A. Deep Ecology's Basic Principles[17]
URL: http://www.fi.muni.cz/~imladris/zelena/deep.html.cz.us~ascii

1. The well being and flourishing of human and non-human life on earth have a value in themselves. These values are independent of the usefulness of the non-human world for human purposes.
2. The richness and diversity of life forms contribute to the realization of these values and are also values in themselves.
3. Humans have no right to reduce this richness and diversity except to satisfy **vital** needs.
4. The flourishing of human life and cultures is compatible with a substantial decrease of the human population. The flourishing of nonhuman life requires such a decrease.
5. Present human interference with the nonhuman world is excessive and the situation is rapidly worsening.
6. Policies must therefore be changed. These policies affect the basic economic, technological and ideological structures, the resulting state of affairs will be deeply different from the present.
7. The ideological change is mainly that of appreciating **life quality** (dwelling in situations of inherent value) rather than adhering to an increasing higher standard of living. There will be a profound difference between big and great.

8. Those who subscribe to the foregoing points have an obligation to directly or indirectly to try to implement the necessary changes.

B. Charter of Rights for the Environment: Twelve Principles[18]
URL: http://iisd1.iisd.ca/sd/principle.asp?pid=26&display=1

By Ann Dale, Sustainable Development Research Institute

The 1990s have been characterized by many environmentalists as the "Turn-Around Decade"; turn-around in the sense that if decisions are not made and acted upon now about how to live more sustainably in this decade, a threshold of irreversibility will be reached, and options for future generations foreclosed.

Although there is a growing consensus about the magnitude and nature of the problems, there is still intense debate about the priorities among the issues. Moreover, since the release of the 1987 UN Brundtland Report (Our Common Future) and the subsequent introduction of the term "sustainable development" into everyday language, there has been extensive dialogue in this country about the type of policy instruments to employ and the relative degree of government intervention required. While discussions are useful about the effectiveness of regulatory regimes versus market mechanisms, or some combination of these, our land, air and water continue to become increasingly degraded. If one accepts the immediacy and urgency of acting now, and the necessity for institutional restructuring, fundamental change in the way we make decisions and the way we do business, many different kinds of policy levers will be required to achieve the necessary scale of change in this decade.

One possible lever for this change could be the development of a legal instrument, perhaps similar to the Charter of Rights and Freedoms entrenched in our Constitution. The process of developing such a national document could stimulate greater institutional reform in the near term, and initiate debate in this country around individual and collective responsibility towards the biosphere.

I would like to suggest twelve principles such a Charter might include:

• The biosphere is a community to which we belong rather than a commodity belonging to us.
• All species have inherent value in the biosphere.
• Human beings have stewardship for the quality of water, air and soil of the biosphere.
• The entropic throughput of natural resources should reflect their real costs as a factor in production and consumption.

• The health and well-being of humans and all other species is inseparable from the health and well-being of the biosphere.
• Development must be in harmony with the environment.
• Any production that is not sustainable cannot be counted as capital.
• Optimal allocation of human and natural resources must be in harmony with optimal scale, recognizing the finite limits of the biosphere.
• Human activity must not be conducted at the irreversible expense of other species and ecosystems.
• Diversity is integral to a sustainable society.
• Sustainable development maintains or enhances the integrity of natural resource capital, thereby contributing to the increased well-being of all species.
• The present generation has an obligation to future generations.
• The health of one nation ultimately affects the health of all nations.

C. Biomimicry Principles[19]

• Nature runs on sunlight.
• Nature uses only the energy it needs.
• Nature fits form to function.
• Nature recycles everything.
• Nature rewards cooperation.
• Nature banks on diversity.
• Nature demands local expertise.
• Nature curbs excesses from within.
• Nature taps the power of limits.

D. The Mollisonian Permaculture Principles[20]

1. Work with nature, rather than against the natural elements, forces, pressures, processes, agencies, and evolutions, so that we assist rather than impede natural developments.

2. The problem is the solution; everything works both ways. It is only how we see things that makes them advantageous or not (if the wind blows cold, let us use both its strength and its coolness to advantage). A corollary of this principle is that everything is a positive resource; it is just up to us to work out *how* we may use it as such.

