Erosion, weeds, chemically produced food, declining wild salmon runs…you name it, we are providing evidence of discordant lifestyles. We have science, we have watershed councils, we have environmental laws, and still, we have declining wild salmon runs. Guess what? It is because of us and our lifestyles, directly *affecting wild salmon survival. If we truly want to save wild salmon, only a massive commitment to reducing our ecological footprint, consuming more intelligently, and adopting a heartfelt land ethic can turn the tide in their favor. Are we ready?*

Lifestyles and Ethical Values to Sustain Salmon and Ourselves

Jack E. Williams and Edwin P. Pister

> We have an "environmental crisis" because we have consented to an economy in which by eating, drinking, working, resting, traveling, and enjoying ourselves we are destroying the natural, God-given, world.
>
> –Wendell Berry (2003:64)

Lifestyles and Salmon Sustainability

Imagine you live in harmony with your surroundings. You are in touch with the land around you. Your family grows much of your own food or participates in a community-supported agriculture program, ever mindful of the healthfulness that comes from fruits and vegetables that are grown without chemical additives. You have given up the quest for a flat, perpetually fertilized and homogenized lawn and have instead planted native grasses, bushes, and trees that, because they are adapted to your environment, require little additional water or fertilizer beyond what they receive naturally. Because your property has gone native, it is good habitat for wildlife. You partake in the beauty of the seasons and know the migratory patterns of local birds. On many days, your home is your office, but when you need to commute, you live close to shopping and business centers. The energy in your home comes from renewable sources such as wind and solar. Public transportation is available, convenient, and used by you and many of your neighbors. A river is nearby. It flows freely, and each winter, the rains and higher flows attract wild salmon and steelhead *Oncorhynchus mykiss* as they have for countless winters before.

“A river is nearby. It flows freely, and each winter, the rains and higher flows attract wild salmon and steelhead as they have for countless winters before.”

The choices we make today are designing our tomorrow. Lifestyle choices made during the next 10–20 years largely will determine whether the harmonious vision described above becomes reality. We constantly

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The views and opinions presented in this chapter are those of the authors and do not necessarily represent those of any organization.

make decisions about what to eat, what to buy or not buy, and how to get from one place to another. We vote for local officials that help decide how our transportation systems work, how our rivers are protected, how our cities grow, and where our tax money will be used. We choose our lifestyles, where to live, and what fills our lives on a daily basis. If we choose well, we can have a future that is harmonious, prosperous, supports sustainability, and has rivers with wild salmon. To date, however, many of our lifestyles are discordant with the natural world. We mostly live apart from nature, not as one with it. Obviously, a fundamental shift in our behavior is needed.

Indicators of our discordant lifestyles can be seen in the increased erosion from the land, the exotic weeds that are overtaking natural landscapes, and our increasing need for more chemicals to maintain agricultural production. Wild salmon, which are themselves good indicators of the health of our rivers and watersheds, are in decline across much of the West Coast of North America (Nehlsen et al. 1991; Nehlsen 1997; Williams 2000; Lackey et al. 2006, this volume). The latest technologies, from hatcheries to complex barge transport systems, have been tried and tried again in often futile attempts to boost runs or mitigate habitat loss. Billions of dollars have been spent on salmon recovery in the Columbia River alone. The Endangered Species Act (ESA) has been invoked many times in an attempt to stave off extinction of numerous groups of salmon stocks or, in government parlance, evolutionarily significant units. In some areas, progress is being made. Our scientific understanding of what is needed for salmon restoration has grown immensely, and a proliferation of watershed councils is implementing restoration projects up and down the West Coast. Despite such gains, however, we largely have failed in our attempts to restore salmon (MacDonald et al. 2000).

> “If wild salmon are to survive and prosper into the next century, humans must come to grips with the simple fact that our lifestyles *directly* affect land and water resources.”

Nearly all our day-to-day decisions affect salmon either directly or indirectly. Electrical energy demand affects whether we can decommission the dams most harmful to salmon migration. Our use of wood products affects how forested, headwater streams are managed. Fertilizers and pesticides applied to lawns or oil that leaks from cars find their way into streams via stormwater drains. Most of the food we consume is produced by a centralized agriculture industry and shipped more than a thousand miles to our table, all at a high cost in oil and chemicals. Our demand for water, energy, and other resources is growing at a rate that cannot be sustained indefinitely.

The roots of this conflict between the demands of our lifestyles and the needs of salmon run deep. Some analysts believe that the root of the salmon problem lies in a clash of two cultures—the industrial economy, which is linear and extractive and encourages production, and the natural economy, which is circular and renewable and encourages reproduction (Lichatowich 1999). In the industrial economy that dominates American society, watersheds are partitioned into discrete zones for mining, timber harvest, agriculture, and cities. In the natural world of the salmon, all activities of a watershed are interconnected as water flows across surfaces, collects wastes, and moves downstream to form larger rivers. The natural integrity of the river, including the quality of its water, is a reflection of how the watershed is managed and conserved.

If wild salmon are to survive and prosper into the next century, humans must come to grips with the simple fact that our lifestyles *directly* affect land and water resources—and hence, we must learn to reduce our demands on the environment. Presently, the combination of a growing human population and an increasing per capita demand for resources is leaving less and less for salmon and all other species. Humans

already appropriate more than 40% of the Earth's plant production (Wilson 2002). As our consumption grows, the ability of technology to mitigate the impacts of this growth is falling short of expectations. For example, increased automobile fuel efficiency since 1970 has only spurred more consumption through purchase of larger vehicles, more vehicles, or both (Princen et al. 2002). Technological dependence has not helped in salmon restoration either. Hatchery programs for salmon have not proven sustainable and often have caused more harm than good through artificial selection of detrimental genes, introduction of diseases into the wild, and numerous other problems (Hilborn 1992; Lichatowich 1999; Myers et al. 2004). As David Orr (1994:2) wisely noted in his book *Earth in Mind*,

> It is widely assumed that environmental problems will be solved by technology of one sort or another. Better technology can certainly help, but the crisis is not first and foremost one of technology. Rather, it is a crisis within the minds that develop and use technology.

