

Living Rivers in a Living Land:

An Initial Exploration of the “Living Rivers” Concept for British Columbia through a Multi-Jurisdictional Overview of a Variety of Governmental and Non-Governmental Initiatives for Conservation and Restoration of Rivers

April 05, 2002

Prepared by JK Youds Planning Consultants Ltd.
For the BC Ministry of Water, Land and Air Protection

Contents

Foreword	3
Executive Summary	4
I: Context and Purpose	6
II: Living Rivers: The Concept	7
III: Understanding the Scope of Living Rivers	9
1. Program Themes	9
1.1 Aquatic Ecosystems and Biodiversity	9
1.2 Fish and Fish Habitat	11
1.3 Water Quality—Human Health	12
1.4 River Hydrology and River Flow Restoration	13
1.5 Angling, Aesthetic and Other Recreation Values	15
2. Governance and Stewardship	17
2.1 Governance Tools	17
2.2 Stewardship Models	20
2.2.1 Stewardship and the Role of Science	22
2.3 Convergence	23
IV: Conclusions	23
Appendix 1: Selected Governmental and Quasi-Governmental Organizations	27
Appendix 2: Significant Statutes and Other Government Initiatives	34
Appendix 3: Selected Non-Governmental Organizations	38
Appendix 4: Miscellaneous Other References and Websites	44

Foreword

This paper has been prepared on behalf of the British Columbia Ministry of Water, Land and Air Protection. Its purpose is to serve as an initial exploration of the application of the “Living Rivers” concept to British Columbia by reviewing, at a general level, the scope of related initiatives for river restoration and conservation occurring in comparable jurisdictions. The subject of “Living Rivers” has a vast scope, and the number of relevant governmental and non-governmental initiatives underway globally is truly enormous. This is not intended or presented as a comprehensive work on the subject. It identifies a sampling of selected programs and initiatives to indicate the scope and potential, as well as to provide readers with ideas and sources for further examination. Through this overview, this work has developed some preliminary observations for the development of a Living Rivers initiative in British Columbia.

The term “living rivers” has been gathering increased usage globally by both professional and citizen organizations concerned with restoration and conservation of rivers and freshwater systems. Living Rivers has a poetic resonance that captures people’s imaginations. It is not a scientific term and it does not have a rigid definition. The term originates with visions of restoring rivers to free flowing conditions, by removal of dams and other flow-restricting structures, and of protection of free flowing rivers from dam construction. However, the concept has spread to include conservation of natural streams of all scales and to include all interconnected components of a freshwater system, from headwaters to estuaries. Thus, in this work, the term Living Rivers is used in this broadest, inclusive sense.

Most, if not all, jurisdictions have a strong and growing interest in conservation of freshwater ecosystems and there is a wealth of information available around the globe. This review has focused on jurisdictions that may have comparability to British Columbia in terms of population density, cultural land use patterns, and physical geography. For these reasons, this work has concentrated on initiatives in Canada, the United States, Australia and New Zealand. Further information about this small sampling of the vast array of initiatives can be found by using the links identified in the Appendices of this report.

JK Youds
April 2002

Executive Summary

In its "New Era for British Columbia" document, the Provincial Government committed to developing a Living Rivers strategy "to protect and improve B.C.'s river systems with scientifically based standards for watershed management, enhancement to fish habitat, and a 10-year program to correct past damage".

This paper summarizes a review of programs, initiatives, ideas, and background references in North America and in related jurisdictions that bear consideration in the development of a Living Rivers initiative in British Columbia.

From a global context, the essence of the Living Rivers concept is conservation and restoration of rivers and watershed systems, with reliance on a science-based ecological management model and the engagement of a broad network of citizens in active stewardship roles. The concept recognizes that rivers express complex interrelationships of physical processes, landscape forms and biological processes and organisms. Moreover, Living Rivers recognizes that human activity and society are tied intimately to rivers, and ultimately depend on healthy rivers for prosperity.

Major thrusts of the "living rivers" concept are:

- A science-based ecosystem model of management
- Stewardship and sustainable management
- Public involvement and responsibility

Summarized Conclusions

1. Living Rivers is both a vision for environmental governance and stewardship, and a visionary approach to these endeavours, by:
 - Seeing rivers, not as plumbing, but as the arteries of life and society
 - Requiring a broadly based partnership of governments, NGOs, business and communities
 - Engaging citizens and communities to actively participate in management and stewardship
2. Living Rivers initiatives are focused on a diversity of complex conservation and restoration themes:
 - Fish and fish habitats
 - Aquatic ecosystems and biodiversity
 - Water quality and human health
 - River hydrology and flow restoration
 - Angling, aesthetic and other recreation values
3. There are a range of governance tools and stewardship models in use. In the jurisdictions reviewed, no government has, as yet established a specific Living Rivers initiative. In most jurisdictions there exists an assortment of

- government and NGO initiatives, with a variety of governance tools and stewardship models at play.
4. Within most jurisdictions, there is a lack of coordinative mechanisms connecting the diverse interests in rivers and watersheds.
 5. The Living Rivers concept, in scope and depth, necessitates a convergence of governance and stewardship, with authority being shared and stewardship being encouraged and coordinated at all levels.
 6. **Possible Lessons for British Columbia**

This review has identified a series of common elements of river conservation initiatives that would be applicable to a Living Rivers initiative for British Columbia. The following individual actions are closely associated elements of a single initiative:

- adopting a formal Living Rivers definition/vision statement that both is inspirational and charts the general science-based direction for the initiative
- developing and applying a standardized, science-based classification system applicable to all fresh waters
- introducing a designation type to be applied to recognize widespread river stewardship initiatives
- instituting coordinative/integrative mechanisms among governments, agencies and programs that relate to Living Rivers
- instituting public-private advisory councils on Living Rivers to serve as a convener of diverse interests and council to government
- initiating a provincially driven, community-based stewardship initiative
- fostering place-based and ecosystem-based watershed planning that links scientific knowledge with community commitment to sustainability
- instituting a watershed-based systematic review of dams and other structures
- adopting a standardized watershed/river health monitoring and reporting tool that may be used by professionals and citizen stewards
- encouraging local governments to adopt science-based watershed planning to guide development
- introducing incentives to foster private land stewardship along freshwater bodies
- encouraging local governments to regulate development design and materials appropriate for minimal river impacts
- creating policy and procedures for vesting public funds to non-government trusts for stewardship purposes

Living Rivers in a Living Land:

An Initial Exploration of the “Living Rivers” Concept for British Columbia through a Multi-Jurisdictional Overview of a Variety of Governmental and Non-Governmental Initiatives for Conservation and Restoration of Rivers

“A river is water in its loveliest form; rivers have life and sound and movement and infinity of variation, rivers are veins of the earth through which the life blood returns to the heart. ”

“A river is never quite silent; it can never, of its very nature, be quite still; it is never quite the same from one day to the next. It has its own life and beauty, and the creatures that it nourishes are alive and beautiful also.” Roderick Haig-Brown, excerpts from “To Know a River” in A River Never Sleeps.

I: Context and Purpose

In its “New Era for British Columbia” document, the Provincial Government committed to developing a Living Rivers strategy “to protect and improve B.C.’s river systems with scientifically based standards for watershed management, enhancement to fish habitat, and a 10-year program to correct past damage”.

Living Rivers is a concept now in global usage. The essence of the Living Rivers concept is conservation and restoration of rivers and watershed systems, with reliance on an ecological science-based management model and the engagement of a broad band of citizens in active stewardship roles. It is difficult to be precise as to where or by whom the expression “living rivers” was first coined. It appears rooted in the work of non-governmental organizations (NGOs) and individuals, particularly active in the United States and, more recently, in Canada. The concept has captured attention rapidly across the internet-connected world. A large and growing array of NGOs, with support from professionals and academics, are concerned with river and freshwater ecosystems in both western developed economies and in developing Third World economies. Closely related to the overarching theme of “living rivers” is the work of organizations focused on restoration of fish populations, fish habitat, aquatic biological diversity, ecological integrity of freshwater systems, and recreational enjoyment of rivers.

Most governments in jurisdictions reviewed in this work (Canada, United States, western Europe, Australia and New Zealand) show an increasing interest in conservation and restoration of rivers and of freshwater systems in general. This interest has both stimulated and been stimulated by the initiative of a widespread and diverse bloom of non-governmental organizations (NGOs) focused on rivers, streams and watersheds. Indicative of the global scope of interest, the International Symposium for Living Rivers, a scientific conference of leading professionals and academics, was held in Budapest, Hungary in 2000.

Currently in British Columbia, as in other jurisdictions, there exists a wide range of government initiatives and NGO programs associated with conservation, preservation and restoration of rivers, freshwater ecosystems, watersheds, fish populations and fish habitats. Analysis of this array of initiatives has not been part of this work.

The purpose of this work is to provide background information, synthesized mainly from other jurisdictions, that might assist in development of a living rivers initiative in British Columbia. This information is derived from a review of selected websites and other documentation of government agencies and non-governmental organizations in a variety of comparable North American and other jurisdictions. In addition, information has been obtained through a long list of e-mail queries (mainly outside British Columbia) and a small number of direct interviews (most by telephone, some in-person) with representatives of a wide range of the government agencies and non-governmental organizations.

Over forty years ago, The Living Land was published as a landmark technical information atlas of British Columbia's many natural dimensions. It's author, Roderick Haig-Brown, was already well known as a magistrate, river conservationist, ardent angler and prolific writer. While Haig-Brown's broad vision was one of wise stewardship of the natural abundance of this vast and diverse land, in many of his writings he recognized that rivers are the lifeblood of the land. Indeed, rivers and streams run through and drain every corner of this vast and diverse province. It seems self-evident that they are of pivotal importance to our lives, our economy and our future; that they are the well-spring of life itself. Therefore, as we enter this twenty-first century, it is particularly fitting that the Province initiates an era of Living Rivers for a "Living Land".

II: Living Rivers: The Concept

Iona Campagnola, when chair of the Fraser River Basin Council and addressing the Third Canadian Heritage Rivers Conference in 2001, said it succinctly:

"Rivers are genuinely sacred to survival and (the) life of all things and at the very heart of comprehensive sustainability."

The concept is a recognition that rivers express complex interrelationships of physical processes, landscape forms and biological processes and organisms, that human activity and society are tied intimately to rivers and ultimately depend on healthy rivers for prosperity.

Major thrusts of the “living rivers” concept are:

- **A science-based ecosystem model.**

It represents a science-based ecological management model, in contrast to an engineering model of river management. [from: Williams (2), Appendix V]. It is at the heart of the work of knowledge-based professional organizations such as American Rivers, International Rivers Network (IRN), River Management Society (RMS), the Pacific Rivers Council (PRC) and Trout Unlimited (US and Canada).

- **Stewardship and sustainable management.**

Rather than a focus on protected areas and related designations, it is about sustainable practices, management and stewardship of rivers and streams and associated human uses in all rivers, streams and watersheds. To this end, for example, science-oriented, watershed based citizen-participation planning is occurring in the Conservation Authorities of southern Ontario and in many counties in the United States.

