

## WHY RIVERS ? WHY WATERSHEDS ? Life-lines of the Ecosystem

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*“Everybody has to go down the river some time. What river, well some river, some kind of river. Huck Finn said that and if he didn’t say it, he should have said it. If he didn’t, I will.”* (Edward Abbey, in One Life at a Time, Please, Henry Holt 1988)

Ed Abbey had a way of getting right to the point. When one cuts to the chase about environmental protection, no matter what the issue, a river is always there. Like the veins and arteries connecting the life-giving functions of the heart to the human body, rivers comprise the ecological infrastructure of the continents. They are the roads and pipes of our natural systems, and the veins and arteries of the watershed body.

Rivers' life-transporting functions help to determine the health and ultimate survival of the entire watershed ecosystem. Rivers provide natural valley flood storage and wetlands, and habitat for a wonderful diversity of aquatic and land species. Rivers supply tremendous natural vistas, impressive displays of nature's power, and conversely, contemplative opportunities central to our lives as thinking humans -- attributes needing far more protection than they currently receive.

Rivers also perform a larger function in the natural realm. They connect the mountains to the sea, link headwater areas to lowlands, and provide a continent-wide system of pathways for the movement of plants and wildlife. This mixing, to the extent it can occur on highly developed rivers, strengthens ecosystems by connecting natural areas -- mountains, coasts, forests and refuges -- one to the other.

In many ways, river systems also serve as the primary natural economic infrastructure: sources for waste disposal, power supply, transportation corridors, drinking water and recreational use. Unfortunately, the history of human development in North America, and throughout the world since 1600, shows an ever-increasing destructive capacity affecting natural riverine systems. The veins and arteries are denuded of their supportive organs while simultaneously becoming overloaded with sediment and other waste products.

Rivers, though, are part of complex watershed systems, with their own intrinsic value and ecological importance. They are also a dynamic and essential component of natural food chains. Despite the importance of watersheds in nature, the concept itself is very poorly understood by the public. Most people have no idea what a “watershed” is, and many equate watersheds with “water closets” or even fancy outhouses. Put simply, a watershed is the land from which water drains into a river, lake, or other water body. *All* land, therefore, is part of one watershed or another.

## **Watershed address and ecological literacy**

We all know our mailing address, but how many people know their ecological address or their watershed address? These are tougher questions, and certainly more important ones from an environmental perspective.

What exactly is an ecological or watershed address? For our purposes, an ecological address may be defined as one's place in the watershed. Knowing your ecological address, your watershed address, means knowing your relationship with the waterways around you. Where does your drinking and washing water come from? What affects its quality and quantity? Where does it go when you are done using it or when you flush your toilet? What local sub-watershed do you live in, and to what major watershed do you belong?

Those of us who have lived in the Great Lakes -- St. Lawrence watershed have some idea of the wonders, vastness, and diversity of this region. But how many of us really know what it means to live in and be dependent upon this watershed?

We've heard a lot of talk about "cultural literacy" over the last decade from the likes of Allan Bloom and other pundits. We rarely hear about, at least in broad public debate, ideas and paradigms essential to physical survival in the coming century. Ecological literacy, the knowledge of our ecological address and relationships, raises far more important issues than does cultural literacy (as defined by Bloom) for our ability to thrive in comfort over the next millennium (see Orr, **Ecological Literacy** 1992).

Ecological literacy is fundamental to our work as citizen activists, environmental engineers, resource scientists, politicians, and regulatory administrators. It is also fundamental to the responsibility of every individual to make informed decisions about quality of life and community in a democracy. Do you know your ecological address? Do you know exactly where you live? Knowledge of your ecological address shows an understanding of your place in the ecosystem. Knowledge of our place in the ecosystem clearly indicates an understanding of the inter-connectedness of the human and natural environment.

Consider, for instance, the on-going public debates in the United States about the claimed unconstitutional "takings" of private property without compensation that supposedly result from passage and implementation of common, limited and generally timid environmental protection measures. A basic level of ecological literacy throughout society would likely render this debate moot. Ecological literacy highlights the absurdity that individual property owners (you, me and our neighbors) should be paid to protect the shared natural resources of land, air and water which are required to sustain all life on the planet.