It is tempting to suggest that if we just recycle more, use less electricity during peak hours, or reduce our impacts in one or two other ways, this will be sufficient to maintain salmon and other species. Unfortunately, as much as these simple actions may help, the degree of change required suggests the need for a substantial redirection of our lifestyle. For example, a reduction in the use of wood products will not help if instead of wood, we depend upon increasing use of plastics, hemp, or other products with their own set of impacts to the natural world. According to Duane Elgin (2000:71) in his book *Promise Ahead: A Vision of Hope and Action for Humanity's Future*, achieving a harmonious and sustainable future will require many changes:

> I believe that we will need to make major changes in every aspect of our lives – including the transportation we use, the food that we eat, the homes and communities we live in, the work that we do, and the education that we provide. Although it is appealing to think that marginal measures such as intensified recycling and more fuel efficient cars will take care of things, they will not. We need to make sweeping changes—both externally and within ourselves.

The sweeping changes Elgin speaks of will come only as an accompaniment to a fundamental shift in our ethical values. We must form an ethic that more fully integrates humans into the natural world and more equally divides the resources of this finite planet among all its inhabitants. Needed changes include not only personal lifestyles, values and choices, but also community design, political leadership, and new measures of economic and personal well-being. In this chapter, we focus on personal ethics and lifestyle choices. North Americans wield considerable power in what we choose to buy, where and how we choose to live, and how we choose to transport ourselves from place to place. If we choose quality over quantity, we can reap many benefits. Wild salmon will be but one indicator of our improved quality of life.

The Ecological Footprint

Understanding Your Ecological Footprint

The concept of an ecological footprint was developed to quantify the overall impact of lifestyles and consumption on the environment (Figure 1). The ecological footprint is defined as the area of productive land and water in various classes—cropland, pasture, forests, and so forth—required to provide all the energy and material resources consumed and absorb all the wastes discharged (Wackernagel and Rees 1996). Ecological footprints can be calculated for individuals, communities, states, or nations (see Box #1).

Each person's footprint depends on a number of factors such as income, personal values and behavior, consumption patterns, and technology used to produce the goods consumed. It should be no surprise that,

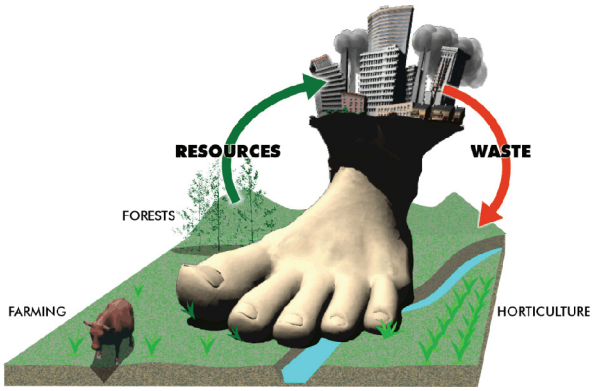

Figure 1. The ecological footprint is a measure of the load imposed by a person on nature. This load is defined as the amount of land—the footprint—needed to sustain the person's level of resource use and waste discharge. (Source: Environment Waikato of New Zealand.)

per capita, the ecological footprint of people in the United States and Canada greatly exceeds that of the average person on Earth (Table 1). Calculations based on 2004 data show that at 23.6 acres (9.6 ha), the United States has the largest per capita ecological footprint on the planet. The Canadian average is not far behind at 21.2 acres (8.6 ha). At these levels, the world's human population will need more than four and one-half Earths to sustain everyone at American standards.

The largest portion of the ecological footprint is derived from burning fossil fuels (Figure 2). With such a high resource demand, particularly for energy and transportation, we are taking far more from nature than nature can possibly renew. In short, we are eroding the natural capital that this and future generations will depend upon for their survival.

The overwhelming majority of carbon dioxide produced by North Americans comes from burning oil, gas, and coal. In addition to being an indicator of fossil fuel consumption, carbon dioxide is a major contributing gas to global climate change and warming of the Earth's atmosphere. North Americans lead the world in carbon dioxide emissions, with the average person in the United States producing 20 metric tons of CO_2 in 2002 compared to 9.4 metric tons for each person in the United Kingdom (Figure 3).

Calculating the size of your own ecological footprint is alarming enough, but what about considering how much of the biosphere should be set aside for other species like salmon, deer, old growth fir trees, and ferns? According to Harvard University's E. O. Wilson (2002), there are about 10 million species presently on the Earth, of which only about 1.8 million have been formally described by scientists and provided with a scientific name. Also, only about 5.4 acres (2.2 ha) per person on Earth are biologically productive land. It would be unrealistic to give equal weight to lands dominated by ice and rock. Given all these additional factors, seven or eight Earths would be required to satisfy everyone if they possessed a lifestyle similar to our example and wanted to provide some space for other species (Redefining Progress 2004a).

A few northwestern communities are examining their own footprints. In May 2004, a report was released by Redefining Progress and the Bay Area Alliance for Sustainable Communities on the ecological footprint of the San Francisco Bay area (Redefining Progress 2004b). The report showed that the Bay Area relied on the equivalent of more than 146 million acres (59 million ha) to sustain itself, an area nearly the size of the states of

BOX 1: Calculating Your Ecological Footprint

As an individual, you have more power and influence than you imagine. As you simplify your lifestyle and reduce consumption, you can influence family members, friends, and neighbors and engage others by providing a positive role model. Seek out more information on sustainability. Join support groups, community groups, conservation groups, or religious groups seeking a more harmonious path with their environment. Additional suggestions can be found on numerous Web-based sites (search on "ecological footprint," "sustainability," or "voluntary simplicity"). Three very good source books for the concerned consumer include *The Better World Handbook* (Jones et al. 2001), *Promise Ahead* (Elgin 2000) and *The Consumer's Guide to Effective Environmental Choices* (Brower and Leon 1999).

To calculate your ecological footprint, you will need to answer some simple questions about your food, transportation, housing, and other factors. Each person should take an online version of the ecological footprint quiz to calculate his or her ecological footprint by visiting the Earthday Network (www.earthday.net) or Redefining Progress (www.rprogress.org) Web sites. The following are examples of questions used to determine the size of each of our ecological footprints. Responses based on averages for North American residents are shown below.

Q1. *How often do you eat animal-based food products?* Animal-based products such as beef, chicken, pork, eggs, fish, and dairy provide 43% of the average North American's diet. It requires more energy to produce meat than vegetables, hence a larger footprint.

Q2. *How many calories do you consume on a daily basis?* The average North American eats approximately 3,000 kilocalories per day.