3. Make the least change for the greatest possible effect.

4. The yield of a system is theoretically unlimited. The only limit on the number of uses of a resource possible within a system is in the limit of the information and the imagination of the designer.

5. Everything gardens, or has an effect on its environment.

Additional Principles

(Listed in Alphabetical Order)

Ahwahnee Principles
URL: http://www.lgc.org/clc/library/ahwahnee/principles.html

Aspen Principles
URL: http://www.personal.psu.edu/faculty/b/a/ban127/PrincipleWeb/Aspen.htm#Aspen

Bellagio Principles
URL: http://iisd1.iisd.ca/measure/1.htm

Bioregional Principles
URL: http://csf.colorado.edu/mail/bioregional/mar96/0009.html

Caux Round Table Principles for Business
URL: http://www.cauxroundtable.org/PRIN4.HTM

International Institute for Sustainable Development (IISD) (list of principles)
URL: http://iisd.ca/sd/principle.asp

National Park Service: Guiding Principles of Sustainable Design
URL: http://www.nps.gov/dsc/dsgncnstr/gpsd/toc.html

Portland Sustainable City Principles
URL: http://www.ci.portland.or.us/energy/sustcityprinc.html

The President's Council on Sustainable Development (PCSD) National Goals
URL http://www.whitehouse.gov/PCSD/Overview/index.html

Rio Declaration on Environment and Development
URL: http://www.greenpeace.org/~intlaw/rio1.html

Silicon Principles
URL: http://www.igc.org/svtc/siprinc.htm

Statement of Environmental Commitment by the Insurance Industry
URL: http://www.unep.ch/finance/stat-in.html

Sustainability Principles for Water Management in Canada
URL: http://www.cwra.org/aboutcwra/arts/susprincil.html

The Talloires Declaration
URL: http://www.ulsf.org/about/tallo.html

The United Nations Global Compact
URL: http://www.unglobalcompact.org

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APPENDIX B

Internet Resources

Sustainability Overview

The Center for Ecoliteracy
URL: **http://www.ecoliteracy.org**
The Center for Ecoliteracy was founded in 1995 by Fritjof Capra, Peter Buckley, and Zenobia Barlow to foster the experience and understanding of the natural world. The Center is a public non-profit foundation that supports a network of Northern California grantees, many of which are schools and educational organizations engaged in habitat restoration and agriculturally-related programs, such as school gardens and food systems.

The Citizens Network for Sustainable Development (CitNet)
URL: http://www.citnet.org
The Citizens Network for Sustainable Development (CitNet) is an independent, non-profit network bringing together US based organizations, communities, and individuals to: strengthen sustainability movements across the US, by providing a framework for information-sharing and collaboration across issue areas, sectors, and levels of activity; connect the US sustainability movement to the global sustainability movement; promote broad-based, multi-stakeholder participation in decision making on sustainable development at the local, national, regional and global levels.

Collective Heritage Institute (CHI) / Bioneers
URL: http://www.bioneers.org
Our collective heritage is the Earth's biological and cultural diversity. Collective Heritage Institute (CHI) seeks to cultivate both a material and spiritual basis for their ongoing conservation with practical and visionary solutions. CHI projects include the Bioneers Conference, Voices of the Bioneers Public Education Project and the Restorative Development Initiative (RDI).

The Commons
URL: http://www.the-commons.org/commons/comhome.htm
What is The Commons? (1) A world-wide forum concerned with improving our understanding and control of technology as it impacts on people in their daily lives. (2) A shared space on the Internet, freely accessible to all via the World Wide Web. (3) A means

for defining and moving toward an ethical framework that will make creative use of 21st century communications and a new spirit of international cooperation -- to find ways to reconcile the apparently contradictory but eminently human, and vitally complementary, traits of individual enterprise and our need for community and place.

Communications for a Sustainable Future (CSF)
URL: http://csf.colorado.edu
CSF was founded on the idea that computer networking could be used to enhance communications with the objective of working through disparate views and ideologies to secure a more promising future. The contents of the archives and the quality of communications on CSF are intended to reflect this purpose.

Forum on Religion and Ecology
URL: http://environment.harvard.edu/religion/home.html
The Forum on Religion and Ecology (FORE), at the forefront of this emerging interdisciplinary dialogue, brings the field of religious studies together with academic and activist discourse on the environment by highlighting the important roles that religious traditions play in constructing moral frameworks and orientating narratives regarding human interactions with the environment. It is our hope that by understanding these historical/cultural connections we can find new ways to revision future human-earth relations.