Canadian Otto Langer describes the debate well in comments to a workshop on urban stream protection, restoration and stewardship in the Pacific Northwest:

“The greatest weakness is that we do not apply the proper degree of protection to the watershed which gives rise to stream processes that create habitat. Instead, we apply remedial solutions such as stream restoration after the problem has developed... We do this because society does not have the will to ensure that good land use planning will protect key features of the watershed.... If we do not take a very different approach in protecting our streams, they will continue to be victims of our growth dependent socio-economic system. The development rights of the landowner greatly outweigh the collective rights of the public to have healthy watersheds. However, it is the healthy watershed that is the true indicator of a sustainable future and a high quality of life....”

(Otto Langer. “Summary Comments and Workshop Reflections”. In Urban Stream Protection, Restoration and Stewardship in the Pacific Northwest. Workshop Proceedings, March 10-12, 1997.)

### **Ecological Shock**

*“Ecologists perpetually talk about the interdependence of nature and lip service is given to this notion on Earth Day, but, in practice, environmental problems are approached one fragment at a time, not as a complex, multivariate, interdependent landscape. The coexistence of technology and biodiversity depends on switching from a fragmented to a landscape view”.*

(John Cairns Jr. “Developing a Strategy for Protecting and Repairing Self-Maintaining Ecosystems”, Journal of Clean Technology and Environmental Science, 1991.)

Current trends reveal a crisis in biodiversity and an inability of current environmental protection laws and efforts to protect endangered species on either a piecemeal or systematic basis. Studies by the Nature Conservancy, The American Fisheries Society and the National Research Council of the National Academy of Sciences illustrate that flowing freshwater systems sustain far more damage than terrestrial systems. Rivers are central to watersheds, so they suffer from environmental damage to land and water habitats -- impacts which become amplified farther downstream.

The Nature Conservancy studies in 1990 and 1997 have concluded that 37% of all native freshwater fish species in the U.S. are threatened or endangered, 65% of freshwater crayfish, and 67% of all freshwater mussels. Studies reported by The American Fisheries Society in 1991 and updated in 1997 have found equally disturbing facts for anadromous fish, concluding that 214 salmon and steelhead fish stocks in the Northwest are threatened, 101 of these near extinction. Eastern species, including Atlantic Salmon and shad, are gone from most of their original spawning grounds.

The major causes of species decline include the loss of riverine habitat, dams, water diversions, river channelization, deforestation, development and other habitat destruction. Because many ecologists believe that rivers are true indicators of general ecological and watershed health, these precipitous declines take on an even greater significance. Indeed, while at least 10 native U.S. fish species went extinct between 1979 and 1989, no terrestrial species are known to have become extinct during that same period.

Similar concerns threaten Canadian rivers, although fewer studies and inventories have been completed. In southern regions, including the Great Lakes -- St. Lawrence, urbanization is a major threat to rivers. Over-exploitation of commercial stocks and resource management remain serious issues in both inland and coastal fisheries. The Recreational Fisheries Institute of Canada reports hundreds of recreational fish stocks in jeopardy, with six species threatened and four in danger of extinction. The leading causes of fisheries decline are identified as human destruction of fish habitat, pollution, the proliferation of non-native species, over-exploitation and neglect. Generally, the ecosystems approach is preferable for preserving the diversity of fishes rather than focusing on one or two economically profitable species.

River systems across the United States are profoundly degraded. Human impacts have grossly altered their physical and chemical characteristics. A recent study by the National Research Council concluded: "Given that there are well over 2.5 million dams in the United States, only a small probability exists that a drop of water could make its way from its cloud of origin, over the land surface through the drainage system, and back into an ocean without passing through a man-made structure." U.S. E.P.A. reports in 1998 that 57% of U.S. watersheds do not meet at least some water quality standards and 40% of rivers, lakes and estuaries do not meet the fishable/swimmable standards required by the Clean Water Act. The most recent available data also shows in 1994, more than 45 million people (20% of the population) were served by community drinking water systems that violated health based requirements at least once during the year.

With 9% of the world's freshwater resources, Canadians generally consider their water supplies as very abundant. Some regions, however, are already beginning to stretch the limits of their water resources. Approximately 60% of Canada's fresh water drains north, while 90% of the population lives within 300km (180 miles) of the Canada-United States border. With some of the lowest water prices in the world, Canadians are now being required to re-examine this resource which has been taken for granted for far too long. Water conservation strategies include higher water rates, meters, conservation technologies, and public education campaigns.

Degradation of river systems has become a serious concern, particularly in densely populated southern Canada. The main water problems in Canada are generally not related to quantity, but rather the issues of degraded water quality, disrupted flow regimes and ecological balance. Urban streams and rivers have experienced significant habitat loss, as well as pollution problems resulting from sewer overflows, nutrient loading and contaminants. The large area of impermeable surfaces in urban areas

exacerbate the problem. Even northern rivers, which are commonly perceived as “pristine”, are not immune to deterioration. In recent years, though, public awareness of the importance of riparian vegetation for streams has been steadily increasing, and many communities are establishing or rehabilitating “greenways”, “blueways” and other wildlife habitats and corridors.