Q3. *How much of your purchased food is thrown out?* In North America, about 26% of purchased food is discarded.

Q4. *How much of the food that you eat is locally grown, unprocessed, and in-season?* A significant portion of the energy cost of food production is spent on transporting food to market and for processing, packaging, and storage. Growing your own food and buying locally produced food minimizes your footprint.

Q5. *On average, how many miles do you travel on public transportation (bus, rail, etc.)?* The more you can use public transportation, bike, and walk, the smaller your footprint.

Q6. *How much do you drive each year (either as driver or passenger)?* The average North American drives about 8,500 mi/year.

Q7. *What kind of fuel efficiency does your vehicle get?* Current U.S. standards are 27.5 mpg for passenger cars and 20.7 mpg for light trucks, vans, and SUVs.

Q8. *How many hours each year do you spend flying?* Each year, the average North American spends 4.8 h on commercial airlines. This is equivalent to a one-way flight between Seattle and New York.

Q9. *How large is your home?* The average North American home is about 2,153 ft^2.

Q10. *Does your home use electricity from a "green" electricity source (solar, wind, micro-hydro)?* Most homes are powered by coal, large-scale dams, oil, or gas.

California and Oregon combined. The groups concluded that the Bay Area's footprint was 33 times too large for sustainability. Major factors leading to the large ecological footprint include high consumption of fossil fuels in the form of gasoline for commuting and transporting goods, electricity for heating, lighting and manufactur-

Table 1. Per capita ecological footprints of selected nations. Data in acres (hectares) from Redefining Progress (2004a).

United States	23.6 (9.6)	Italy	8.1 (3.3)
United Arab Emirates	22.2 (9.0)	Mexico	6.4 (2.6)
Canada	21.2 (8.6)	Costa Rica	4.7 (1.9)
Norway	20.2 (8.2)	Iran	4.7 (1.9)
Sweden	19.6 (8.0)	Cote D'Ivoire	4.0 (1.6)
Australia	17.5 (7.1)	Central African Republic	3.7 (1.5)
France	14.2 (5.7)	Uganda	3.2 (1.3)
Denmark	13.1 (5.3)	Mali	2.9 (1.2)
Spain	12.1 (4.9)	Philippines	2.7 (1.1)
United Kingdom	11.7 (4.7)	Congo	2.0 (0.8)
Russia	10.6 (4.3)	Malawi	1.6 (0.6)
Germany	10.6 (4.3)	Haiti	1.6 (0.6)
Saudia Arabia	10.1 (4.1)	Bangladesh	1.2 (0.5)
Kazakhstan	9.2 (3.7)		

ing, and deforestation to produce building materials. On the positive side, the area's per capita footprint is 20.9 acres (8.5 ha), about 14% smaller than the national average of 23.6 acres (9.6 ha). Local governments are using ecological footprint accounts as a measure of progress towards sustainability. The president of the Association of Bay Area Governments and Alameda County Supervisor Scott Haggerty was quoted in the Redefining Progress report as noting that, "Smart Growth is not only good business, it needs to become a way of life in the Bay Area: jobs near housing, public transit and protected greenbelts."

Devising a Fair Ecological Footprint

There are two primary ethical concerns with existing consumption levels and corresponding ecological footprints in North America. First, the existing consumption levels of the rich are depriving the poor of the basic resources needed to meet their needs. Second, existing consumption rates are harming the environment and impairing the long-term capacity of the earth to sustain future generations. Prevailing models anticipate a 5- to 10-fold increase in world economic activity by the time the human population stabilizes toward the middle of this century (Rees 1998; Everett 2001). In short, our total human ecological footprint, which is larger than the available land, has resulted in the ethically unacceptable reality wherein our overconsumption and waste are depriving some people and many plant and animal species of the basic necessities for life. Without significant changes in lifestyles, these harsh realities will get much worse.

"Our total human ecological footprint, which is larger than the available land, has resulted in the ethically unacceptable reality wherein our overconsumption and waste are depriving some people and many plant and animal species of the basic necessities for life."

Adopting a fair ecological footprint that is both ecologically and socially sustainable—the consumption ethic of Everett (2001)—is perhaps the most critical task of our time. To produce a fair ecological footprint,