- **Public involvement and responsibility.**

Rather than depending on governments to do what they can and will, the concept engages citizens and their organizations to participate in funding, prioritizing and hands-on stewardship and restoration initiatives. For instance, several American states, inspired by the federal Environmental Protection Agency, have instituted programs for communities and NGOs to “adopt” rivers, streams or watersheds. NGOs such as the many chapters of Trout Unlimited are serving as both fund raisers and organizers of volunteers to directly undertake restoration works.

It is evident from this review that Living Rivers is a concept that extends well beyond the boundaries of protected areas; they represent the complex web of life, including human activities and uses. Just as rivers and streams are central components of virtually every landscape and integral to almost every land use—from wilderness to agriculture to urban—Living Rivers is a vision of huge scope, a vision that seems in many jurisdictions to be igniting a substantial movement of NGOs and communities. It is a vision based on recognition that rivers, streams and all fresh waters are central to the very fabric of our lives. It is no coincidence that for most major religions of the world, rivers are deeply symbolic of life itself.

From examination of some of the enormous and growing network of people and organizations focused on conservation and restoration of rivers, it becomes evident that Living Rivers is a vision that focuses the interests and efforts of

society on valuing, sharing, restoring and enhancing rivers, streams and watersheds, not as large scale plumbing systems for human use and abuse, but as exquisite ecological arterial systems, vital to all life and essential to a healthy society and a vibrant economy.

Moreover, the Living Rivers vision transcends the conventional governance model of modern society, where we have come to depend on government to establish priorities and take appropriate action. The rapidly emerging pattern is that Living Rivers is not for government to solely manage on behalf of a passive public. Rather, the vision requires that, with government providing key leadership and technical capabilities, communities of ordinary citizens become actively involved in participatory stewardship. Success for this vision will depend on a positive partnership of government, business, communities, non-government organizations and individuals. If this is achievable, it is believed that our environment will be enriched with the direct investment of labour and resources in conservation and restoration, while our communities are enriched with the pride and knowledge derived from building a sustainable relationship with the environment.

III: Understanding the Scope of Living Rivers

1. Program Themes

While leading edge scientists, professionals, academics and NGO's are bridging disciplines with application of the Living Rivers concept, the majority of relevant current government and non-government initiatives each tend to be more narrowly focused. These more specific interests, which now can be coalesced within the broader reach of Living Rivers, are briefly explained here as "program themes".

Program themes, identified through this review, can be thought of as the categories of key purposes, or missions, of the array of existing initiatives. These themes are:

- 1) aquatic ecosystems and biodiversity,
- 2) fish and fish habitats,
- 3) water quality and human health,
- 4) river hydrology and river flow restoration, and
- 5) angling, aesthetic and other recreation values.

While there can be considerable overlap among these themes, the specific deliverable programs or measurable outcomes for each tend to vary significantly.

1.1 Aquatic Ecosystems and Biodiversity

Discussion

Some government initiatives and some citizen-based initiatives express their mandates or missions in terms of the preservation and restoration of the full diversity and complexity of ecosystems associated with aquatic environments. This includes rivers and tributaries, headwaters, riparian areas, wetlands, ponds and lakes. Biodiversity refers to the natural range of species occurring in a given environment. While fish are an important attribute of many ecosystems, a natural system encompasses micro and macro organisms, appropriate water chemistry, turbidity and nutrient loads, aquatic and semi-aquatic plant life, and a diversity of animal species.

There is a strong inter-connectedness among the diverse elements of an ecosystem, such that it is self-regulating and sustaining. For example, for cold water salmon-bearing streams of coastal British Columbia, where water chemistry and flow regimes might otherwise tend to offer a less-than-ideal environment for sustaining aquatic life, the rotting carcasses of spawned salmon provide a crucial nutrient source for the web of plant and animal (invertebrate and vertebrate) species of those streams.

Likewise, the protection of aquatic ecosystems and biodiversity requires consideration of the relationships of land to water along the entire length of a river or watershed. In turn, the ecological health of lakes, wetlands, and tributary streams depends strongly on land use regimes and management practices in surrounding areas. As a result of the recognition of the importance of conservation of aquatic ecosystems, there is a trend in many jurisdictions toward watershed-based management and regulatory protection of wetland and aquatic ecosystems. In some states in the United States, there has been an introduction of private land prohibitions, controls and stewardship incentives in relation to riparian and wetland areas.

Examples

Australia, Natural Heritage Trust: a federal initiative to assist communities in conservation of “river health”, which is defined as “the ability of the aquatic ecosystem to support and maintain key ecological processes and a community of organisms with a species composition, diversity, and functional organization as comparable as possible to that of natural habitats...”.

Ontario, various Conservation Authorities: For example, the Grand River Conservation Authority, which have watershed-based regional governance of water resources and have developed detailed conservation plans and initiatives.

Kentucky: Water Watch Program: The state government fosters community-based stewardship of all aquatic environments in the state.

Massachusetts: Riverways Program: This program has the mission of identifying, protecting and providing stewardship of riparian areas, including private lands adjoining rivers.

New South Wales, Australia: RiverCare Program: A program directed to management and rehabilitation of “riverine corridors” in their entirety with emphasis on citizen-based stewardship initiatives.

United States’ Environmental Protection Agency: Watershed Initiative: A program intended to encourage successful watershed partnerships to protect and restore water resources, encompassing watersheds and their aquatic ecosystems.

1.2 Fish and Fish Habitats

Discussion

The protection, management and restoration of fish populations and fish habitats associated with freshwater systems is one of the most popular conservation themes for governments and non-governmental organizations alike. Much of the attention has been and continues to be on commercial and recreational species (particularly salmonids). Today there is an increasing emphasis on protection and restoration of all native species, regardless of whether society has a direct use interest. The ability of freshwater systems to support self-sustaining wild fish populations, with an emphasis on species native to those waters, is strongly associated with high water quality, appropriate hydrological flow regimes, as well as appropriate management of harvest and non-harvest recreational and commercial interests.

Restoration and stewardship initiatives are widespread in all reviewed jurisdictions, with active roles being taken by most central governments (federal, provincial, state), various local and first nations/tribal governments, and many non-governmental organizations. Conservation and restoration of wild fish and wild fish habitats has garnered considerable private and public funding support in most jurisdictions of the western world. Watershed-based management and stewardship, protective designations for rivers, restoration of river flows, and a myriad of special management arrangements are most commonly rationalized with fish and fish habitats as important factors.

Examples

Canada; the *Fisheries Act*: Gives overarching authority for the priority of protection of fish populations and habitats, with the Provinces having more specific delegated authorities under corresponding provincial statutes.

United States; the *Endangered Species Act*: Increasingly used to argue for restoration of water flows in rivers where native species of fish are threatened, such as the Colorado River.

Ontario; the *Exceptional Waters Program*: Yet in developmental stages, this is directed at developing management regimes for rivers and streams in southern Ontario that offer fish habitat of outstanding quality.

Canada and United States; *Trout Unlimited*: An NGO of many chapters in both countries which sees fish as “bell weathers” and symbols of river health, has been particularly active through their many chapters, including in British Columbia, in sourcing and distributing funds for restoration projects and in bringing diverse watershed interests together for common purposes.

1.3 Water Quality—Human Health

Discussion

Many towns and cities depend on rivers and streams directly for their freshwater supplies. Other settlements depend on groundwater supplies which may easily and invisibly be affected by human activities on the land. Today, regardless of the relative abundance of freshwater, many of these water sources are either of suspect quality or there is an absence of sufficient watershed management and/or regulation to ensure the sanctity of water quality over time. The nature of water drainage is that all dissolvable substances and water-borne micro-organisms, whether naturally occurring or associated with human activities flow downstream from one part of a watershed to all lower parts. It has been a pattern of history that rivers and streams tend to be both the accidental and deliberate conduits for disposal of undesirable substances, with costly (and sometimes devastating) consequences for downstream communities using the same waters for consumption purposes. For this reason, many observe there to be a strong correlation between the health of an economy and the health of the people. Since the health of local and regional populations can be undermined by poor water quality, poor water quality can undermine an entire economy. Hence governments and non-governmental organizations are increasingly focused on protecting and restoring water quality from the human health perspective and this is an important Living Rivers theme.

While the protection of clean water supplies has long been a government priority, it also has tended to be treated on a piecemeal basis, rather than a watershed management basis. The protection of large scale water catchment areas from development, as undertaken in some locations in British Columbia, is less common than reliance on treatment of waters taken from rivers and streams as they pass towns and cities. While the former approach is impractical, if not impossible in most areas due to land ownership, settlement and development patterns, the latter approach is now increasingly recognized as inadequate.

Integrated watershed conservation, management and stewardship is seen as the more appropriate model.

Examples

United States, the *Clean Water Act* and the Environmental Protection

Agency: The EPA has declared “clean water” to be the priority theme for 2002, declaring that “All Americans will have drinking water that is clean and safe to drink” and linking delivery of this goal to funding support for watershed conservation and restoration initiatives nation-wide at the county level.

Canada, Environment Canada and the Federal Water Policy: This policy is rooted in the *Canada Water Act (1970)* which is focused on the conservation of freshwater resources. While the *Canada Water Act* provides a statutory hallmark for water quality protection in this country, most jurisdictional control is provincial and local, with a cross-country variety of approaches and array of agency mandates. For example, in British Columbia, although the *Forest Practices Code of B.C. Act* and regulations reflect forest management attention for watershed restoration, riparian sensitivities and community watersheds, a parallel management control is absent when it comes to agricultural practices or many other types of land uses in relationship to watersheds. On this point, the Final Report of the Drinking Water Review Panel (February 2002), in reviewing British Columbia’s *Drinking Water Protection Act*, reiterates the Auditor General’s 1999 conclusion that drinking water sources lack adequate protection from human-related impacts (p.12).

Western Australia, Water and Rivers Commission: This agency has been established by statute to protect, conserve and enhance water resources. The emphasis of its work is on ensuring the adequacy of quantity and quality of freshwater to support human needs, and therefore protection and restoration of waterways and wetlands are important aspects of the mission.

Waterkeeper Alliance: a United States-based umbrella NGO with numerous sub-initiatives throughout North and Central Americas. Their focus, modeled after “Riverkeepers” in Britain, is to activate citizens to monitor the waters associated with their communities.

1.4 River Hydrology and River Flow Restoration

Discussion

River hydrology, as a “living rivers” theme, refers to the physical aspects of the flow of water in each given river or stream. This includes the changing flow of water over time (daily and seasonally, for example), the volume and velocity of flow, and the structure of the riverbed and shorelines that impede or accentuate speed. An increasing chorus of people and institutions, some professionally linked to hydrology (such as hydrological engineers and hydro-management

agencies), and many others concerned with fish, recreation, and water quality management as affected by river hydrology and flow, are recognizing the significance of river flow restoration, wherever feasible.