Additions to the “Ecosystem Collapse” file accumulate regularly. Included in the file is testimony by Dr. James R. Karr, Professor and former Director of the Institute for Environmental Studies at the University of Washington. Dr. Karr's testimony to the U.S. Congress, accompanied by a grim list of statistics, states “Simply put, the ecology of North American Rivers has been decimated by the actions of human society. But river degradation goes beyond the loss of species. Sport and commercial fisheries of the U.S. have also been decimated by human actions during this century. Commercial fishery harvest in rivers such as the Columbia, Missouri, and Illinois, have declined by over 80 percent during this century.”

Emily Yoffe's stark cover story for The New York Times Magazine, entitled *The Silence of the Frogs* (December 13, 1992), provides yet another illustration of the ecological shock affecting North American freshwater systems, namely the global collapse of amphibian populations. Studies collected by the Declining Amphibian Populations Task Force in Corvallis, Oregon, show almost one-third of North America's 86 species of frogs and toads appear endangered or extinct. In the article, David Wake, Director of the Museum of Vertebrate Zoology at the University of California at Berkeley, says, “My theory is that it's general environmental degradation. That's the worst thing. Frogs are in essence a messenger. This is about biodiversity and disintegration, the destruction of our total environment.” Follow up reports published in *Conservation Biology* and elsewhere suggest that the decline in amphibian populations results in part from the continued deterioration of the ozone layer in Earth's atmosphere, along with a myriad of other causes, including chemical contamination and loss of habitat.

Entering The Watershed, a paradigm shifting book by the Pacific Rivers Council, contains a comprehensive collection of ecological crises and policy recommendations for North American rivers. Documented impacts include the estimated disappearance of 70-90 percent of natural riparian vegetation due to human activities, and the fact that 70 percent of United States rivers and streams have been impaired by dams and other flow alteration.

Taken together, or even individually, scientific studies provide compelling evidence and a warning that the integrity of many of our natural systems, including rivers and their watersheds, may be overloaded and in some form of ecological shock.

## **Traditional Approaches to River Protection**

The wilderness and river conservation movements often converged in the 1960s and early 1970s with a focus on preventing dams in the few stretches of rivers not already dammed (or “damned”). Occasionally, we also focused on protecting land along the banks. Through the 1980s, traditional technical fixes accompanied these efforts, including sewage treatment plants, discharge permits, wetlands mitigation and replication.

Many of those traditional "fixes" merely put conditions on the new development or existing degradation to mitigate ongoing problems. Mitigation, however, does not address the root issues. It only slows the harmful effects addressed by discharge permits, dredge and fill permits, development and habitat destruction. Meanwhile, pressures from population growth and development sprawl continually increase. These traditional approaches also spend enormous time and effort with provincial, state and federal agencies which live and breathe technical fixes. In fact, if one takes a cynical view of environmental law protection, most of these laws were set up to implement discharge permits and enforce the degradation of our water, air and land.

Professionals in agencies, national environmental groups and local river groups become caught in this pattern over and over. We spend so much time fighting the battle of the day trying to mitigate a development or put a technical fix on the end of a sewer pipe, we miss the larger issues so clearly illustrated in scientific studies and in our rare walks along rivers.

## **New Approaches**

River-oriented, community based stewardship began in Canada well over a half century ago, as public concern about river degradation increased. One of the first organizations was the Grand River Conservation Authority, which works in partnership with municipalities, citizens and other government agencies in the watershed to solve flood, low flow and water quality problems. After years of public pressure, provincial legislation formally established Conservation Authorities in 1946 to undertake programs for natural resource management, based on watersheds. There are now 38 Conservation Authorities operating in watersheds in which 90% of the Ontario population resides. Their work includes reforestation and sustainable woodlot management, watershed strategies and management, flooding and erosion protection, acquiring and managing sensitive lands and providing education and recreation opportunities for all Ontario residents.

The Conservation Ontario watershed model has received worldwide recognition for its foresight and holistic approach. The watershed is now widely recognized as the best ecosystem unit for the management of natural resources, especially for water quality and pollution issues. In Ontario alone, there are now over 300 watershed management and strategic plans in place with member municipalities of Conservation Ontario.