Horizon Solutions Site
URL: http://www.yale.edu/horizon
The purpose of this site is to provide a forum for the presentation of solutions to vital concerns in the areas of health, population, development and the environment. Initiatives are gathered through a number of different means, including direct user submissions, the efforts of partner institutions, and HORIZON's own research activities. The case studies not only encourage the replication of existing projects and provide information on how to do so, but also inspire the development of new initiatives.

International Institute for Sustainable Development (IISD)
URL: http://iisd.ca
Since its incorporation in 1990, IISD has worked to help decision-makers understand the principles of sustainable development and how to put them into practice. In addition to providing international leadership on key issues, the institute also works closely with Canadian government agencies and businesses to interpret sustainable development in a national context.

International Society for Environmental Ethics (ISEE)
URL: http://www.cep.unt.edu/ISEE.html
ISEE now maintains this website, which includes the largest bibliography in the world on environmental ethics, over 7,000 entries. Newsletters over the last ten years are also

available here, and by consulting these a full historical record may be obtained. For current events and contacts, read the latest newsletter.

The New American Dream
URL: http://www.newdream.org
The Center for a New American Dream is a not-for-profit organization dedicated to helping individuals and institutions reduce and shift consumption to enhance quality of life and protect the environment. We are building a strong network of organizations and individuals to promote sustainable policies and practices that will ensure a healthy planet for future generations. We are a membership based organization and receive our financial support from our members, donors, and foundations. Our goal is to encourage more Americans to adopt our motto of: MORE FUN, LESS STUFF!!

New Dimensions
URL; http://www.newdimensions.org
New Dimensions Broadcasting Network is a communications medium like no other. An independent, listener-supported producer and distributor of public radio and shortwave programs, New Dimensions is dedicated to presenting a diversity of views from many traditions and cultures, and strives to impart practical knowledge and perennial wisdom. New Dimensions fosters the process of living a more healthy life of mind, body and spirit while deepening our connections to self, family, community and the environment.

Rocky Mountain Institute
URL: http://www.rmi.org
Rocky Mountain Institute was established in 1982 by resource analysts Hunter and Amory Lovins, who still lead it. What began as a small group of colleagues focusing on energy policy has since grown into a broad-based institution with more than 45 full-time staff, an annual budget of nearly $5 million (much of it earned through programmatic enterprise), and a global reach. RMI brings a unique perspective to resource issues, guided by the following core principles: Advanced resource productivity; Systems thinking; Positive action; Market-oriented solutions; End-use/least-cost approach; Biological insight; Corporate transformation; The pursuit of interconnections; Natural capitalism.

E. F. Schumacher Society
URL: http://www.schumachersociety.org
The E. F. Schumacher Society, named after the author of Small Is Beautiful: Economics As If People Mattered, is an educational non-profit organization founded in 1980. Our programs demonstrate that both social and environmental sustainability can be achieved by applying the values of human-scale communities and respect for the natural environment to economic issues. Building on a rich tradition often known as decentralism, the Society initiates practical measures that lead to community revitalization and further the transition toward an economically and ecologically sustainable society.

Second Nature: Education for Sustainability
URL: http://www.2nature.org
Second Nature is a nonprofit organization that helps colleges and universities expand their efforts to make environmentally sustainable and just action a foundation of learning and practice. Education for Sustainability (EFS) is a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, and commitment to engage in responsible individual and cooperative actions. Second Nature focuses on colleges and universities because they educate our future teachers, leaders, managers, policymakers and other professionals.

Sristi
URL: http://csf.colorado.edu/sristi
Sristi is a non-governmental organisation setup to strengthen the creativity of grassroots inventors, innovators and ecopreneurs engaged in conserving biodiversity and developing eco-friendly solutions to local problems. Here, on the official web site of Sristi, you can read about its activities and participate in them, download its newsletter and research papers and much more.

Sustainability Institute
URL: http://www.sustainer.org
The Sustainability Institute provides information, analysis, and practical demonstrations that can foster transitions to sustainable systems at all levels of society, from local to global.