Societies have often sought to harness rivers to specific purposes--flood control, electricity generation, irrigation, industrial and domestic consumption—without necessarily giving sufficient attention to ecological or other consequences or even fully appreciating the physical dynamics of rivers. For instance, the hardening or reinforcement of river banks to reduce flooding might be effective (most of the time) for that narrow purpose, but directly curtails the natural replenishment of nutrients to lowland soils and, by accelerating flow, may reduce the suitability of the river for fish habitat and lead to increased flood risk for downstream communities. Throughout North America, where thousands of dams and other riparian structures were developed over the past two centuries, now there is a rising chorus of advocates calling for re-examination of the benefits and for decommissioning structures where appropriate.

In several western U.S. states, such as California, Oregon, and Washington, there is strong and growing advocacy for reassessment of dams and other structures. In fact, the term “living rivers” seems to originate with such advocacy interests. At the same time, in response to the advocacy of some United States-based groups favouring dam removal, a contrary lobby movement has emerged that opposes dam removal (calling itself “Wise Use”), arguing that these structures are economically and recreationally important. This dichotomy of interests underscores the importance of multi-stakeholder consensus-building and a careful re-assessment of societal priorities. Similar interest has emerged globally with vigorous international NGO initiatives, some focused on new large dam projects and others focused on restoration works.

Examples

British Columbia, Water Use Planning process: This is a review mechanism for the major hydroelectric water licenses, is inclusive of the range of stakeholders, local governments, first nations and other interests in attempting to develop Water Use Plans that fully reflect and balance the various social and ecological needs for river flow.

European Centre of River Restoration: This body represents a number of governments in coordinating river restoration initiatives.

Northwest Power Planning Council: A public advisory body serving a regional hydro-energy producer and developing water management plans for improving water flows on the Columbia River to improve salmon migration and habitat.

United States, Environmental Protection Agency, River Corridor and Wetland Restoration Program: This program encourages restoration works

through supply of technical information and partnerships with NGOs, including funding arrangements.

Elwha River Restoration Project: A citizen-based initiative in Washington State to promote the removal of dams on the Elwha River. It is representative of many such grass-roots organizations throughout the United States.

International Rivers Network: A professionally-based NGO with international interests in the protection and restoration of free flowing rivers.

Living Rivers: A United States NGO promoting large-scale river restoration through broad-based mobilization of concerned citizens.

Outdoor Recreation Council of B.C., “Endangered Rivers List” and “River Recovery” initiatives: Through these programs, the Council promotes public awareness of river restoration issues, as well as interest among public sector steward groups in dam decommissioning or modification.

Pacific Rivers Council: A United States NGO based in Oregon with a mission of protecting and restoring rivers, their watersheds and native aquatic species. PRC is directed by a distinguished professional board and, from this platform, is highly successful at private sector fundraising.

1.5 Angling, Aesthetic and Other Recreation Values

Discussion

Angling, scenery appreciation, various active recreational pursuits, wildland conservation and wilderness appreciation comprise a commonly associated family of interests that are, fundamentally, social and spiritual expressions of humanity. True, there are often important economic aspects—such as the associated infrastructure investments and tourism expenditures—but at their core, these are human interests that reflect direct positive **values** enjoyed by interaction with natural environments. As a consequence we find these diverse interests to be commonly promoted by those government agencies and citizen-based groups focused on environmental conservation and/or recreation and tourism in environments of high aesthetic quality. In short, these human values are directly linked to valuing the rivers themselves. Anglers, for example, have often been founders of and keen participants in conservation and restoration initiatives.

Scenic, recreational, or aesthetic conditions that might be associated with river environments range from the prim (eg. urban riverside parks) to the pastoral (picturesque countryside) to the pristine (untrammelled wilderness). Recreational activities range from the contemplative and quiet (fly-fishing, for example) to the raucous and extreme (eg. whitewater kayaking or river rafting). A range of land

use arrangements are used to facilitate, foster or (at least) accommodate such scenic and recreational uses: from wilderness protected areas, at one extreme, through protected corridors areas, to simple recognition of and management of multi-use river corridors. Due to the linear, dynamic nature of rivers and the extensiveness of river watersheds, the promotion of aesthetic and recreational values tends to require a wide range of management strategies to accommodate a complex mixture of human uses and priorities. Thus, appropriately, the Living Rivers vision reaches beyond the strictures of a single aesthetic vision (eg. protection of a specific feature or of a wilderness area) to bridge between and connect a myriad of values, functions, and visions.

Examples

Canadian Heritage Rivers Board and System: Canadian Heritage Rivers are designated as such due to their outstanding and exemplary role in the history, the environment and the cultural fabric of the nation. While managed by Parks Canada, this designation is not protective but rather is intended to foster public awareness of these rivers and, thereby, to encourage stewardship in all associated endeavours.

Ontario, various Conservation Authorities: The Conservation Authorities of southern Ontario are responsible for development of detailed river management plans which are often focused on angling, aesthetics and other recreational benefits.

United States, *Wild and Scenic Rivers Act*: This statute has provided for the creation of an extensive wild and scenic rivers system. There are three classes of protective designation, recognizing different existing development and access levels. The emphasis is on aesthetic and recreation values in the rivers themselves. There has been criticism of the lack of protection afforded adjacent lands. The Act has spawned a huge public awareness and interest throughout the nation in protecting rivers, with many NGOs taking a “watchdog” role with respect to the national system and the related programs that have been developed in thirty-three states.

American Whitewater: A NGO dedicated to conserving and restoring whitewater rivers primarily from the perspective of enhancing opportunities to recreationally enjoy them.

Living By Water Project: An innovative citizen-driven project based in British Columbia to promote appropriate use, design and development on shorelands. This initiative is particularly directed at private landowners. While there is a strong ecological stewardship basis to this project, landowners are most likely to be persuaded by sharing in an improved aesthetic environment.

Restore Hetch Hetchy: A California NGO intent on seeing the elimination of a dam built in Yosemite Park in the early 1900's. This group is unusual among groups advocating dam-busting in that its primary interest seems to be in restoring an aesthetic and recreational environment, with other benefits noted secondarily (for example, ecosystem restoration).

2. Governance and Stewardship

Implementing a Living Rivers initiative requires that governance and stewardship be examined to determine most appropriate tools and models. For purposes of this report, "governance" refers to the system, hierarchy or mechanisms of authority. "Stewardship" refers to sustainable management of resources. The following discussion is not intended as a comprehensive treatise on these topics, but only as a framework for the various approaches observed in this review.

It is likely that implementation of this new Living Rivers vision requires innovation. This review has found that, to be effective, governments are shedding a need to control the delivery of programs and sharing responsibility with NGOs and others. This seems to go hand-in-hand with a blossoming of grass roots stewardship. In this section, the variety of governance tools and stewardship models that have been observed in the course of this review are briefly described, with commentary on their usefulness for Living Rivers.

2.1 Governance Tools

Statute-based Protective Designations

With respect to rivers, the most frequently cited example of this kind of governance tool is the United States' *Wild and Scenic Rivers Act*, through which hundreds of miles of rivers have been designated for protection as linear corridors. Various state governments in the U.S. have followed with similar river-focused statutes and designations. The major limitations of this tool are (1) that it is usually limited to the defined corridor of the river, which is often the river itself and not the watershed or even adjacent lands, leaving many instances of non-conforming uses outside of the management jurisdiction of the authority (U.S. National Parks), and (2) that it is intent on protection of recreation and aesthetic values, rather than stewardship for a complex of values.

Other protected area statutes, which exist for most jurisdictions, allow for designation of non-linear protected areas, such as wilderness-oriented parks in British Columbia and elsewhere. In many instances, these can include substantial tracts of land associated with waterways, including some entire watersheds. In many instances, such as with National Parks and Provincial Parks, these designations tend to exclude the authority of other land use laws, and thereby afford the highest level of legal protection for the natural values contained within the designated areas. However, as rivers are virtually universal

components of our environment, only a portion can be set aside from the normal range of economic activities and development.

Statute-based Use Regulation

For example, the Canada *Fisheries Act*, in controlling and regulating the protection and management of fish populations and habitats, including in freshwaters, is intended to afford protection to these sensitive resources wherever they occur. Other uses are regulated or managed as secondary to the interest of the statute. As with any statute, effectiveness is often limited to the ability to adequately monitor the habitat resources in their vastness. Similarly, the United States' *Endangered Species Act* affords a measure of regulatory control over other river uses in order to protect a threatened species, however it is really a measure of last resort in much of the U.S.

Statute-based use regulation is most commonly used by those provincial and state governments which have significant measures of authority over water and land use in Canada, the United States and Australia. Water rights, or licenses, however have tended to exist for many years and it can be difficult to adjust them to allow for stewardship of a broader range of values. Private land uses, which can include forestry, agriculture, and urban (commercial, industrial and residential) land uses, are often not regulated by statutes of state or provincial governments. Such private land uses and practices may be regulated by a myriad of authorities, such as pesticide regulations and local government land use bylaws. This results in a geographic and regulatory patchwork of authority that is ineffective for river systems.

Statute-based Outcome or Planning Regulation

Some statutes generate standards for environmental outcomes or, at least, planning processes that reflect consideration of all values and interests. A leading example here is the U.S. Environmental Protection Agency under the auspices of the *Clean Water Act*. Through various programs the EPA sets standards for clean water and fosters county-level planning initiatives to develop appropriate multi-party management regimes to meet the standards. This approach, with a senior government providing statutory direction, can be effective at engendering appropriate resource management planning at local levels.

Umbrella or Comprehensive Statutes

Often in natural resources or environmental management in most jurisdictions, a complex array of uncoordinated legislation and regulation will have evolved over the decades. To reduce the complexity and improve the overall effectiveness, some jurisdictions have adopted comprehensive legislation that includes all natural resources and/or environmental management under a single statute. This tool can be crucial with respect to river conservation and stewardship, since rivers tend to involve multiple authorities under the same government. Examples are Alberta's *Environmental Protection and Enhancement Act* and New Zealand's *Resource Management Act*.

Symbolic Designations

Some central governments have developed designations that are intended to foster stewardship but carry no protective status. In Canada, the Canadian Heritage Rivers System identifies rivers of outstanding significance. There are two named in British Columbia. British Columbia has its own Heritage Rivers initiative with twenty rivers identified. Similarly, the EPA in the United States identifies American Heritage Rivers. These have mainly symbolic value, with the main purpose being to encourage or support more specific stewardship initiatives by citizens and agencies.

Joint Government Agreements and Institutions

Where two or more governments share responsibilities—such as for air sheds and rivers—joint agreements and institutional arrangements have been developed. The International Joint Commission represents both Canada and the United States on selected trans-boundary management issues and has suggested the broadening of watershed management activities. The Columbia River Treaty exists between the United States, Canada, British Columbia and bordering states with regard to the damming and water regulation of the Columbia River. With a focus on river stewardship, the St. Croix International Water Commission exists as a joint creation of the State of Maine and the Province of New Brunswick.