In other parts of Canada, various forms of river basin planning have been underway since the 1960s. For example, in Western Canada, the Fraser Basin Council

and Partners for the Saskatchewan River Basin are multi- partnership groups with representation from First Nations, governments, business and environmental groups. There are also hundreds or perhaps thousands of citizen-based watershed groups across the country.

In 1889, U.S. Army Major and scientist-explorer John Wesley Powell proposed that Western state boundaries be formed along the natural boundaries of river watersheds. Few people listened and state and other political boundaries were formed according to a higher human 'logic'. Nearly three score years later, citizen-based non-governmental river protection organizations in New England and other scattered areas began to heed Powell's advice. These groups have led a quiet revolution in environmental management since the late 1940s. Some have begun to implement educational programs stressing the fundamental interconnections between water quality, water supply, wetlands, air quality and wildlife habitat. Watershed associations, including the Connecticut River Watershed Council, the Housatonic Valley Association, the Merrimack River Watershed Council and many others, are at the front of this movement. These groups restore and protect the environment on an ecosystem basis, using river watersheds as the basic unit.

In the Great Lakes-St. Lawrence River watershed, local and regional groups, including the Tip of the Mitt Watershed Council in Michigan, Rivers Unlimited in Ohio, the Lake Michigan Federation, the River Alliance of Wisconsin, and the newly formed Minnesota Rivers Council, lead a citizen-based renaissance in watershed protection during the 1990s. Governmental efforts on both sides of the international border are also joining in citizen and watershed based initiatives.

### **Challenges in Watershed Protection**

*"Step back and look at this place.... Look carefully and you will see the myriad patterns of ridges and valleys etched with riverine paths pulsating to the rhythms of life; the cascading, trickling, gurgling, babbling, gushing, roaring, seeping, lapping, crashing, and silent rhythms of life."*

Water Connection. Newsletter of the New England Interstate Water Pollution Control Commission. "At the Watershed of Environmental Management" Vol. 10 (1). 1993.

Watershed is one of the environmental buzz words of the 1990s and will no doubt lead environmental protection efforts in the new millennium. Debates on what watershed approaches mean politically and geographically echo through the halls of government, the offices of conservation organizations, and on the pages of leading journals throughout the continent. It is not, however, a particularly new debate. A century ago, spurred by Major Powell's reports, watershed boundaries, political and environmental, were debated in the same wide range of venues including federal agencies, the U.S. Congress, and journals throughout the continent.

Improved upon, refocused, energized, and revised, the time for watersheds -- comprehensive, integrated environmental and political approaches to our river ecosystems -- has arrived again one hundred plus years later.

A major challenge for the river watershed conservation movement includes gaining a greater public understanding of the role that natural rivers and streams play in enhancing daily life. In particular, we need to communicate river watershed protection in ways with which people can relate.

People relate easily to what they can taste, touch and feel. Waste products and recycling are popular and easy to understand because we have to deal with them each and every day as part of living. The importance of river mollusks (clams and snails), macroinvertebrates (bugs), and their relationship to a healthy and natural environment is a more difficult concept for the general public to grasp

Effective education means going beyond the tangible and daily issues of recycling and household wastes. It includes helping the public understand the importance of topics such as aquatic invertebrates, which are essential in food chains. The message must be clear that clean water and protecting rivers also means effectively addressing population growth, urban sprawl, air quality, solid waste disposal and a myriad of other issues throughout the watershed. These topics must become a part of our culture, and a part of our ecological literacy.

### **The Question of Population Growth**

Effective watershed protection involves a tough step-by-step process and the allocation of precious resources and limited staff. It means stepping back a little, trying to figure out the critical and global issues for the watershed. It also means making tough choices to cut back on time spent in day-to-day mitigation efforts, and in the state and provincial permitting statutes, and spending more time and effort on political change which enables comprehensive approaches solving the broader issues. Watershed protection means educating adult decision-makers to regional issues and figuring out useful and innovative ways to adapt governmental boundaries to drainage basins and multiple jurisdictions. Most importantly, effective watershed protection and restoration means focusing public attention on solutions for the most critical environmental issues.