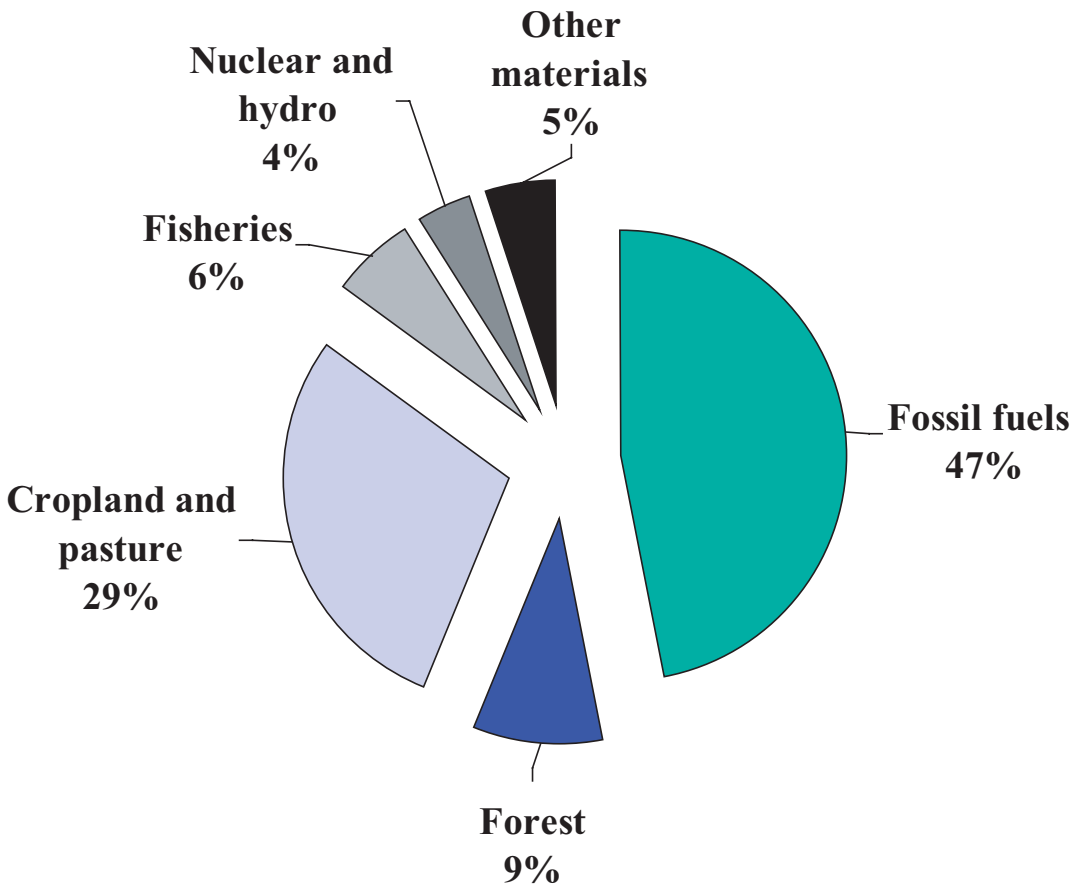

Figure 2. Sources of the global ecological footprint. High levels of coal, oil and natural gas consumption in wealthier countries greatly influences this global pattern of resource use. (Source: Redefining Progress 2004a; available at www.RedefiningProgress.org.)

that is, with each person on Earth being entitled to a sustainable footprint of the approximate same size, Americans will need to reduce our consumption by half or more (Everett 2001).

A goal of reducing our ecological footprint by 50%, at least in the near term, may be impractical. We are not advocating a return to the land in a manner devoid of modern convenience. But a significant reduction of 10% to 25% within a decade could go a long way towards demonstrating our desire to act as responsible stewards and would provide substantial options for salmon recovery that presently are unavailable. With some restructuring of how we build houses, plan communities, and lay out transportation systems, further gains in reducing our footprint could then be forthcoming. This assumes, of course, that population increase does not negate gains made in per capita consumption rates!

Human population growth is another confounding problem. Population growth in excess of national averages continues in West Coast states and provinces. State of California analysts estimate, for example, that their population will jump by more than 20 million people over the next 50 years (California Department of Finance 2004). Less than 34 million people were present in the 2000 census, yet by 2012,

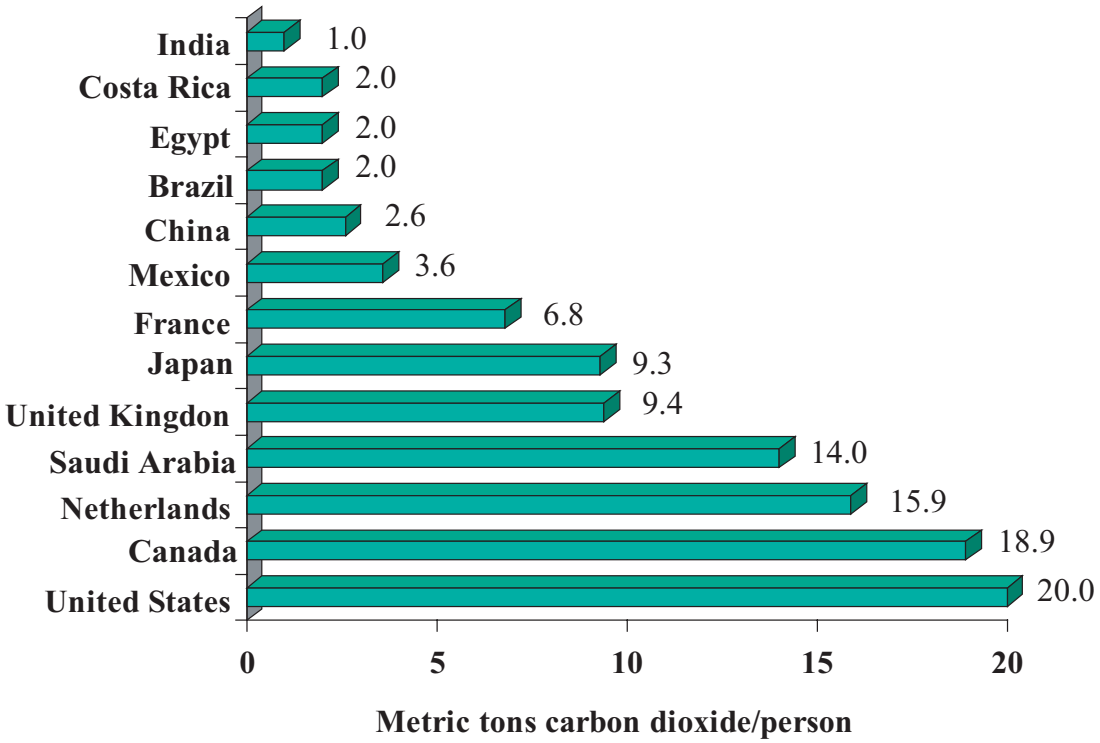

Figure 3. Carbon dioxide emissions per capita in year 2002. Data in metric tons of CO_2 per person. Carbon dioxide is a major contributor to global climate change, so its emission levels continue to be a primary and contentious issue needing to be addressed immediately. (Source: International Energy Annual for 2002; available at www.eia.doe.gov.)

California is projected to pass the 40 million mark. A total state population of 55 million is projected by the year 2050. Idaho, another state with dwindling salmon resources, is predicted by the U.S. Census Bureau to be the sixth fastest growing state in the nation during the first 30 years of this century with population increasing from 1.3 million in 2000 to nearly 2 million by 2030, a 52% increase (Idaho Department of Commerce and Labor 2005). Regardless of what level our regional population reaches, per capita consumption must decrease to maintain a high quality of life. The more rapid the population increase, the more drastic a reduction in per capita consumption is required to simply hold the line. It seems hard to imagine how such a growing population could accommodate wild salmon without fundamental changes to our ethical framework, culture, and lifestyles.

> “The more rapid the population increase, the more drastic a reduction in per capita consumption is required to simply hold the line.”

In at least one important resource area, there are signs for some optimism. Water use in the United States has held steady since about 1980 despite increasing population, indicating that water conservation

efforts may be making some inroads to curb high use (Figure 4). According to the latest figures from the Portland (Oregon) Water Bureau, per capita water consumption in Portland decreased from 142 gal per day in 1994 to 125 gal per day in 2004 or about a 13% decline in 10 years (Associated Press 2004). Agricultural water use in Oregon declined by 1% between 1995 and 2000, despite adding about 330,000 acres (133,650 ha) to irrigation.