Watershed Management Authorities

The best known examples in Canada of application of this tool are the various Conservation Authorities of southern Ontario. Originally these were established for conservation of water and flood control. Now they are evolving to an ecosystem based management model with a focus on conservation and restoration. Exclusive watershed designations, such as the Greater Vancouver Water District, are closer to protective designations than a management authority which must accept and manage for a mix of land uses and ownership.

Empowered Councils and Commissions

A common tool of many governments is the authorization of special councils or commissions to examine river or watershed issues. These are often advisory bodies that have been empowered under specific legislation. Such bodies are useful for focusing high profile attention on significant issues, as exemplified by Western Australia's Water and Rivers Commission, or New South Wales' Healthy Rivers Commission. These bodies are typically formal and somewhat isolated from the agencies of government and from the general public.

Advisory Councils

In recent years, various governments and other authorities have found success in the creation of multi-party advisory councils designed to foster the development of consensus-based objectives, plans and management priorities. In the case of the Fraser Basin Council, for example, its "authority" is simply the

combined synergy and goodwill of many local interests and authorities working toward consensus. While not established as a regulatory body, the Council has proven to be very effective at fostering watershed-based comprehensive understanding and developing common approaches across jurisdictions.

2.2 Stewardship Models

From the many organizations keenly interested in stewardship, it is evident that stewardship is more than a vogue synonym for resource management. The notion of stewardship is one of valuing and caring for a broad range of environmental and resource values both in the present and into the future. This idea has evolved from other management ideas.

Human societies have gradually developed more sophisticated ways of understanding and managing their environments. When resources seem plentiful, the model that dominates might be characterized as “sole ownership, control and use”. As resource competition increases, government authorities might institute “resource allocation” model to attempt to rationalize control and use. In recent decades in many jurisdictions governments have applied a “multiple resources management” model, wherein there is a centralized, planned effort to balance competing commercial and non-commercial values and interests. The stewardship model can be seen as a further evolution wherein the emphasis is on coordinated management of all resource values to best ensure sustainability and stability for society and ecosystems.

Stewardship can take many forms. It can be mandated to a government agency. It can be a shared responsibility between government agencies and the public. And it can be citizen-based or grass-roots driven. From reviewing the range of models for stewardship, there seems to be a **direct, inverse relationship** between government control and a public role in stewardship. That is, the more control that government exerts, the less interest the public will have in being active participants in stewardship, other than in criticism of government controlled initiatives. Conversely, as government shares control, it allows opportunities for the public to have a stronger stewardship role. The following forms of stewardship, observed through this review, are not mutually exclusive; they tend to occur in various combinations.

Sole Agency Control

In the most conventional or traditional model, an agency of government is empowered by a statute and associated regulations of government to manage a resource. Traditionally functioning government agencies tend to desire to exercise strong control over programs within their mandate, in terms of funding, priorities, planning and delivery. Many protected area designations, for example, are the sole authority of single agencies, notwithstanding consultations that may occur for planning or management purposes. However, for rivers and watersheds in many jurisdictions, and certainly in Canada, this sole agency model is usually

inappropriate since there is usually an assortment of governing authorities, from federal to local.

Multi-Agency Management

Multi-party arrangements and agreements have been developed in many instances to facilitate cooperation and, if possible, coordination of the various authorities affecting river management issues. Sometimes these are formal inter-governmental arrangements (such as provincial management of freshwater fisheries in B.C.), but these can co-mingle with other arrangements (such as with aboriginal groups and other agencies of a provincial government) such that responsibility for stewardship is broadened. Often each participating agency may have consultation programs or policies that further expand the stewardship community.

Private Land Stewardship

One important arena in many jurisdictions is the awkward relationship that exists between statutory authority and private property rights. River shorelines are commonly dominated by private land holdings, which can be a significant limitation to stewardship initiatives, river access and development controls. In some jurisdictions, such as Massachusetts and Connecticut, statutory authority has been revised to include regulation of uses of some private land in riparian zones. While no doubt necessary in some instances, such measures do not foster stewardship as much as minimum compliance. In other areas, particularly by local governments, stewardship incentives (such as tax incentives) are used in conjunction with regulatory bylaws (particularly as conditions of re-zoning) to encourage appropriate design, development controls, and public access. The Living By Water project is a citizen-based information program to encourage private land owners to follow appropriate design and development, with the incentive being that they benefit directly from an improved environment.

Senior Government Support for Local Watershed Planning

Local and regional levels of government, including indigenous peoples' governments, seem to become most active in river and watershed stewardship and management when stimulated by funding sponsored by a senior level of government. In the United States, for instance, a great deal of watershed planning work occurs at the county level as a result of the federal *Clean Water Act* and the funding available through the Environmental Protection Agency to assist in the development of watershed management plans. Local and regional governments are often responsible for regulation of land uses on private lands and are closest to the "ground" in terms of understanding local issues and developing locally acceptable solutions.

Community-based Stewardship Initiatives

As central governments realize their limitations in capital and human resources, they are showing interest in fostering increased active roles for local, community-based stewards. The U.S. EPA's "Adopt-A-Watershed" Program, Maryland's

“Adopt-A-Stream” Program, and Kentucky’s “Water Watch” Program are examples of senior governments encouraging local initiative and fund raising for river and watershed stewardship.

Private Funding and Operation of Stewardship Projects

Throughout the western world, there are now many NGOs and private foundations focused on raising and distributing funds for watershed and river conservation and restoration. Increasingly governments may rely on such NGO’s to carry out this work and the NGO’s are proving to be talented in using public funds to attract private funding. In British Columbia, much of this work is directed toward salmonid species as well as watersheds affected by forestry operations. These organizations have often demonstrated the ability to effectively and responsibly manage significant capital resources, from both government and the private sector. They also demonstrate adeptness at determining priorities for funding. Other NGOs combine, in various proportions, fund raising with direct facilitation of restoration, monitoring and stewardship projects at the local level. Trout Unlimited Canada, through its various chapters, exemplifies this model. As non-government bodies, such organizations rely on volunteers to build consensus and confidence and to carry out the actual project work. The experience throughout the United States and Canada is that there are thousands of people willing to participate in such projects. It seems that, when projects are led by volunteers, many others are willing to volunteer their time for implementation in the field.

NGO Advocacy

The traditional roles for NGOs are as advocates for government action and watchdogs on government programs. While there seems to be a renaissance in the NGO sector with respect to bridging into stewardship and shared governance, it remains critical for other NGOs to perform the traditional roles. This is particularly the case where governments might be seen as relatively unmotivated to foster river conservation and restoration. Some international NGO’s, International Rivers Network for example, are the primary watchdogs on the mega-dam projects still being developed in non-western economies. Even in North America, initiatives like the Waterkeeper Alliance are designed to monitor government action or inaction, rather than river conditions themselves.

2.2.1 Stewardship and the Role of Science

One of the major challenges arising from fostering active public participation in stewardship is the continued need for sensible prioritization of stewardship initiatives. Leadership is important in order to establish logical and appropriate priorities for conservation and restoration. The most appropriate basis for systematically and efficiently allocating scarce funding and human resources is reliance on scientific or technical knowledge of river. Technical expertise may come from within government or from authorized or recognized NGOs. In some jurisdictions, this role is already performed by NGOs such as Trout Unlimited

(Canada and the U.S.), the Habitat Restoration Group in California, the Pacific Rivers Council, and the River Management Society. The key is that effort and initiative must be grounded in and focused by objective science.

The alternative to a science-based approach coordinated by an appropriate authority is one that gives priority to projects based on private or public advocacy. Such an approach can be effective for meeting localized social objectives, such as alleviating unemployment in a given area, or responding to perceived crises. However this advocacy-driven approach is less likely to have a scope appropriate in scale for diverse jurisdictions with numerous rivers and watersheds.

2.3 The Convergence of Governance and Stewardship

Most often, governance and stewardship are two distinct discussion themes. However, for Living Rivers, and perhaps indicative of an emerging new era for post-industrial societies, governance and stewardship converge. It is amply evident from the many vigorous initiatives underway, that they are two sides of one coin. Governance over resources is hollow without the follow-through of stewardship in the field. Effective stewardship of complex shared resources relies for direction and order on governance authorities.

It is increasingly recognized that governments and agencies, to be effective at river conservation, need to share responsibilities with other governments and agencies, as well as with non-government organizations and special multi-interest bodies. Moreover, as found in this review, senior governments increasingly seem to recognize that they must foster active stewardship, not just by their internal agencies, but by a network of communities, corporations and citizens. This is particularly important with regard to the dominance of private land ownership along many rivers. It is essential that governments lead and provide the technical grounding essential for effective conservation and restoration. Increasingly many governments are coming to understand that they cannot alone accomplish anything close to society's expectations for environmental stewardship.

Thus, new governance-stewardship relationships seem to be evolving in many jurisdictions. While not fettering the final authority and accountability of governments for decisions, innovations involve shared responsibility and multi-party arrangements to build consensus and broad public participation, to develop stewardship incentive programs, and to foster widespread citizen participation guided by sound technical information and inclusive planning processes.

IV: Conclusions

The following conclusions are based on review of a large number of government and non-government sources, as identified in the attached Appendices.

1. A Vision and a Visionary Approach

Living Rivers is both a vision for environmental governance and stewardship, and a visionary approach to these endeavours, by:

- Seeing rivers, not as plumbing, but as the arteries of life and society.
- Requiring a broadly based partnership of governments, NGO's, business and communities.
- Engaging citizens and communities to actively participate in management and stewardship.

2. A Broad Scope of Living River Program Themes

Living Rivers as a vision includes initiatives focused on a diversity of complex conservation and restoration subjects:

- Fish and fish habitats
- Aquatic ecosystems and biodiversity
- Water quality and human health
- River hydrology and flow restoration
- Angling, aesthetic and other recreation values

3. A Range of Governance Tools and Stewardship Models

While no government in the reviewed jurisdictions has, as yet, a specified "living rivers" initiative *per se*, most (if not all) governments have a number (often a plethora) of initiatives aimed at one or several of the five subject areas noted above. In so doing, governance tools and models range considerably along a spectrum from government control to strong public involvement. For river and watershed conservation and restoration, the trend for governments seems to be away from control-style models and toward shared responsibilities with other governments and levels and with NGOs and communities.

4. A Shortage of Coordinative Mechanisms

In the jurisdictions examined in this review, there tend to be a number of programs and initiatives, some public, some private, focused on aspects of conservation and restoration of rivers and freshwater systems. However there is a dearth of encompassing coordinative mechanisms. Individual programs and initiatives have been developed over time, each fulfilling a specific need, with often few connections or linkages. This is particularly true of the range of initiatives delivered by the hierarchy of governments. But it is also true that in

many (but not all) instances, NGOs seem to be competing for dominance, rather than working in partnership toward a common end.

5. Convergence of Governance and Stewardship

Rivers and freshwater systems are the epitome of complexity and universality. To truly embrace a Living Rivers initiative exceeds the ability of even the most richly endowed government. At all levels, people—citizens, communities, NGOs, corporations—must be fully engaged in funding, organizing, prioritizing, planning implementing, and monitoring. Living Rivers necessitate a convergence of governance (authority) and stewardship (sustainable management) in a full partnership of public and private sector abilities, resources and energy.