We can spend lots of time and money in new environmental studies and initiatives determining the exact chain of events driving freshwater species into extinction, and in some instances perhaps we should. But it does not take a nuclear physicist, a rocket scientist, or a plant or fisheries ecologist to see the single most important factor in ecosystem degradation today. It is a factor which, if not addressed effectively and promptly, may quickly overwhelm every other effort undertaken by humans to reduce environmental damage and restore healthy ecosystems. This root problem is human population growth. In the United States and Canada, it is also the issue of per capita resource consumption. If we do not effectively address and reverse these trends, it will be difficult, if not impossible, to ensure that our generation's grandchildren will ever see

anything remotely resembling healthy natural ecosystems anywhere in the Great Lakes-St. Lawrence watershed: rivers teeming with aquatic life, riparian forests with wild predators and grazers, and diverse bird populations.

Statistics released by the U.S. Census Bureau show population growth in the United States has climbed from a negative rate throughout much of the 1970s and early 1980s to a major new baby “boomlet” in the 1990s. The increased growth rate is a combination of rising birth rates, and also greatly increased immigration, both legal and illegal. In Canada, as in the United States, increased rates of net in-migration contribute to population growth. World population, meanwhile, continues to expand exponentially.

Given the rates of resource depletion and consumption by residents of the United States and Canada, (who consume natural resources at rates conservatively estimated at more than ten times the rest of the world), even a relatively low rate of population growth in North America has a disproportionate impact on the environment, locally and globally.

Lester R. Brown, President of the Worldwatch Institute, provides a graphic example when he states: "Our generation is the first to witness the doubling of world population during a lifetime. Indeed, everyone born before 1950 has seen world population double" (Vital Signs 1993: The Trends that are Shaping our Future). **The United Nations Population Division estimates human population will reach 6 billion in 1998, 7 billion by 2010, and 10 billion by about 2050.**

The problem of population growth is greatly responsive to political leadership. It was no fluke that the decline of the birth rate in the United States through the late sixties and early seventies coincided with major political attention to the issue from administrations as divergent as Nixon and Carter. (See e.g. **Report of the Commission on Population Growth and The American Future**, 1972 or **Global 2000**, compiled by the Carter Administration and published in 1980).

Current growth rates are greatly influenced by the dearth of past political leadership of the Bush administration and the outright hostility to the issue by the Reagan administration. As Brown puts it, “The eighties, however, turned out to be the lost decade, one in which the United States not only abdicated its leadership role, it also withdrew all financial support from the United Nations Population Fund and the International Planned Parenthood Federation.”

While government can provide non-coercive policy leadership with speeches, tax incentives, subsidization of birth control research and distribution, and other methods, ultimately the choice to have a child is rightfully left to the individual in a democratic society.

## **Building a Watershed Movement**

The framework for grassroots watershed conservation exists in the 3000 or more river guardian groups across the continent. The challenge is to work with international, regional, provincial, state and citizen groups to foster a cohesive movement for river and watershed protection. This means recruiting and empowering leaders. It means building the local citizen organizations so that they are capable of carrying out campaigns. It means linking up all these leaders and organizations so that they can work together for the common goal, to stem the tide of river deterioration and forge new tools for watershed conservation. It also means building the personal relationships where we live, with our neighbors and businesses, river conservation colleagues, and key decision makers at all levels of society.

In two aspects this is easy. We are a continent dependent on rivers and reservoirs (damned rivers!) for our drinking water. More than 85 percent of all U.S. citizens get at least some of their water from rivers, and more than 75 percent of Canadians rely on rivers and lakes for their drinking water as well. And even those reliant on groundwater for drinking ultimately share the same concerns.

Watershed approaches also provide unique opportunities for improved environmental justice throughout North America. Rivers are so intricately woven into the fabric of urban and rural society they affect both the wealthy and poor. Poor people, though, are most at risk when a river becomes degraded. They rely on rivers for drinking water to a larger extent, rely on catching contaminated fish for a large part of their food supply, and are most exposed to pollution and contamination. Watershed action, with an emphasis on empowering urban grassroots organizations and poorer rural communities, can become a major tool for improving human health and increasing equity in North American environmental policy.

Long term success for river watershed protection and restoration will hinge on our ability to mobilize existing river guardian organizations, reaching out to new constituencies in the inner cities, businesses, governments and environmental organizations in expanded watershed protection efforts in the future.

Some of these efforts are underway. River Network, a national nonprofit organization founded in the U.S. in 1988, provides a wide variety of organizing efforts, technical assistance, and policy help to local citizens throughout the country from their headquarters in Portland, Oregon. In 1997, citizen activism in Canada took a huge step forward with the formation of two nation-wide charities, the Rivers and Lakes Foundation and the Rivers and Lakes Society. Headquartered in Coaticook, Quebec, both are working to encourage citizen-led watershed protection. The Rivers and Lakes Foundation is developing a variety of trust and donor-directed funds to provide long-term, and growing, support for local watershed and national watershed initiatives. The Society provides technical and inspirational advice to local watershed protection and restoration efforts throughout Canada.