Sustainable America (SA)
URL: http://www.sanetwork.org
Sustainable America (SA) is a national membership organization that rejects destructive consumption and development patterns and promotes public policies and private actions that support sustainable development. SA's diverse membership pursues this overarching goal through a variety or independent and collaborative strategies, while giving special attention to poor communities, respecting the needs of nonhuman species and safeguarding natural resources and public assets for future generations. SA's National Office promotes this agenda through technical assistance, education, policy campaigns and organizing.

The Sustainability Web Ring
URL: http://sdgateway.net/webring/default.htm
Welcome to the Sustainability Web Ring, a service of the SD Gateway. This Internet tool allows users to navigate easily between web sites that deal with the principles, policies, and best practices for sustainable development. By following the links through the web ring, you will find information from around the world on how to deal with such crucial issues as: climate change, cleaner production, waste, poverty, consumerism, natural

resource management, and governance. This information is particularly suited to decision-makers within civil society, government, business, research and funding institutions, and communities.

The Worldwatch Institute
URL: http://www.worldwatch.org
The Worldwatch Institute is dedicated to fostering the evolution of an environmentally sustainable society--one in which human needs are met in ways that do not threaten the health of the natural environment or the prospects of future generations. The Institute seeks to achieve this goal through the conduct of inter-disciplinary non-partisan research on emerging global environmental issues, the results of which are widely disseminated throughout the world.

The World Wide Web Virtual Library: Sustainable Development
URL: http://www.ulb.ac.be/ceese/meta/sustvl.html
A comprehensive Web site with a wide range of resources on sustainable development including: organizations, projects / activities, events, news, discussion groups, listservs, libraries, documents, references, electronic journals, databases, and fun, humor sites.

Sustainability and Community

Sustainable Seattle
URL: http://www.scn.org/ip/sustainable/index.htm
Sustainable Seattle's mission is to protect and improve our area's long-term health and vitality by applying sustainability to the links between economic prosperity, environmental vitality, and social equity. Founded in 1991, Sustainable Seattle is an award winning, volunteer-based civic network and forum located in Seattle with a focus on the metropolitan city/county area. Formerly a program of Metrocenter YMCA, Sustainable Seattle is now incorporated as a non-profit organization and has moved into a new space.

Center of Excellence for Sustainable Development
URL: http://www.sustainable.doe.gov
Welcome to the Web site of the U.S. Department of Energy's Center of Excellence for Sustainable Development. We are delighted to offer you this menu of information and services on how your community can adopt sustainable development as a strategy for well-being.

International Society for Ecology and Culture
URL: http://www.isec.org.uk

ISEC runs a concerted information campaign to challenge the view that the global economy is universally beneficial. We work internationally with institutions and communities that seek both to resist the consumer monoculture and to strengthen their diverse spiritual and ecological roots. ISEC has over 20 years of counter-development experience in Ladakh. We focus on the following key issues: The crucial link between cultural and biological diversity; Food and agriculture, with an emphasis on small farmers and rural society; The importance of strong local economies; The psychological benefits of community and connection to nature.

Redefining Progress
URL: http://www.rprogress.org
Redefining Progress is a public policy organization that seeks to ensure a more sustainable and socially equitable world for our children and our children's children. Working both within and beyond the traditional economic framework, RP generates and refines innovative policies and ideas that balance economic well-being, the environment, and social equity so that those living today and those who will come in the future can have a better quality of life.

Resource Renewal Institute
URL: http://www.rri.org/home.html
The Resource Renewal Institute (RRI) is a nonprofit, non-governmental organization that supports innovative environmental management strategies in the United States and worldwide. RRI's mission is to catalyze the development and implementation of green plans. RRI evaluates the effectiveness of existing and emerging green plans and uses this information to spearhead green planning processes throughout the United States.

Sustainability and Commerce

AtKisson + Associates
URL: http://www.atkisson.com
A+A, an international consulting firm based in Seattle and New York, has been helping to make sustainability real since 1992. We design initiatives, provide keynote speeches and trainings, co-create strategy, do research, facilitate meetings and conferences, and develop new measures (indicators) of progress. Our clients range from small communities to Fortune 500 corporations.