6. Possible Lessons for British Columbia

This review has identified a series of common elements of river conservation initiatives that would be applicable to a Living Rivers initiative for British Columbia. The following individual actions are closely associated elements of a single initiative:

- a) Adopting a formal definition of and vision statement regarding Living Rivers (refer to Appendix 5, articles by Dr. Phil Williams), coupled with specific criteria and principles tied to a science-based approach to management and stewardship.
- b) Developing and applying a standardized classification system and associated management standards/guidelines for all fresh waters (Example: Kentucky Water Watch Program).
- c) Introducing a designation type designed to recognize significant river management efforts (conservation, restoration, fisheries rehabilitation) by government or non-government organizations, and to recognize that a river meets accepted criteria or conditions and may be deemed a “living river”.
- d) Instituting coordinative or integrative mechanism(s), particularly between federal and provincial initiatives, to ensure science-based prioritization and efficient coordination of projects. There might be statutory and/or inter-government policy aspects, as well as tools such as a “roadmap” guide linking the various programs and initiatives.
- e) Instituting one or more a public-private advisory councils, with clear terms of reference and operational criteria to convene diverse stewardship and governance interests, to advise government on the Living Rivers initiative and actions, and to assist with prioritizing specific projects. The immediate task of a general multi-sector council would be to adopt a vision statement and principles for Living Rivers.

- f) Initiating a broad provincially-driven watershed “adoption” (or “watershed-stewards” and/or “river-stewards”) program to encourage local citizen groups, NGOs and communities as monitors and field stewards of rivers.
- g) Instituting an inter-governmental process to foster place-based and ecosystem-based watershed planning that facilitates the convergence of governance and stewardship by linking science-based prioritization with community commitment to sustainability.
- h) Building on the Water Use Planning program, instituting a watershed-based assessment process of all existing dams and other riparian structures to determine options (if any) for modification or elimination to enhance or restore river flows.
- i) Developing and implementing a standardized watershed/river health monitoring and reporting tool for use by professionals, NGO’s and communities, incorporating all Living River program themes (eg. fish and fish habitats, river hydrology, etc.) as well as land use issues affecting river stewardship.
- j) Encouraging local and regional governments to undertake land use planning that is watershed or ecosystem-based and, within this, to foster private land stewardship in riparian zones, including measures aimed at favouring developmental designs that minimize impacts on nearby rivers and streams.
- k) Introducing measures or incentives to encourage owners of riparian lands toward riparian stewardship and increased public access to and along river shores.
- l) Encouraging local governments regulate or provide incentives for developments to favour designs, methods and materials that minimize developmental impacts on rivers and streams.
- m) Creating policy and procedures for vesting public funds in trust with private foundations to facilitate NGO conservation and restoration projects and to act as a catalyst to encourage private contributions to the same foundations for these purposes.

* * *

Appendices

The sources consulted in this review are summarized in the following appendices. Although the sources are numerous, these lists are not intended to be complete and thorough. The actual potential number of sources is overwhelming, since there are multiple sources for every jurisdiction. This review has deliberately concentrated its effort outside British Columbia and has attempted to identify **a selection of the most key or relevant** agencies, programs, initiatives, organizations and references, as well as to provide **a sampling of the range** of public and private initiatives in existence.

Appendix 1:

Annotated List of Selected Governmental and Quasi-Governmental Organizations Focused on River and Watershed Issues

Listed Alphabetically:

American Heritage River Initiative (AHRI)

This is a United States Environmental Protection Agency initiative that identifies rivers of “heritage” significance in order to assist river communities in seeking federal financial aid and other resources for river conservation works. This is a non-regulatory approach involving an interagency task group and the designation of citizen-stewards. Info: www.epa.gov/rivers/contact/inter.html

Canadian Heritage Rivers Board (CHRB)

Government-appointed board overseeing the development, operation and promotion of the Canadian Heritage Rivers System (CHRS). The Board is served by a CHR Secretariat, a division of Parks Canada. Furthermore, each participating provincial government also designates an appropriate staff member to participate in CHRS matters in the respective jurisdictions. CHR designation is primarily a method of recognizing a select number of rivers as meeting the particular criteria established by the Board. Designation enhances public awareness and CHR status serves as banner, attracting local, regional and provincial initiatives to protect and sustain the special values of the rivers. There are two designated Canadian Heritage Rivers in British Columbia: the Fraser, the Kicking Horse and a third river, the Cowichan, has been nominated but not yet designated. For the Fraser, a management strategy document has been prepared with the purpose as acting as a common reference or tool for the range of governments and the many agencies with interests along the river. For example, the document identifies ten federal statutes and fourteen provincial statutes as “some examples” of relevant legislation. Info: www.chrs.ca

Environment Canada: Federal Water Policy

The general objective of the Federal Water Policy, under the auspices of the *Canada Water Act* (1970) is “to encourage the use of freshwater in an efficient and equitable manner consistent with the social, economic and environmental needs of present and future generations”. Toward this end, the policy is aimed at (1) protecting and enhancing the quality of the water resource, and (2) promoting the wise and efficient management and use of water. This initiative is mainly one of fostering individuals, governments, communities and organizations to manage water resources in appropriate ways. Info:

www.ec.gc.ca/water/en/policy/pol/e_pol.htm

European Centre for River Restoration

The ECRR supports the development of river restoration as an integral part of sustainable water management throughout Europe, with the aim of ensuring that restoration projects will be more cost effective, more likely to succeed and will encompass multifunctional objectives. It also promotes the use of river restoration technology to routine management activities and promotes the sustainable and “wise” economic use of rivers. Info: www.ecrr.org

Fisheries and Oceans Canada, Pacific Fisheries Adjustment and Restructuring (PFAR) Program

Under the auspices of the federal Fisheries Act, PFAR is an umbrella program encompassing a range of fisheries and community initiatives. As a component of PFAR, the “Rebuilding the Resource” program with a total capitalization of \$100 million, includes several significant conservation and restoration programs.

- The Pacific Salmon Endowment Fund (\$30 million commitment from government) focuses on protecting and restoring habitat, restoring fish access to critical habitat, restoring adequate water flows, improving freshwater and marine survival, providing information for fisheries management, employing selective harvesting methods, and education.
- The Habitat Restoration and Salmon Enhancement Program (HRSEP) provides financial and technical support to community projects seeking to improve the health of salmon stocks and fish habitat. More than \$36 million has been provided to conservation programs since 1997/98.
- The Habitat Conservation and Stewardship Program focuses on building partnerships in communities to strengthen the stewardship of watersheds. It is responsible for hiring qualified stewards and funds their activities.
- Strategic Stock Enhancement (\$7 million expended to date) is an initiative directed toward serious conservation concerns for endangered stocks. First Nations, community groups and industry are partners in the initiative.

Info: www.dfo-mpo.gc.ca

Fraser Basin Council

A not-for-profit British Columbia society comprised of individuals, local and regional governments and NGOs working together to foster social, economic and

environmental sustainability in the Fraser River Basin. The basin covers one quarter of the land area of the Province, contains some 2.7 million people and contributes 80% of the provincial economy. The FRBC defines sustainability to be “living and managing our activities in a way that balances social, economic, environmental and institutional considerations to meet our needs and those of future generations. While not exclusively focused on river issues, FRBC has developed a number of management plans concerned with conservation and restoration of rivers and watersheds within the basin. Beyond the development of such specific plans, the FRBC’s most important role and demonstrated effectiveness has been to bring diverse interests together to common purpose. Info: www.fraserbasin.bc.ca

Fraser River Estuary Management Program (FREMP)

This program is designed to link federal, provincial, and regional government agencies in planning for sustainable development in association with the estuary area. Since 1985, FREMP and its partners have “provided a framework to protect and improve environmental quality, to provide economic development opportunities and to sustain the quality of life in and around the Fraser River Estuary”. FREMP follows a consensus model for its planning and management work. Info: <http://bieapfrempp.org>

Grand River Conservation Authority

The GRCA is responsible for management of the Grand River watershed. Recently it has completed a detailed management and restoration plan for the river. This plan, which emphasizes recreation, scenic values and fishery values, was developed with considerable community consultation. Info: www.grandriver.ca (see Ontario: Conservation Authorities)

Interagency Wild and Scenic Rivers Coordinating Council

A coordinating body representing all U.S. federal government agencies involved in the designation and management of the wild and scenic rivers system. This group may also be key in linking the thirty-three state initiatives that are, in concept at least, state derivatives of the federal *Wild and Scenic Rivers Act*. Info: www.amrivers.org/wildscenic toolkit/interagencyguidelines.htm

International Joint Commission

Government appointed commission of both Canada and the U.S. for the planning, management and negotiation of joint nation arrangements involving shared waters. Info: www.ijc.org

Kentucky Water Watch Program

A program of the Kentucky State Division of Water intended to foster local, community-based stewardship of streams, rivers, lakes and wetlands. All waters are classified in the Kentucky Administration Regulations or the Federal Register into the following categories: Cold Water Aquatic Habitat, Exceptional Waters, Reference Reach Waters, Outstanding State Resource Waters, Outstanding

National Resource Waters, State Wild Rivers, and Federal Wild and Scenic Rivers. Info: http://water.nr.state.ky.us/wq/special_waters/specdef.htm

Lower Elwha Klallam Tribe

A tribe in Washington State that advocates for the removal of two dams on the Elwha River for cultural, land conservation and fishery reasons. In 1996, the State modified the Elwha Act, allowing for the State to purchase the two dams for \$2 provided it makes a binding agreement to restore the river within a reasonable time period. Also in 1996 US Interior Secretary Bruce Babbitt (Clinton Administration) determined that the two hydroelectric dams would be removed. Rescue Elwha Area Lakes (REAL) is an advocacy organization that opposes the removal of the two dams on the Elwha River, favouring fish ladders as an alternative action. Info: www.Elwha.org/jeopardy.htm and www.leg.wa.gov

Maryland, US, Department of Natural Resources—Adopt-A-Stream Program

Parallels the EPA program “Adopt-A-Watershed”, providing a framework for local citizen groups to take direct responsibility and action in conservation and restoration works. Much of the needed funding is raised by the volunteer organizations themselves. Info: www.saveourstreams.org

Massachusetts, State of. Riverways Program

This program exists as a result of passage of the *Rivers Protection Act*, an updated version of the preceding *Wetlands Protection Act*. The mission is to identify, protect and provide stewardship of riparian areas. Specific conservation commissions oversee application of regulations for use and development of riparian lands. The regulations are developed by a multi-stakeholder committee. A “Rivers Advocate” serves as chief coordinator of the program. Info: www.state.ma.us

Montana, State of.