If we could reduce our consumption of energy and other resources in the Pacific Northwest by a significant amount, what might this mean? Although it is difficult to quantify precise results of such a significant shift, watershed integrity, river flows, and wild salmon clearly would be on the receiving end of many benefits. A significant decrease in energy demand, for example, would result in a much easier political decision to breach the four main-stem dams on the lower Snake River, considered by many fisheries scientists to be the primary obstacles to recovering Idaho's salmon and steelhead (Palmer 1991; Dombeck et al. 2003). These four dams on the Snake River produce only about 7% of the hydroelectric energy generated in the Columbia River basin but have major impacts on migrating adults and juvenile salmon. Table 2 speculates as to how major reductions in our western ecological footprint could affect salmon resources.

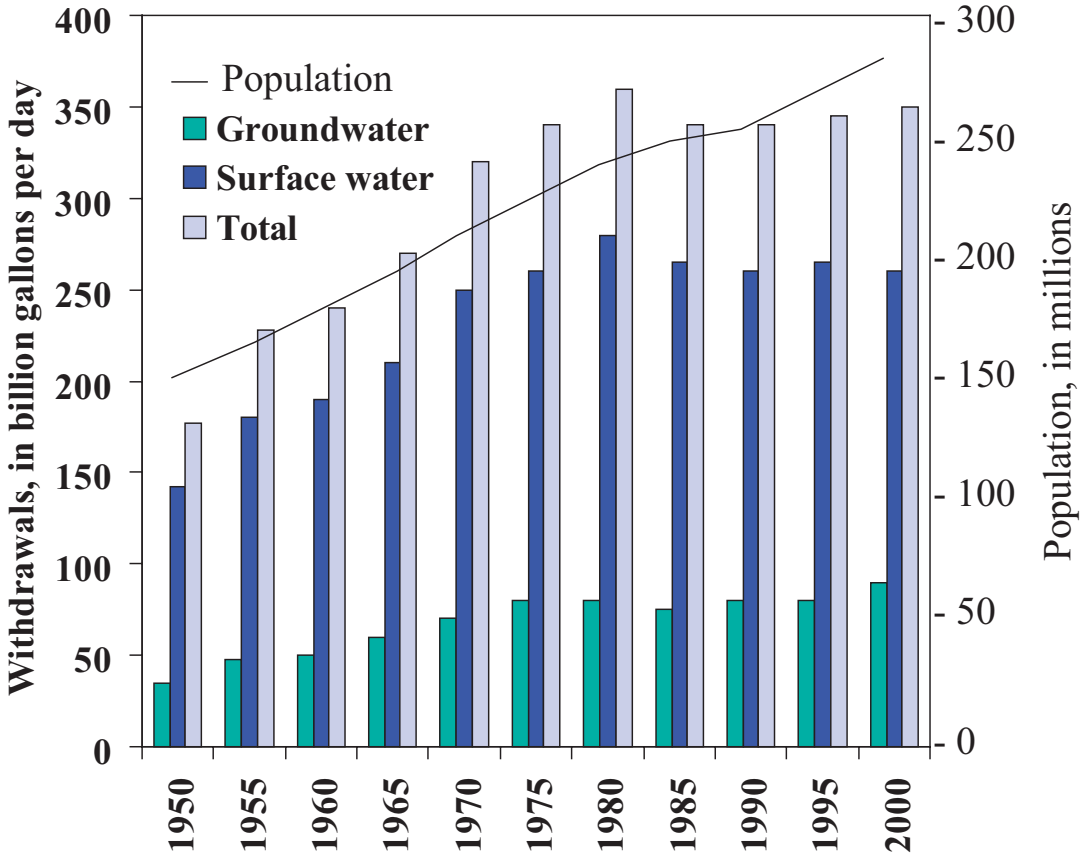

Figure 4. Trends in population and water use in the United States from 1950 to 2000. A key issue in saving wild salmon is addressing this upward trend. (Source: U.S. Geological Survey data, cited in Hutson et al. 2004.)

Table 2. Hypothetical results of reducing our ecological footprint on the demand for resources and resulting impact on wild salmon conservation.

Resource demand	Benefit to wild salmon
Demand for electricity would decrease.	Increased ability to remove main-stem dams on Snake and Columbia rivers.
Demand for wood products would decrease.	Increased ability to protect riparian and old-growth forests.
Demand for water would decrease; domestic, agricultural, and industrial water uses would decrease.	More water available for instream uses, fish, and riparian systems.
Demand for oil, gas, and other nonrenewable resources would decrease.	Conversion of wildland for development would decrease.
Overall waste streams and detrimental society byproducts would be reduced.	Pollution would be reduced in river systems.

Ethics and Transformations

In considering a sustainable future for wild salmon in California and the Pacific Northwest, we envision the required major shift in ethics resting on three key transformations—adopting a heartfelt land ethic, reducing our ecological impact, and promoting intelligent consumption. These form the essential triad upon which any wild salmon restoration policy must be founded to achieve long-term success.

1. Adopting a Heartfelt Land Ethic

A fundamental first step towards reducing our impact on the environment is to adopt an ethic that recognizes that people are part of the natural world and subject to the laws of nature just like all other species. We are not separate from nature. In his famous essay The Land Ethic, from *A Sand County Almanac*, Leopold (1949:204) calls for each of us to realize our fundamental interconnection and dependence upon the natural community:

> In short, a land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such.

Many philosophers, conservationists, and religious leaders have called for adoption of a set of ethical standards that lead us to a more harmonious relationship with the natural world. Substantial numbers of Americans are seeking lives more in tune with quality, personal satisfaction, and sustainability. According to a 1995 survey, about 13% of adults in the United States, or 24 million people, have values centered on environmental and social concerns (Ray 1996). Unfortunately, while the numbers of people seeking cultural change are encouraging, they are not sufficient to alter overall societal trends. As Leopold (1949) reminds us, "No important change in ethics was ever accomplished without an internal change in our intellectual emphasis, loyalties, affections, and convictions."

"Substantial numbers of Americans are seeking lives more in tune with quality, personal satisfaction, and sustainability."