Federal agencies including the EPA, U.S. Forest Service, Fish and Wildlife Service, and Bureau of Land Management, have all adopted new programs for ecosystem

and watershed restoration and management, as have the Canadian federal Departments of Environment, and Fisheries and Oceans. The immediate challenge for the river conservation movement is to coordinate, connect and expand the grassroots constituency as fast as river science and public policy have developed in the last few years.

### **‘the Brook’**

How do we most effectively use the data gathered on the Canadian rivers, or the data presented by the Nature Conservancy and the American Fisheries Society? Site specific threats literally occur by the thousands. To answer this question let's look at the recent history of one relatively insignificant several mile-long brook.

Thirty years ago when a child regularly hiked and fished and swam at ‘the Brook’ most of it was fairly well insulated from direct human impact. Turtles, salamanders, water striders, and brook trout were easily found. There were only about 3 houses within 300 yards of ‘the Brook’, but 25 years later there were over 40 in just the upper reaches. In the summer, little or no water was left in this stretch. It was silted and dried up. There were no fish left there, no turtles, no salamanders, nothing much for little kids to play with or to discover. An old gravel pit had expanded and diverted what was left of the stream. There were no bitterns left in the cranberry bog near ‘Bittern Lane’, and the pond nearby drained in a trickle to the brook’s confluence with a nearby river. A sad story of a lost resource.

There may yet be a happy ending. In a brief visit to that home town just before the blizzard of 1993, Russell, a 71 year-old family friend and avid fisherman, told some new stories about ‘the Brook.’ Russell spoke of some low-key natural restoration that has taken place in the lower stretch of the brook below the new subdivisions. Beaver have returned above the gravel pit, damned the brook and created new fishing holes. Russell fished to his daily limit in the beaver pond twice in the summer of 1992. The return of ‘the Brook’ has proven to be a true story.

This anecdote reveals the tremendous resilience of rivers, streams and watersheds -- if they are given a chance. It also illustrates the possibility of restoring ‘the Brook's’ entire length if we change the way we use resources and interact with natural systems. In this case, the decline of trapping allowed the beaver to return to the drainage basin, thereby restoring some of the brook’s natural functions. Restoration of other reaches of ‘the Brook’ will require human intervention, but the opportunity is there.

‘The Brook’, and the thousands of others like it, represent a challenge in the new century -- a challenge to increase river protection to a new level of political awareness, protection and effective restoration. We need to change the way we treat our rivers, and address the landscape and our watersheds in new and innovative ways. We must do this, regardless of whether our ecological address is ‘the Brook’, or the Black, Grand or Cuyahoga Rivers, or the Grand or Ottawa Rivers, The St. Francis, the St. Maurice, the

Saguenay, Rivière du Loup, the Gatineau, or the Bad, the Wolf, the Fox, the Menominee, the Muskegon, Manistee, Maumee, Genessee Rivers or the Raquette.

Restoration of the innumerable brooks and rivers of this great continent is our collective challenge. This is where the myriad efforts of citizen activists, volunteer monitors, restoration ecologists, visionary politicians, progressive businesses and interested citizens will go now and in the future. To ensure the health of streams, rivers and lakes, we must also focus on the protection of headwater, upland and wetland areas. Ecosystem integrity and the well-being of our precious water resources demand that we address environmental issues from a holistic, watershed perspective.

One closing thought from Edward Abbey which again cuts to the chase:

*"One final paragraph of advice: Do not burn yourselves out. Be as I am -- a reluctant enthusiast, a part-time crusader, a half-hearted fanatic. Save the other half of yourselves and your lives for pleasure and adventure. It is not enough to fight for the land; it is even more important to enjoy it. While you can. While it's still here. So get out there... and mess around with your friends, ramble out yonder and explore the forests, encounter the grizz, climb the mountains, bag the peaks, run the rivers, breathe deep of that yet sweet and lucid air, sit quietly for a while and contemplate the precious stillness, that lovely, mysterious and awesome space. Enjoy yourselves, keep your brain in your head and your head firmly attached to the body, the body active and alive, and I promise you this much: I promise you this one sweet victory over our enemies, over those desk-bound people with their hearts in a safe deposit box and their eyes hypnotized by desk calculators. I promise you this: you will outlive the bastards."*

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(Edward Abbey in a speech to environmentalists, Missoula, Montana, 1978).