An example of a US state keen to foster business investment and, at the same time, encourage environmental responsibility through community and citizen participation in conservation and restoration projects. Featured on the state’s website is “EnviroNet”, an information-access initiative to connect people to programs (mainly federal and NGO) concerned with environmental action. Info: <http://nris.state.mt.us>

Natural Heritage Trust

An initiative of the Australian government to assist communities in their local conservation initiatives. An important thrust of the Trust is the fostering of “healthy rivers”. River health is defined as “the ability of the aquatic ecosystem to support and maintain key ecological processes and a community of organisms with a species composition, diversity, and functional organization as comparable as possible to that of natural habitats with a region.” A standardized procedure has been developed by the Trust for local organizations to evaluate the health of rivers and other waterways. Info: www.nht.gov.au

New Jersey, State of. Department of Environmental Protection

As an example of the approach taken by many US state governments, New Jersey has a well developed and streamlined supply of web-based information for the public, providing them with efficient and extremely cost-effective access to government. With regard to rivers and freshwater, the EP Department features a Freshwater Wetlands Program and a Stream Encroachment Program, both of which reflect duo interests in (1) fostering (rather than impeding) development, and (2) conserving natural environments associated with freshwater. Info: www.state.nj.us/dep/landuse/

New South Wales, Australia: Department of Land and Water Conservation

The RiverCare Program is focused on “riverine corridors ... which are in need of management, and in some cases, rehabilitation.” The program is aimed at encouraging and providing direction for citizen-based and community-based initiatives to conserve and restore riparian environments. Effort is expended toward fostering interest in stewardship, the Department takes leadership in planning for restoration works, and provides seed funding for volunteer projects in the targeted river corridors. There is much emphasis on partnerships. Motivational awards are distributed to recognize the efforts of citizens and groups. Info: www.dlwc.nsw.gov.au/community/rivercare/index.html

New South Wales, Australia: Healthy Rivers Commission

This semi-autonomous commission has been established by the state government to conduct public inquiries into the condition of selected rivers. It is a formal structure, part of the government’s Water Reform Program, designed to identify the river restoration issues of high priority for the government and help prescribe the remedies. Info: www.hrc.nsw.gov.au

Northwest Power Planning Council

Public advisory body serving a regional hydro-energy producer. The council is concerned with moderating the restricted flow regime of the Columbia River in order to offer improved habitat conditions for salmon. They have devised the concept of a “normative river”, a computer model depicting the central processes of the river. The modification of the regulated flow regime of the river is opposed by groups seeking maintenance of the status quo. Sources: www.buchal.com and *Northwest Energy News*.

Ontario, Ministry of Natural Resources: “Exceptional Waters” Program

This pilot program is directed toward identification of and development of management regimes for streams/rivers in southern Ontario that offer fish habitat of outstanding quality. The pilot project work has been designed to establish the selection criteria and to determine the processes and tools by which waters of exceptional quality may be managed and sustained as a community resource for angling, recreation and other values. This work is closely associated with the

Conservation Authorities, such as the Grand River Conservation Authority (see below). Source: Jack Imhoff, Ontario Department of Natural Resources.

Ontario: Conservation Authorities and Watershed Planning/Management

Watersheds in southern Ontario have long been designated for management purposes as Conservation Authorities. Each authority has regional government responsibilities with respect to the management of freshwater systems. The Grand River, Upper Thames River, Credit River and Metro Toronto Conservation Authorities are noteworthy examples of comprehensive water conservation management. Since 1993 the Ministries of Environment and Natural Resources have been fostering the use of an ecosystem/watershed basis for local and regional land use planning. Info: eg. www.grandriver.ca; refer below to Appendix 5.

St. Croix International Water Commission

An international joint commission established jointly by the State of Maine and the Province of New Brunswick. The St. Croix River was designated as a Canadian Heritage River in the mid-1980's and also recognized as important in Maine. The commission was established through supporting legislation in each jurisdiction and an intergovernmental Memorandum of Understanding. The Commission has been successful in developing a management plan based on multi-stakeholder participation. One innovative approach was to adopt shoreline management standards within a riparian zone along the river. Info: www.asf.ca/OrgsNB/SCIWC/

United States, Environmental Protection Agency, Watershed Protection Initiative

Spawned by the *Clean Water Act*, the EPA has developed a "Watershed Initiative" intended to encourage successful watershed partnerships to protect and restore water resources. The EPA expresses its clean water goal as:

"All Americans will have drinking water that is clean and safe to drink. Effective protection of America's rivers, lakes, wetlands, aquifers, and coastal and ocean waters will sustain fish, plants, and wildlife, as well as recreational, sustenance, and economic activities. Watersheds and their aquatic ecosystems will be restored and protected to improve human health, enhance water quality, reduce flooding, and provide habitat for wildlife".

With sanction by the President, 2002 has been declared "Clean Water Year", with a catalyst fund of \$20 million US available for grants communities and local groups for up to 20 watershed projects. The initiative is intended to promote the clever use of all levels of government, as well as private programs and resources, in the development of innovative approaches to improving water quality. The EPA notes that "40% of the country's assessed waters do not meet quality goals established by states under the *Clean Water Act*". Info:

www.epa.gov/owow/watershed/initiativefs.html

United States, Environmental Protection Agency, Adopt-Your-Watershed Program

The purpose of this program, operational throughout the country, is to encourage stewardship at the community and individual level. The program is basically a campaign to motivate people to participate directly in conservation and restoration work in their local areas. The concept is based on recognition that governments cannot do as much as thousands of volunteers and that, by rolling up their sleeves and getting involved, citizens develop pride in their areas and appreciation for their environment. Info: www.epa.gov/adopt/

United States, Environmental Protection Agency, Office of Water, Wetlands Division: River Corridor and Wetland Restoration Program

This program is focused on encouraging restoration works through grants and partnerships with NGOs and funding organizations. The website offers access to technical information, definitions of restoration terminology. The definition adopted for restoration is from the US National Research Council's 1992 report, Restoration of Aquatic Ecosystems: "return of an ecosystem to a close approximation of its condition prior to disturbance". Other, related terms are also defined.

United States. Western Water Policy Review Advisory Commission

A formal body established by the federal government (Bureau of Reclamation) to review federal activities in nineteen western states affecting by the allocation and use of water resources. This is the impetus behind Water in the West, a private NGO initiative to enlighten the public about the Commission and water issues. Info: www.den.doe.gov/wwwprac/

Washington State—Various Counties (examples of implementation EPA's Clean Water Act)

For example, three adjacent counties—Snohomish, King and Pierce— independently and cooperatively deliver a series of watershed and fisheries programs. At the core of these initiatives are Watershed Resource Inventory Areas (WRIAs) and an associated participatory planning process to design comprehensive management plans. This process is triggered by the *Clean Water Act* of the US EPA, particularly with regard to protection of fish habitat. The counties deliver a range of programs relating to inventory, research, education, development control, restoration and stewardship. Non-governmental groups have noted that this planning process tends to have a "tilt" toward a local government perspective. Info. examples: www.co.snohomish.wa.us; www.co.king.wa.us; www.ecy.wa.gov/watershed/01.html

Water and Rivers Commission

An agency of the State of Western Australia with broad responsibilities for wetlands, waterways and water supplies, although its enabling legislation seems to focus its attention on managing freshwater for human uses, particularly

domestic and agricultural consumption, rather than an emphasis on ecological sustainability. Source: www.wrc.wa.gov.au

Appendix 2:

Annotated List of Significant Statutes and Other Government Initiatives in Selected Other* Jurisdictions (*outside British Columbia)

Listed Alphabetically:

Alberta, Province of. *Water Act*

The comprehensive provincial legislation governing use and conservation of freshwater, including rivers, streams, lakes and wetlands. Most applicable section pertaining to river conservation and restoration is Part 2: Planning and Environmental Assessment which sets out the requirements for water management planning and impact assessment. It is primarily a use management statute rather than a “conservation first” one. Source: www3.gov.ab.ca

Alberta, Province of. *Environmental Protection and Enhancement Act*

This new legislation consolidates a number of Acts, including the *Clean Water Act*. This exemplifies the use of umbrella environmental statutes to simplify the legal framework for environmental management. Info: www3.gov.ab.ca

Canada. *Canada Water Act (1985)*

This federal statute “provides for the management of the water resources of Canada (by the federal government), including research and the planning and implementation of programs relating to the conservation, development and utilization of water resources”. While this is important enabling legislation for the federal government, most freshwaters in the Provinces are provincial resources. For this reason, this statute enables the federal government to enter into arrangements with provinces for purposes of research, planning, conservation, development, and policy and program development and implementation. Where there is deemed to be a “significant national interest in the water resource management”, the federal government may enter into agreements for research, planning, and development and implementation of conservation initiatives. Info: <http://laws.justice.gc.ca>

Canada. *Fisheries Act*

This is a cornerstone statute with respect to the protection and management of fish populations and habitats. It encompasses “all waters in the fishing zones of Canada, all waters in the territorial sea of Canada and all internal waters of Canada”. It regulates fishing activities, obstructions in streams and rivers, and

protection of fish habitats from physical damage or pollution. Provincial management of freshwater angling is delegated under the authority of this Act. Info: <http://lois.justic.g.ca/en/F-14/54991.html>

Canadian Heritage Rivers

(refer to Canadian Heritage Rivers Board in Appendix 1).

Connecticut, State of. *An Act Concerning a Model River Protection Ordinance and Protection of Ridgelines*. (1998)

This statute authorizes the preparation of a model ordinance which may be used by any municipality in land use planning, with direction for inclusion of incentives for property owners to protect lands within the river corridor and to develop such lands in a manner that is compatible with resource protection. Tax credits and easements are specifically mentioned. This is a model only, intended to facilitate local governments to apply such measures.

Massachusetts, State of. *Rivers Protection Act*.

Statute that replaces earlier *Wetlands Protection Act*. The 1997 Act governs uses in river and wetlands as well as, importantly, imposes development controls on adjacent riparian lands, “riverfront area”, extending 200 feet (61 metres) from each side of a river or stream.

Info: www.gulfofmaine.org/times/spring97/page3a.html; www.state.ma.us

New Zealand. *Resource Management Act of 1991*

This comprehensive legislation includes sections concerning protection of river and lake beds and restriction of the use of water. This is a useful example of a single statute encompassing all aspects of natural resource management. Info: www.mfe.govt.nz/management/act.htm

United States. *Clean Water Act*

This is a keystone federal statute with the broad objective “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters”. It applies to federal waters: “navigable waters, waters of the contiguous zone, and the oceans”. It also enables the federal government to financially assist state and local governments in research, planning and management initiatives aimed at pollution prevention, reduction and elimination. While noting that the statute does not supercede the jurisdiction of the states over water resources, it provides a platform for federal agencies to cooperate with state and local agencies with regard to pollution issues. Info: <http://www4.law.cornell.edu/uscode/33/1251.html>

United States. *Elwha River Ecosystem and Fisheries Restoration Act (1992)*

Initiated a legal process to determine environment impacts and final decision on removal of the dams on the Elwha River. Final decision made in 1996 under Bruce Babbitt/Clinton administration to remove the dams. Info:

www.elwha.org/river.htm

United States. Grand Canyon Protection Act of 1992

Legislation developed in response to public pressure to moderate the operation of Glen Canyon Dam in order to provide for fishery, wildlife, recreation, land conservation and other values, while reducing the generation of electricity. Info: www.Kenyon.edu/projects/dams/glp02bac.html

United States. Wild and Scenic Rivers Act

Provides for a national wild and scenic rivers system, listing and defining the rivers included by Act of Congress. There are three classes of linear designation: “wild river areas”, which are free of impoundments and generally inaccessible by road; “scenic river areas”, which are free of impoundments, have shorelines generally free of development and are accessible in places by road; and “recreational river areas”, which are readily accessible by road or railroad and may have some shoreline development and impoundment and/or diversionary works. The designations restrict hydro and water resource developments but have been criticized by NGO groups as permitting incompatible uses on adjacent lands. This statute has stimulated corresponding initiatives, programs and statutes in thirty-three states (see below). Info: www.nps.gov/rivers/wstract.html; interviews with various NGO representatives.