Many religious leaders have recognized the ecological crisis and the role that spiritualism and religion should play in healing both human spirit and the broader environment. According to James Morton, Dean of the Cathedral of St. John the Divine, "the growing environmental consciousness is very close to spirituality itself, for religion is essentially the yearning in the human heart and the human brain for inclusiveness, wholeness, togetherness" (Golliher and Logan 1996). Creation is fragile and threatened with destruction. What is needed, according to Robert Massie, Jr. (1996) of the Harvard Divinity School, is a shift in ethics. Massie recognizes the negative influences of our economic system and assails those economists who argue that the current generation should not be called upon to make sacrifices to slow climate change or reverse environmental degradation because future generations will be richer and can do it themselves.

Leopold's land ethic was shaped equally by his appreciation for the role of individual responsibility to conserve private lands and the need to manage public lands in the broader public interest (Meine and Leopold Bradley 2004). If we are to have wild salmon in the 22nd century, we will need to integrate the land ethic into management of private and public lands and to reach into the marine environment as well (Dombeck et al. 2003). Salmon and steelhead, through their anadromous habits, underscore the need to view land health across various ownerships and political boundaries. Salmon are just as dependent upon lower-elevation valley bottom channels as they are higher-elevation spawning streams. The lower elevation sections of streams and rivers, typically in private ownership, have the highest degree of modification but also the greatest restoration potential. Historically, these lower-elevation valley bottom streams were some of the most diverse and important for juvenile rearing and adult thermal refuges (Dombeck et al. 2003).

"Implementing the land ethic will not be complete without involvement of both public and private lands, for they are integrated ecologically, socially, politically, and economically."

Implementing the land ethic will not be complete without involvement of both public and private lands, for they are integrated ecologically, socially, politically, and economically (Knight 1998; Knight and Landres 1998). For far too long, our efforts to restore and conserve salmon have focused on one component of the overall problem while blithely ignoring others. A riprapped streambank may reduce erosion at that site but may increase stream energy and cause a host of other problems further downstream. Similarly, hatcheries may increase smolt production but may cause harmful competition with remaining wild fish for rearing habitat. Successful conservationists and land managers must work with natural processes and see the broader ecological context in which the salmon conservation dilemma lies. Wendell Berry (1981) refers to this broader context as the art of *solving for pattern* and notes that "the whole problem must be solved, not just some handily identifiable and simplifiable aspect of it." So it is with maintaining wild salmon; we must seek to understand and treat the fundamental causes of decline, including the contributions of private land declines and individual lifestyles to these problems. Our collective adoption of Leopold's land ethic will allow society to address the broader context of salmon conservation.

2. Reducing Our Ecological Impact

In order to save wild salmon, we must substantially reduce our ecological footprint (see Box 1), especially in terms of our energy use, water use, transportation habits, and shopping decisions. Using public trans-

portation, bicycles, or hybrid vehicles would greatly reduce energy consumption. Similarly, growing your own foods, subscribing to a community supported farm, or buying from local producers saves significant amounts of energy. Buying smaller homes and utilizing renewable energy for home power also would significantly reduce our footprint. Table 3 lists 12 priority actions in the areas of transportation, food, and household operations that each person should take to substantially reduce each of our ecological footprints.

As a landowner, farmer, or rancher, there are many additional steps that can be taken to improve the ecological impact of land management activities. Reducing water consumption and improving water quality should be primary goals. Chemical and water-hogging grass lawns should be replaced with native plants. Water consumption can be reduced by raising crops that require less irrigation and/or by improving the efficiency of irrigation practices, such as retrofitting from flood irrigation to sprinklers, or from sprinklers to drip irrigation. Water quality can be improved by reducing surface runoff, reducing soil erosion, and providing a protected riparian buffer zone to cushion the negative impacts that land management has on streams (Table 4). Even relatively small amounts of fine sediment in stream substrates have been shown to be detrimental to salmon by reducing egg survival and converting stream insect communities to mostly burrowing organisms, which are less likely to be available to salmon as food (Suttle et al. 2004). Although the width of the buffer zone should vary depending upon slope and upslope management, a good starting point would be 100 ft of protection on either side of a fish-bearing stream if the land is relatively level (add 2 ft on each side for each 1% of land slope) and 50 ft on either side of smaller, non-fish-bearing tributaries. Such a riparian protection zone would provide space for stream meandering, would buffer the impacts of upslope management activities, and would facilitate vegetative growth that will shade streams and help filter out sediment. Buffers along small streams, even intermittent streams, are critical as they often greatly influence water quality in larger, fish-bearing streams.

Table 3. The top 12 actions that North American consumers need to make to substantially reduce their ecological footprint. Actions are organized around the top three areas in which North Americans affect their environment. This list is modified from *The Consumer's Guide to Effective Environmental Choices* produced by the Union of Concerned Scientists (Brower and Leon 1999).

Transportation
1. Choose a place to live that reduces the need to drive.
2. Think twice about purchasing another vehicle.
3. If you buy a vehicle, choose a fuel-efficient, low-polluting model.
4. Set concrete goals for reducing your vehicle travel.
5. Whenever practical, walk, bicycle, or take pubic transportation.
Food
6. Eat less meat.
7. Buy certified organic foods.
8. Buy as much food as practical from local growers.
Household operations
9. If you move, choose a smaller house.
10. Install energy efficient lighting, heating, and bathroom and kitchen appliances.
11. Obtain your household energy from solar or wind generation, or choose an electricity supplier offering such renewable energy.
12. Replace grass lawns with plants native to your area.

Table 4. Characteristics of healthy streamside areas and riparian zone buffers and subsequent benefits. Information corresponds best to streams and smaller rivers on private lands. Modified from the Tualatin (Oregon) Soil and Water Conservation District Small Acreage Factsheet.

Characteristics of a healthy riparian zone	Benefit from healthy condition
80% of more of streamside banks are vegetated and stable.	Erosion is minimized. Fine sediments are reduced in spawning gravels.
Overhanging trees and shrubs provide shade to at least 30% of the streamside.	Water temperatures are reduced, which is a prime requirement for most salmon and steelhead.
Livestock use is not allowed along streams.	Bank stability is increased; weeds are more easily controlled
Native plants comprise the streamside community with little or no nonnative species.	Nonnative plant species often are invasive and will exclude more beneficial plants; native plants provide greater benefits to wildlife.
There are sufficient grasses, sedges, shrubs, and trees to filter out sediment from upstream areas and to protect banks during high flows.	Sediment is trapped by plants in riparian zones and does not pollute streams.
Stream gravel is relatively free of fine sediment (< 20% fine materials)	Stream substrate is appropriate for successful spawning and egg survival.
Riparian plants provide dense cover that slows water flows and increased groundwater storage.	Riparian buffer soils can take up water 15 times faster than pasture or crop lands; increases stream flows in summer.