The Business Ecology Network (BEN)
URL: http://naturaledge.org
The Business Ecology Network (BEN) is a learning community of leaders---managers, entrepreneurs, citizens, and other stakeholders---who apply the business ecology model to create enduring success in our work and personal lives. Through our membership,

products and services, BEN helps businesses, communities, governments, and industries develop the vision, systems thinking, knowledge, and strategic alliances to transition successfully to a spiritual, ecological future.

Business for Social Responsibility (BSR)
URL: http://www.bsr.org
Business for Social responsibility is a membership organization for companies of all sizes and sectors. BSR's mission is to be the leading global resource providing members with innovative products and services that help companies be commercially successful in ways that demonstrate respect for ethical values, people, communities, and the environment.

Coalition for Environmentally Responsible Economies (CERES)
URL: http://www.ceres.org
CERES is a non-profit coalition of investors, public pension funds, foundations, labor unions and environmental, religious and public interest groups working in partnership with companies toward the common goal of corporate environmental responsibility worldwide.

EcoSTEPS
URL: http://www.ecosteps.com.au
EcoSTEPS is a multi-disciplinary consultancy specialising in Sustainability and Triple Bottom Line issues. We offer support and advice in sustainability training, education, practices and strategies. We are based in Sydney, Australia with associates and connections throughout Australia, New Zealand, UK and the USA.

Natural Logic, Inc.
URL: http://www.natlogic.com
Natural Logic, Inc. delivers internet-based decision support software, strategic consulting, management training, workshops, and related business services that help companies turn exceptional environmental performance into competitive advantage. The US economy produces only 6% product, and 94% non-product. Our job is to help companies reverse that ratio, moving toward zero waste and 100% product. We equip companies to create More Value. Less Stuff.™ -- gaining profit, market share, customer and employee loyalty, regulatory insulation, and resilience in the face of change, while reducing environmental impacts.

The Natural Step
URL: http://www.naturalstep.org/index.html
The Natural Step (TNS) is a non-profit environmental education organization working to build an ecologically and economically sustainable society. TNS offers a framework that is based on science and serves as a compass for businesses, communities, academia, government entities and individuals working to redesign their activities to become more sustainable.

Natural Strategies
URL: http://www.naturalstrategies.com
Natural Strategies is a management consulting firm that helps organizations achieve long-term, "bottom-line" results through the application of sustainability principles in strategic and tactical decision-making and action. Natural Strategies helps organizations improve efficiency and quality at all levels - from the board of directors to managers of specific functional areas. By educating corporations about better environmental business practices and aligning their processes toward environmental leadership, Natural Strategies' mission is to help shape a new economy that supports a healthy human balance with nature.

SustainableBusiness.com
URL: http://www.sustainablebusiness.com
In the coming century, the transition to sustainability will change the types of businesses that exist and the products they produce. The way we structure and manage our economy will be fundamentally different. Sustainability is, in commercial terms, a business driver of immense significance. Leaders from many disciplines believe we are witnessing and participating in a societal transition on a scale comparable to the Agricultural and Industrial Revolutions – the Environmental Revolution. That's what we believe at SustainableBusiness.com. It's contagious – you'll se when we visit our site on an on-going basis.

Sustainability and Resource Extraction

Ag BioTech InfoNet
URL: http://www.biotech-info.net
Ag BioTech InfoNet covers all aspects of the application of biotechnology and genetic engineering in agricultural production and food processing and marketing. Our focus is on scientific reports and findings and technical analysis, although the page also covers emerging issues of widespread interest, developments in the policy arena, and major media coverage.

AgNIC
URL: http://www.agnic.org
AgNIC (Agriculture Network Information Center) is a distributed network that provides access to agriculture-related information, subject area experts, and other resources. It was established by an alliance of the National Agricultural Library, land-grant universities, and other organizations committed to facilitating public access to agricultural and related information.

Institute for Sustainable Forestry (ISF)
URL: http://www.isf-sw.org
ISF is a community-based organization founded in 1991 by loggers, tree-planters, educators, watershed restorationists, engineers, geologists, foresters, business and conservation managers, veterans, woodworkers and environmentalists. ISF serves local rural communities and works in collaboration with many other non-profits and agencies to facilitate community redevelopment strategies and the transition to sustainable forestry in the Pacific Northwest.