United States, River Conservation by Thirty-three State Governments

Following from the federal model of Wild and Scenic Rivers, thirty-three US states have created state initiatives, programs and/or statutes to protect or conserve river corridors. These vary in conservation significance and in the specific measures and provisions. The common theme is emphasis on a selected number of rivers or sections of rivers which, for scenic or recreational values, should remain free flowing. In some states, the designations are based on policy or initiative, in others they are based on statutes. Some examples:

- Connecticut has a *Protected River Act* where certain rivers are designated.
- The *Maine Rivers Act* is intended to designate certain rivers as remaining free flowing.
- Oregon has a “Scenic Waterways” initiative to recognize free flowing rivers.
- Washington State has “Scenic Rivers” statute to identify and designate free flowing rivers.
- In Missouri, four river segments are listed as protected under the *Missouri Water Resource Law* from dams and other such structures.
- California has a *California Wild and Scenic Rivers Act*, modeled after the federal statute of similar name.

In total 460 rivers have measures of protection through these programs. American Rivers, an NGO, offers information on all these initiatives to foster public understanding of the level of conservation afforded rivers in the various states. In general, the evaluations indicate that these are modest protective measures. Info: www.amrivers.org/wildscenic toolkit/stateprograms.htm

Washington, State of, USA. *Elwha River Act*

Legislation designed to acquire the two privately owned dams on the Elwha River, enabling their removal and restoration of river flows for fishery and other conservation values. Also refer to US Elwha River Ecosystem and Fisheries Restoration Act.

Ibid. Washington's Environmental Health 2000

This is a "state-of-environment" style report. It includes sections pertaining to rivers: water quality, water availability, river/stream bacteria, contaminated sediments. Info: www.ecy.wa.gov/pubs/0001003/index.html

Ibid.. House Bill 1319: An act relating to increasing anadromous fish runs in the Elwha River

Allows for modification of the Elwha Dam to facilitate fish passage. Info: www.leg.wa.gov

Western Australia, State of. *Water and Rivers Commission Act 1995*

This statute establishes the Water and Rivers Commission, a government agency, which is assigned a lead role in protecting, conserving and enhancing water resources. The commission is intended to protect wetlands, waterways and water supplies and restore degraded environments through land use planning and management. This illustrates a formalized effort to focus governance attention on river conservation and restoration, in comparison to the more traditional regulation of use of a resource. Info: www.wrc.wc.gov.au/about/legislation.html

Appendix 3:

Annotated List of Selected Non-Governmental Organizations Focused on River and Watershed Issues in Various Jurisdictions

Listed Alphabetically:

American Rivers

Self-proclaimed as North America's leading river-saving organization. Its mission is to preserve and restore America's river systems and to foster a river stewardship ethic. Founded in 1973. Has been a leading advocate for the protection of 20,000 miles of rivers and five million acres of adjacent lands—a reference to the implementation of the *Wild and Scenic Rivers Act*, various programs in thirty-three states aimed at river protection, and the *National Parks Act*. Website includes a “dam removal” toolkit to inform the public on advocacy of restoration. Also, American Rivers includes a systematic evaluation of federal and state programs focused on river conservation. Info and Contact: Rebecca Wodders at amrivers@amrivers.org, www.americanrivers.org

American Whitewater

This national organization is dedicated to conserving and restoring America's whitewater resources, primarily from the perspective of enhancing opportunities to recreationally enjoy them. It fosters direct recreational use of the rivers as a means to appreciate them and value their conservation. Contact: John Gangemi, Conservation Director at jgangemi@digisys.net. Info: www.americanwhitewater.org

Canadian River Management Society

Registered charitable society affiliated with The River Management Society in the United States. (see RMS below).

Colorado River Water Users' Association

Organization representing the range of water consumption interests competing for use of the Colorado River – exemplifies comparable organizations on other heavily utilized rivers in western U.S. Concerns are raised at conference proceedings about the federal *Endangered Species Act* which requires that the ecological needs of endangered species also be part of the water budget for the river. CRWUA website is a useful compendium of interests. Sources: www.crwua.mwd.dst.ca.us; www.slcgov.com

Elwha River Restoration Project

Citizen-based initiative dedicated to the removal of the dams on the Elwha River (Washington state) and the restoration of the fisheries and other ecological values of the river. Info: www.elwha.org

Global Rivers Environmental Education Network (GREEN)

A youth-based environmental NGO seeking to improve the quality of watersheds and rivers, with resulting benefits to society. GREEN uses watersheds to organize local volunteer initiatives and serves as a link between these local efforts. Info: www.earthforce.org/green/

Habitat Restoration Group

A citizen group working to restore California's rivers and creeks and their native fish and wildlife resources. Provides professional technical assistance to private-public partnerships seeking to develop watershed restoration strategies culminating in the preparation and implementation of river and water management plans. Contact: J. Theodore Stanley at hre@cruzio.com

Inland Rivers Network

An Australian coalition of NGOs with the aim of promoting and facilitating the flow of information to promote the cause of ecological sustainability for Australia's inland rivers. Includes the Australian Conservation Foundation, NSW Nature Conservation Council, Coast and Wetlands Society, National Parks Association of NSW, Total Environment Centre and Friends of the Earth. Liaises routinely with government agencies. Info: www.nccnsw.org.au

Institute for River Research International

Focused on research on major rivers of the world, including chemical, physical, geographical, biological, and economic aspects of problems facing the world's rivers. Contact: Frank Butterworth at butterwo@vela.acs.oakland.edu

International Rivers Network

A U.S. based international organization concerned with fostering river restoration on major rivers of the world. It expresses its mission as "to halt and reverse the degradation of river systems; to support local communities in protecting and restoring the well-being of the people, cultures and ecosystems that depend on rivers; to promote sustainable, environmentally sound alternatives to damming and channeling rivers; to foster greater understanding, awareness and respect for rivers; to support the worldwide struggle for environmental integrity". Info and contact: info@riverrevival.org; www.irn.org; info@irn.org

Living By Water Project (Canada)

A creative citizen-driven initiative promoting appropriate use, design and development on shore lands. It is directed at private property owners, encouraging them in taking a stewardship approach to managing their properties by providing a centralized source for guidelines, standards and regulations for use and development in shore areas. The website is currently under development. Info: www.livingbywater.bc.ca Contact: Clive Calloway at lbywater@jetstream.net

Living Rivers

A U.S. organization promoting large-scale river restoration through broad-based mobilization of concerned citizens. They organize investigation, litigation and political demonstrations to encourage the restoration of rivers through “undoing the extensive damage brought on by dams, diversions and unmitigated pollution”. They foster local level organization of people to meet these aims. Info: www.livingrivers.net

Nature Conservancy, The

For fifty years this national organization has been operating throughout the United States and around the world to preserve plants, animals and natural ecosystems by protecting lands and waters. The organization is extremely effective at raising private funds for land acquisition, with a total of almost 93 million acres acquired globally. Their conservation approach stresses the use of science to determine the priorities for protection. Info: <http://nature.org>

Nature Conservancy, Illinois Chapter

Group authored the Illinois River Restoration Feasibility Study (2000), advocating for a free-flowing river, with fisheries, cultural, recreational, educational, scientific and community benefits. Example of one of the many chapters of the national Nature Conservancy organization. Info: <http://nature.org/states/illinois>

Pacific Rivers Council

Oregon-based non-profit organization now operating throughout the western states and with a Washington D.C. office. The PRC mission is “to protect and restore rivers, their watersheds, and native aquatic species”. The national board of directors consists of leading scientists, economists, business, government and policy specialists. Through the funds raised by donations from individuals and foundations (almost 30 on the roster), the PRC focuses its efforts on funding conservation and restoration works. Info: www.pacrivers.org

Outdoor Recreation Council of B.C. (ORC)

This an umbrella organization representing 40 diverse outdoor recreation and conservation organizations in British Columbia with a combined membership of over 120,000. ORC functions as a convener, coordinator, leader and advocate for outdoor recreation and related conservation issues. For ten years, one of its products has been an “Endangered Rivers List”, which is published to raise public and media attention on rivers that, in the judgment of ORC, require the most urgent conservation and restoration attention. Another program is “River Recovery”, which is focused on identifying dams in the province that are considered no longer useful and provide only marginal benefit. The idea is to foster public awareness and to encourage multi-agency efforts to de-commission such dams. Work toward this end on the Theodosia River dam near Powell River has been in process for a number of years and there is wide government, non-government and community support for de-commissioning this structure. Info: www.orcbc.ca; www.recovery.bcit.ca/

Restore Hetch Hetchy

Advocacy organization dedicated to the removal of the Hetch Hetchy Dam in Yosemite National Park and the restoration of the valley to natural conditions. Mainly engaged in fundraising, lobbying and public awareness. The focus seems to be on an aesthetic vision, followed by an interest in ecological/ethical management. Info: www.hetchhetchy.org

River Management Society (RMS)

This is a U.S.-based society with a Canadian chapter. It is a nonprofit professional society dedicated to conservation and management of North America's rivers. Membership includes professionals of governments and other organizations associated with river management. The focal objective is to advance the understanding of river management by fostering and sharing technical information. Info: www.river-management.org Contact: Michael Greco, President, Canadian Chapter at greco.crms@webruler.com

River Restoration Centre

A United Kingdom organization proactively aimed at influencing policy and practice to institute river restoration initiatives. Its focus is the restoration of in-river and riparian habitats to benefit biodiversity and the restoration of river functions of economic and social importance. Info: www.qece.demon.co.uk Contact: rrc@cranfield.ac.uk

RiverNet

An international web-based organization whose purpose is to link organizations that deal with development, river, freshwater and environmental issues. Website is a useful tool to locate specific organizations around the globe. Info: www.rivernet.org

River Network (a.k.a. River Watch Network)

This is a national organization in the United States with a focus on providing educational and stewardship information to individuals, organizations, agencies, tribal governments and others subscribing to the service. Their chief interest is in fostering understanding, protection and restoration of rivers and watersheds. It also has a Conservancy Program to purchase key river-associated lands. It currently has a \$5 million US budget and 34 staff working in four offices to serve 500 partner groups. Info: www.riverwater.org, www.rivernetwork.org, Info@rivernetwork.org

River Parkway Trust

NGO initiative focused on preservation and restoration of the ecological, scenic and historical values of the San Joaquin River. Example of many localized citizen-based initiatives in California and elsewhere in the United States. Info: www.riverparkway.org

Rivers Council of Washington

Citizen-based coalition intended to lead to an expanded effort to preserve, enhance and restore rivers and their watersheds in Washington State for their natural, recreational and cultural values. Info: www.riverscouncilofwa.org

Salmon River Restoration Council

A community-based non-profit corporation in northern California established in 1992 with a focus to protect and restore the ecosystem of the Salmon River, which is part of the federal Wild and Scenic River System. The SRRC builds community partnerships to meet its goals. It is particularly focused on anadromous fish populations and habitats.