There are many valuable references available for restoring degraded lands (National Research Council 1992; Williams et al. 1997) and using best management practices to restore streams and rivers (Naiman 1992; Williams and Williams 2004). Extension service offices of local universities typically have a variety of useful brochures on improving land-management practices. Many watershed councils and soil and water conservation districts have prepared excellent strategies for restoring salmon at the watershed scale and integrating management across public and private lands. Some of the best watershed-scale case studies are the Central Valley of California (Bingham and Harthorn 2000), Coquille Watershed in Oregon (Hudson and Heikkila 1997), and the Asotin Creek watershed in Washington (Thiessen and Vane 2000). But it is important to remember that our collective daily choices of what to eat, where to live, and what to buy can be as important to long-term prospects of salmon survival as direct habitat restoration.

When wood products are used, they should come from forests that have been certified by the Forest Stewardship Council (FSC) as being grown and harvested in ways that are environmentally responsible and socially beneficial. As of 2005, the FSC has certified 96 forests in the United States, including 1 in Idaho, 3 in Washington, 10 in Oregon, and 24 in California, as meeting their standards for providing clean water and healthy forests (Forest Stewardship Council 2005). Some of these forests are substantial, like the 440,787 acres (178,519 ha) of FSC-certified forests managed by Confederated Tribes of Warm Springs in Oregon and 669,370 acres (271,095 ha) of FSC-certified forests managed by Potlatch Corporation in Idaho. Wood products bearing the FSC-certified logo are available in many retail outlets in the Pacific Northwest.

Despite the importance of improving our environment, many people may still be reluctant to pursue substantial changes in consumer habits because they believe they will be missing out on the American Dream. Ironically, high rates of consumption do not necessarily lead to better lifestyles or more content-

ment. Duane Elgin (2000), a leader in the voluntary simplicity movement, notes that the American Dream of "more spending and more consumption leading to more happiness" has proven false. It appears that once a comfortable level of income is reached, there is little or no positive correlation between income and overall happiness. Despite a near doubling of disposable income from 1960 to 1990, the percentage of Americans reporting themselves as "very happy" actually declined slightly (35% in 1957–32% in 1993) (Etzioni 1998, cited by Elgin 2000).

3. Promoting Intelligent Consumption

Numerous bold initiatives, community groups, and education projects are seeking to guide us towards more sustainable consumption habits. One such effort is the Intelligent Consumption Project (ICP), a joint effort of the Wisconsin Academy of Sciences, Arts and Letters, and the USDA Forest Service. The ICP examines the impact informed consumer choices could have on both the consumption and conservation of wood and wood products (Strigel and Meine 2001). The project resulted in a comprehensive strategy that included five elements designed to reduce the demand for forest resources: an ethical foundation for consumption, public access to better technical and scientific information, research on efficiencies of resource use, public education, and incentives to encourage responsible consumer choices. The ICP recognized that reversing the culture of consumption that grips the United States is a long-term and difficult task. Specific ICP recommendations that appear particularly applicable to the Pacific Northwest are provided in Table 5.

Table 5. Selected recommendations of the Intelligent Consumption Project to reduce the demand for wood and wood products in the United States. (Source: Strigel and Meine 2001)

Ethics and moral authority
1. Investigate and make explicit the connections between overconsumption and environmental degradation.
2. Promote a sense of place to reconnect people to the places they live, work, and play.
3. Explore models for local study groups that support individuals in making more intelligent consumption choices.
Technical and scientific information
1. Establish a national (or regional) materials commission to synthesize information on the manufacture, use, and disposal of materials.
2. Support studies on the impacts of material use and consumption.
3. Develop an easily understood rating system to inform consumers of their choices.
Research and development
1. Support continued research on more efficient use of forest products.
2. Support research into recovery, reuse, and recycling of wood products.
Public education
1. Develop basic educational materials relating to the production, use, and consumption of forest products.
2. Promote exploration of the environmental consequences of consumption at all education levels.
Institutional incentives and barriers
1. Foster a national dialogue on desired future population and immigration policy.
2. Develop alternatives to gross domestic product as measures of well-being.
3. Encourage the production of durable and easily recyclable goods by promoting producer "take back" laws that incorporate costs of product disposal and/or recycling in original purchase.
4. Promote tax credits and subsidies for more environmentally sound consumer choices.

The ICP focused on wood consumption for several reasons. First, per capita consumption of wood in the United States is twice that of other developed countries and approximately three times the worldwide average (Strigel and Meine 2001). Second, there is a clearer connection between the demand for wood and the condition of our natural environment than there is for many resources. In general, most people recognize the value of healthy forests and clean water to abundant salmon. Of course, protecting Pacific Northwest forests while decimating forests in other regions of the world is no solution. Neither is transforming the demand to wood substitutes, which may be less environmentally benign than tree production. Therefore, we need to look at decreasing the demand for wood products.

The wasteful use of wood and the resulting plundering and burning of old-growth and second-growth forests is a familiar story across the United States and Canada. From 1924–1928, Aldo Leopold, an early pioneer of ethical resource use, was associate director of the Forest Products Laboratory of the U.S. Forest Service in Madison, Wisconsin. This is the same Forest Service laboratory that served as co-convenor of the ICP report. In a 1928 essay, Leopold wrote about how consumer demand helped shape wasteful forest management: "A public which lives in wooden houses should be careful about throwing stones at lumbermen, even wasteful ones, until it has learned how its own arbitrary demands as to kinds and qualities of lumber, help cause the waste which it decries" (Leopold 1928). Later in the essay, he reinforced the connection between consumption and conservation more forcefully by saying that "the long and short of the matter is that forest conservation depends in part on intelligent consumption, as well as intelligent production of lumber" (Leopold 1928).

"Of course, protecting Pacific Northwest forests while decimating forests in other regions of the world is no solution."

In the long run, even strong laws and regulations can only go so far in promoting sustainable resource management. Despite sound legislation such as the ESA in the United States and Canada's Species at Risk Act, the growing *demands* of consumers and growing *numbers* of consumers, can outweigh even the best of policy intentions by forcing changes through pressures on lawmakers. Ludwig et al. (1993) pointed out that wealth or the prospect of wealth has frequently generated the political and social power necessary to promote unlimited exploitation of resources. The pursuit of credible science often takes a backseat to the pursuit of profits when it comes to feeding consumer demand.