The Land Institute
URL: http://www.landinstitute.org
When people, land, and community are as one, all three members prosper; when they relate not as members but as competing interests, all three are exploited. By consulting Nature as the source and measure of that membership, The Land Institute seeks to develop an agriculture that will save soil from being lost or poisoned while promoting a community life at once prosperous and enduring.

The Leopold Center for Sustainable Agriculture
URL: http://www.leopold.iastate.edu
The Leopold Center is located at Iowa State University and has three primary objectives: to identify and reduce negative impacts of agriculture on natural resources and rural communities to develop profitable farming systems that conserve natural resources to work with ISU Extension and other groups to inform the public of new research findings

National Oceanic and Atmospheric Association (NOAA) Fisheries
URL: http://www.websites.noaa.gov/guide/nmfs/where.html
NOAA Fisheries aka The National Marine Fisheries Service (NMFS) is a part of the National Oceanic and Atmospheric Administration (NOAA). NMFS administers NOAA's programs which support the domestic and international conservation and management of living marine resources. NMFS provides services and products to support domestic and international fisheries management operations, fisheries development, trade and industry assistance activities, enforcement, protected species and habitat conservation operations, and the scientific and technical aspects of NOAA's marine fisheries program.

Sustainable Fisheries Foundation
URL: http://www.sff.bc.ca
The Sustainable Fisheries Foundation is a non-profit organization dedicated to the protection, enhancement and wise use of fisheries resources in the Pacific Northwest. Our mission is to promote a balanced approach to fisheries management — one based on sound ecological and economic principles — to ensure that fish populations remain viable, productive and accessible to future generations.

Sustainability and Ecological Design

Center for Renewable Energy and Sustainable Technology
URL: http://solstice.crest.org
Solstice is the Internet information service of the Renewable Energy Policy Project and the Center for Renewable Energy and Sustainable Technology (REPP-CREST), and is your site for sustainable energy and development information. We invite you to Register, leave a comment, or browse our main resource collections.

Ecological Design Institute
URL: http://www.trope.com/edi/aboutedi.html
The Ecological Design Institute and Van der Ryn Architects create innovative design solutions that link nature, culture and technology to reintegrate the needs of human society within the balance of nature.

Living Technologies
URL: http://www.livingmachines.com/htm/home.htm
As we move into the next century and the world population exceeds 6 billion, all of us need to develop ways to work with nature to conserve and recycle natural resources. Inspired by ecosystems as old as the earth itself, Living Technologies designs and builds Living Machines®, revolutionary natural wastewater treatment systems that accelerate natures own water purification process.

William McDonough + Partners
URL: http://www.mcdonough.com
At William McDonough + Partners, our approach to architecture is designed to accommodate complex aesthetic, economic and performance criteria into buildings that embody ecological intelligence and intergenerational justice: elegant, affordable, safe and sustainable architecture. William McDonough founded his architecture practice in New York City in 1981. Since then his firm has taken the lead in producing designs of the highest aesthetic quality that also incorporate extraordinary environmental sensitivity.

Van der Ryn Architects
URL: http://www.vanderryn.com/va/index.html
Van der Ryn Architects is a leader in environmentally-friendly design and planning. For over thirty-five years, we have been creating environments which enrich the human spirit, work with natural processes and respect the beauty and vitality of nature. Our approach, ECO-LOGIC Design, is a marriage of nature and technology, using ecology as the basis for design. We work at all levels of scale to produce innovative buildings, landscapes, communities, cities and applied technologies.

Sustainability and The Biosphere

Appropriate Technology Transfer for Rural Areas (ATTRA)
URL: http://www.attra.org/attra-pub/perma.html
The focus of the ATTRA program is on farming systems that enhance the economic livelihoods of farm families while sustaining the environment. ATTRA provides resources and technical assistance to commercial farmers, including small farmers and market gardeners, in the United States. Accordingly, the focus of this publication in on permaculture in the temperate U.S. with some emphasis on broad-scale application such as agroforestry and bio-integrated production systems.

Biomimicry
URL: http://www.biomimicry.org
Biomimicry is a new science that studies nature's models and then imitates or takes inspiration from these designs and processes to solve human problems, e.g., a solar cell inspired by a leaf. Biomimicry uses an ecological standard to judge the "rightness" of our innovations. After 3.8 billion years of evolution, nature has learned: What works. What is appropriate. What lasts. Biomimicry is a new way of viewing and valuing nature. It introduces an era based not on what we can extract from the natural world, but on what we can learn from it.