In order to reduce demand, consumers must be aware of the consequences of their high consumption rates and be willing to search for ways to reduce their resource demands. This becomes much more than simply choosing the most environmentally responsible product among a suite of products on the store shelf, but actually reducing our dependence upon the product itself. This requires a change in attitudes and ethics.

In 1998, Oregon State University embarked upon a Sustainable Living project designed to reduce environmental degradation and improve the quality of life in the Pacific Northwest by fostering new consumption patterns and sustainable lifestyles (Simon-Brown 2003). The project defines sustainable living as "a life that is deeply satisfying, fulfilling and appealing, and at the same time, environmentally responsible." Since 1999, more than 5,000 people have participated in Sustainable Living project workshops at the university. The intent of the workshops is for participants to identify their individual values and beliefs for making more informed lifestyle decisions and address major economic and cultural barriers to achieving their desired lifestyle. The participants are given access to research-based information on numerous topics,

such as energy use and healthy foods, and then connected to local community programs, such as Earth Ministry churches, simplicity circles, and neighborhood EcoTeams that help implement desired lifestyle changes (Simon-Brown 2003).

Elgin (2000) noticed that people choosing to simplify their lives and live more sustainably tended to make the following kinds of changes in their consumption patterns:

- They tend to buy products that are durable, easy to repair, energy efficient, and not tested on animals.
- They were more inclined to make their own furniture and clothing and grow their own food.
- They used more public transit, carpooling, bicycles, and smaller and more fuel-efficient cars. They also tended to make more extensive use of electronic communication and telecommuting.
- They tended to shift their diets from highly processed food, meat, and sugar toward foods that are more natural, simple, and locally grown.
- They recycled more and cut back on use of nonrenewable resources.
- They tend to buy less clothing, jewelry, and cosmetics.
- They observe holidays in a less commercialized manner.

There is more evidence to suggest that Americans are ready to fundamentally change their lives for the better. Sixty percent of Americans say they want to simplify their lives (Schor 1998). As many as 35–40 million Americans are experimenting with some form of the voluntary simplicity movement (Simon-Brown 2003). A substantial part of life simplification includes reducing individual consumption rates and thereby living more harmoniously with the natural world. Although many people are changing lifestyles to improve the quality of their lives, people are becoming increasingly aware of linkages between their lifestyle choices and environmental quality.

Envisioning the Future

We have presented a framework and rationale for an individual's set of ethics and values that must be adopted if we are to have significant populations of wild salmon in the year 2100. Those of us who have become keenly aware of the impacts of American lifestyles on wild salmon constitute but a small minority of North Americans. If the harmonious lifestyle envisioned at the beginning of this chapter is ever to become a reality, this minority must grow, and quickly. A clue to the solution of our current dilemma may be found in the wisdom of Aldo Leopold (1953:165). In *Round River*, he reminds us that

> “Sixty percent of Americans say they want to simplify their lives.”

> One of the penalties of an ecological education is that one lives alone in a world of wounds. Much of the damage inflicted on land is quite invisible to laymen. An ecologist must either harden his shell and make believe that the consequences of science are none of his business, or he must be the doctor who sees the mark of death in a community that believes itself well and does not want to be told otherwise.

Those of us who see the marks of disease and instability in our communities, therefore, become the doctors who must try to convince an unwilling patient what our knowledge and intuition mandate must be done to avoid disaster. This is not unlike a maritime captain, aware that the ship is about to sink, being totally ignored by all but a handful of passengers because they are having too much fun playing shuffleboard.

Change is seldom, if ever, accepted gracefully and without dissent. Those that see the need for a redesigned future must lead by example and encourage others to follow.

One thing we can say with certainty is that the future will be unlike the past. One way or another, consumption rates will change. For example, we know that the American consumer's dependence on oil will shrink dramatically in the next two decades. Experts estimate that oil production will peak sometime within the next 10–25 years and that significant disruption of supplies is highly probable prior to that date (Elgin 2000; Roberts 2004). The question is, will we plan for this change or will it be imposed catastrophically upon us as supplies dwindle? Clearly, now is the time to begin to wean ourselves from a dependence on fossil fuels, not 15 years from now.

The long-term answer to problems of overconsumption must inevitably lie in the realm of ethics and education, directed at all levels of society. Only when the great majority of the populace becomes ecologically literate and shares with us the role of doctor who sees the mark of disease in our lifestyles can we expect to receive the required political support necessary to affect a behavioral turn-around. Brian Czech (2000) in his landmark book *Shoveling Fuel for a Runaway Train* envisions a future where more and more people will understand the folly of perpetual economic growth and will begin to see the conspicuous consumer as a bad citizen. This new set of values needs to come sooner than later for wild salmon and their habitats.

> “One way or another, consumption rates will change.”

Change will occur. As noted by Lester Milbrath (1992:352) in *Envisioning a Sustainable Society: Learning Our Way Out*, quoting Jonas Salk (1983),

> Survival of the world as we know it is not possible. The world will have to be transformed and evolve for continued survival. This is the necessity and the imperative of our time and will continue to be so long into the future until this transformation is achieved.

Milbrath then proceeds to expand upon ways in which societal support may be engendered to overcome our current immersion in unsupportable consumerism, citing the concern shown through public opinion polls relative to environmental quality, and how our current lifestyles might finally be shifted toward a new paradigm of sustainability. Milbrath emphasizes the need for a positive and optimistic attitude. His message is that rapid change, although difficult, is indeed possible. Milbrath (1992:380) concludes his book with the following paragraph:

> Our common journey promises to be challenging and exciting even though difficult. It will be much easier and likely more successful if we face it optimistically and with deep understanding of the pace and character of social transformation. Those given the gift of understanding will become the conscious mind of the biocommunity, a global mind, that will guide and hasten the transformation. Those who understand what is happening to our world are not free to shrink from this responsibility.

We must reduce our ecological footprint not only in the hope that wild salmon will survive in the year 2100, but also to ensure a livable future for our children and grandchildren and others with whom we share our planet. Each of us must make a commitment to adopt a land ethic that is sustainable, moral, and harmonious. Each choice we make now in our daily lives can be a step in that direction. Quite simply, the future is ours to imagine and then to design and live.

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