The Institute for Deep Ecology
URL: http://www.deep-ecology.org
The Institute for Deep Ecology promotes ecological values and actions through experiences that transform old ways of thinking, honor spirit, and support bold actions.

Deep Ecology: Selected Deep Ecology Writings
URL: http://forests.org/ric/deep-eco/welcome.htm
A collection of writings on deep ecology topics including the work by: John Seed, John Revington, Ruth Rosenheck, and Eshana (Elizabeth Bragg).

The Permaculture Global Assistance Network
URL: http://members.optusnet.com.au/~pgan
The Permaculture Global Assistance Network's aim is to facilitate community-based ecologically sustainable development in international development and aid programs in developing countries. We are a conduit for information flow between and within countries of the South and the North.

The Permaculture Research Institute
URL: http://www.permaculture.org.au
Dedicated to supporting research and education in ecological design, environmental restoration, appropriate technology and sustainable agriculture. Permaculture is a design system for permanent agriculture and ecological human settlement. It is based on a set of

ethics: care for the earth; care for people; and return of surplus to earth and people care systems.

Online Publications / Newsletters / List Servers

Business and the Environment (BATE)
URL: http://www.cutter.com/bate
If your job involves environmental cost accounting, product stewardship, or corporate environmental accounting, you too may find BATE an essential aid. Since its launch in 1990, Business and the Environment has emerged as the key international forum for executives worldwide to learn about and debate environmental management issues. Published by the Cutter Information Corporation

Earth Ethics
URL: http://www.crle.org/ethics.html
Earth Ethics, our award winning journal, publishes the best thinking in emerging earth ethics. Articles focus on sustainable practices in education, religion, the arts, business, agriculture, and other fields. Writers provide updates on international forums which are challenging current economic and development practices.

Ecological Economics
URL: http://csf.colorado.edu/lists/ecol-econ
This list was founded on the view that it is necessary to have major change in the way we think about economics if we intend to make a credible response to the environmental threats to the planet. We are building substantial archives around sustainable economics which gives attention to the limits to growth and the implications of ecological thought for economics.

EnviroLink News Service
URL: http://www.envirolink.org/environews
The EnviroLink News Service is a project of the EnviroLink Network, a non-profit organization. The primary mission of this service is to inform EnviroLink's users about the latest news and information about the global environmental movement.

The Natural Business LOHAS Journal
URL http://www.lohasjournal.com
The Natural Business LOHAS (Lifestyles of Health and Sustainability) Journal tracks business and consumer trends in this fast-growing marketplace. LOHAS journal will spotlight industry leaders, innovative companies, authors, market research, ideas and research that help generate financial and societal rewards.

Permaculture International Journal
URL: http://www.nor.com.au/environment/perma
The *Permaculture International Journal* ,published by PIL (Permaculture International Limited), is a non-profit organisation which provides readers and the public with the resources to better care for people and the earth. We offer positive alternatives to local and global problems. This is achieved through; global networking; products and educational resources; sponsorship of permaculture and related projects in under-resourced countries; providing a free public information service on permaculture and environmental issues.

Rachel's Environment & Health Weekly
URL: http://www.rachel.org/home_eng.htm
Rachel's Environment & Health Weekly is published by the Environmental Research Foundation: "News and resources for environmental justice." — Providing understandable scientific information about human health and the environment.

Tidepool
URL: http://www.tidepool.org/home.html
TIDEPOOL is updated every weekday by nine a.m. with the best news stories collected from more than two dozen on-line news sources. Our goal is to provide the Bioregional community with a daily source of the news they need to create a conservation based economy.

World Watch Magazine
URL: http://www.worldwatch.org/mag/index.html
World Watch: Working for a Sustainable Future focuses exclusively on issues that will determine the Earth's long-term health: the battle to rein in an out-of-control consumer economy, to stabilize the global climate, and to protect our rapidly declining cultural and biological diversity.

Yes! A Journal of Positive Futures
URL: http://futurenet.org
YES! is published by the Positive Futures Network, a nonprofit organization that supports people's active engagement in creating a more just, sustainable, and compassionate world.

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