Info and contact: info@srrc.org; www.srrc.org

San Lorenzo River Restoration Institute

A California organization bringing together community groups, schools, businesses and public agencies to promote the social, economic and environmental benefits of restoration of the San Lorenzo River. Contact:

slriver@cruzio.com

Save Our Streams

A Maryland, US-based initiative by the Izaak Walton League of America to engage volunteers in stream restoration work: data collection, environmental education, stream clean-up work, monitoring and other efforts directed at protecting waterways. They also work to link government, NGOs and business in this cause and are very active in promoting the Adopt-A-Stream program of the Maryland Department of Natural Resources. Info: www.saveourstreams.org

Sustainable Futures

This is an interactive website developed to initiate and motivate public awareness and action with regard to “river health” issues in New South Wales, Australia. The initiative seems young at this stage and is, in part, reactive to the state government’s Healthy Rivers Commission. The idea of the website is to help citizens and NGO’s understand river conservation and restoration issues, assess rivers in their areas, and make useful input to the Commission. Info:

www.sustainablefutures.com.au

Trout Unlimited (U.S.)

A national organization, founded by business leaders interested in participating in environmental work, with numerous chapters nation-wide. It is focused on protecting and restoring river habitat for and populations of salmonid species. Based on an annually produced “National Conservation Agenda”, TU identifies priority issues with regard to: improving water quality, securing adequate in-stream flows, recovering Pacific and Atlantic salmon, and conserving wild trout and salmon. TU functions in a coordinated way at the national, state and local levels, with a strong commitment of volunteers. One of its major initiatives is the

Coldwater Conservation Fund which supports biological and economic research and watershed-scale demonstration projects based on donations from foundations, corporations and individuals. Info: www.tu.org

Trout Unlimited Canada (TUC)

A national organization founded in 1972 with 15 local and provincial chapters across the country, such as the British Columbia chapter. Paralleling Trout Unlimited in the United States, TUC is a “not-for-profit organization dedicated to the conservation and wise use of Canada’s cold-water resources through the undertaking of habitat restoration and enhancement, research, management, and public education”. Because many members have business affiliations, they are adept at organization, networking and attracting funding for their projects. Members participate in hands-on habitat projects, advocacy, education, as well as in fund-raising for initiatives that are focused on conservation and rehabilitation of salmonid freshwater habitats and populations. Trout are named in the group’s moniker and depicted on the logo because of the symbolic and “bell weather” values associated with trout. TUC is actually interested in freshwater ecosystem conservation and restoration more broadly. TUC has an outstanding track record of restoration works and of linking government and non-government efforts and funding sources. Info: www.tucanada.org

Upper Mississippi River Conservation Committee

An inter-governmental organization bringing together the interests of five states (Illinois, Iowa, Minnesota, Missouri, and Wisconsin), the U.S. Army Corps of Engineers and other agencies to implement fish, wildlife and recreational conservation action along an 800 mile stretch of the river. The committee evaluates the river ecosystem and recreation resources and is interested in regulatory management of pollution, sedimentation, flooding, impoundment, channelization and public use. It works in cooperation with government and non-government organizations. Info: www.mississippi-river.com

Washington Environmental Alliance for Voter Education (WEAVE)

Associated with the Environmental Working Group (a non-profit research organization, a project of the Tides Center, which is a California Public Benefit Corporation), WEAVE was one of the groups involved to defeat Referendum 48 which provided for compensation to landowners for loss of land due to government regulation. Referendum 48 had been adopted by the State legislature in the mid-1990’s in response to lobbying from agricultural, forestry and other industrial/development interests. Source: www.ewg.org

Waterkeeper Alliance

An umbrella organization for the eighty-plus Waterkeeper programs located throughout North and Central America. The Waterkeeper movement or network is a grass-roots, citizen-based “neighbourhood watch”-style initiative to monitor the waters associated with communities. The initiative began on the Hudson River in the 1980’s, modeled after the “Riverkeepers” in Britain. Robert Kennedy

Jr. is the founder and president of the Waterkeeper Alliance. The Alliance is a strong advocate and active litigate for the protection of water bodies. Info: www.waterkeeper.org

Water in the West

An information project funded by the Wm. C. Kennedy Watershed Protection Foundation. An excellent digest and source for information about water restoration priorities and initiatives throughout the western United States. Content on British Columbia is under development. The project was conceived as a result of the federal Western Water Policy Commission, which has had dire warnings about the need to develop conservation strategies for western rivers. The Commission's reports are summarized on the website. Info: www.waterinthewest.org

Appendix 4:

Miscellaneous Other References and Web Sites

Alberta Council, Trout Unlimited. "Maintaining the Alberta Advantage: The Importance of Aquatic Resource Management and Protection". Presentation to the Standing Policy Committee on Energy and Sustainable Development. January, 2002. This paper emphasizes the importance of enhancing the priority of fishery conservation and restoration works.

Angelo, M., Rod Stott and Laurie Smith: BC Outdoor Recreation Council. "Dam Decommissioning", in The Third Canadian River Heritage Conference Proceedings. pp. 22-23. Also see: www.recovery.bcit.ca/

Babbitt, Bruce. US Secretary of the Interior (1998). Speech before the Ecological Society of America in which Mr. Babbitt notes that, on average, there has been a dam built each day since the Declaration of Independence—some 75,000 structures. He boasts to be the first Secretary of the Interior to oversee the removal of dams (20 during his term) and this speech helps fuel an environmental NGO focus on dam-busting and river restoration. Source: www.hetchhetchy.org/babbitt_on_dams_9_4-98.html

Bourgeois, M. and D. Folster (ed.) 2001. Caring for the Waters That Connect Us: Proceedings of the 3rd Canadian River Heritage Conference. Fredericton, N.B.

British Columbia, Province of, and BC Heritage Rivers Board. Heritage Rivers System of British Columbia Victoria, B.C.

Note: The BC Heritage Rivers program dovetails with the Canadian Heritage Rivers initiative. Twenty rivers in British Columbia have been included in the BC system at this date, with three of these included in or nominated for the CHR system. The

Heritage River system is not an exclusionary land use designation, but rather a mechanism to flag rivers of outstanding significance so that natural, cultural, recreation and stewardship values can be recognized and accommodated in land and water use planning, management, conservation and development initiatives. Also, the system of heritage rivers serves as an education vehicle focusing societal attention on the values and benefits free flowing rivers and streams.

CNN.com

April 10, 2000 news article in which the conservation group American Rivers announces its 15th annual list of America's most endangered rivers. This article lists 13 rivers as having excessive pollution, dams or water diversion. Info: www.cnn.com/2000/NATURE/04/10/endangered.rivers/index.html

Canadian Heritage River System. (2001). Principles, Procedures and Operational Guidelines. Ottawa, Minister of Public Works and Government Services Canada.

Ibid. (1998). A Framework for the Natural Values of Canadian Heritage Rivers. Ottawa, Minister of Public Works and Government Services Canada.

Canadian Heritage Rivers Board Secretariat. (1997). Canadian Heritage River System Guidelines. Ottawa, Canadian Parks Service, Environment Canada.

Drinking Water Review Panel (2002). Final Report: Panel Review of British Columbia's Drinking Water Protection Act. Fraser Basin Council, Vancouver.

Freeman, Robin. (1999). "Restoring Healthy Riparian and Wetland Ecosystems: An Interview with Phil Williams", Ecological Restoration 17:4 Winter 1999. Dr. Williams explains the relationships between hydrological engineering and ecosystem restoration, noting the need for re-thinking how engineering is applied to fluvial geomorphology.

Gersib, R.A. "The Need for Process-driven, Watershed-based Wetland Restoration". Washington State Department of Ecology. Refer to: www.wa.gov/puget_sound/Publications/01_proceedings/sessions/oral/3c-gersi.pdf

Grafton, R. Quentin, Dale Squires, Kevin Fox. Private Property and Economic Efficiency: A Study of a Common-Pool Resource. University of Ottawa: Institute of the Environment Working Paper 2000-01. Paper focuses on the British Columbia halibut fishery and the effects of "privatizing the commons".

Grafton, Quentin R. Governance of the Commons: A Role for the State? University of Ottawa: Institute of the Environment Working Paper 2000-03. Paper examines property regimes and common-pool resources, evaluating the relative merits of private, community and state-based rights.

Gwin, S.E., M.E. Kentula, and P.W. Shaffer. (1999). "Evaluating the Effects of Wetland Regulation through Hydrogeomorphic Classification and Landscape Profiles": Wetlands 19(3): 477-489.

Haig-Brown, R. (1946) A River Never Sleeps. 2nd ed.(1981) Totem Books, Don Mills, Ontario.

Ibid. (1961) The Living Land: An Account of the Natural Resources of British Columbia MacMillan, Toronto.

Interagency Wild and Scenic Rivers Coordinating Council. (1998). "An Introduction to Wild and Scenic Rivers". Technical Report. Source: www.nps.gov/rivers/about.html

McCully, Patrick (2001) Silenced Rivers: The Ecology and Politics of Large Dams. International Rivers Network. Classic study of large dam projects around the globe.

National Research Council (US). (1992). Restoration of Aquatic Ecosystems: Science, Technology and Public Policy. National Academy Press, Washington, D.C.

Ontario, Province of. Ministry of Natural Resources (1993). Watershed Management on a Watershed Basis. Ontario Queen's Printer. This is a primer document intended to assist those undertaking watershed planning in communities and to assist in the consistent application of provincial programs.

Penn, Briony (1996). Stewardship Options for Private Landowners in British Columbia. BC Ministry of Environment, Lands and Parks, Victoria, B.C.

Nedotiafko, R.J. "The Red River in Manitoba—A Canadian Prairie River of National Heritage Significance", in The Third Canadian River Heritage Conference Proceedings. pp. 33-38.

Raphals, P. and Helios Centre (2001). Restructured Rivers: Hydropower in the Era of Competitive Markets. International Rivers Network. Analysis of the interrelationships between hydropower, electricity markets and regulation.

United States Environmental Protection Agency publications on wetlands restoration are listed at www.epa.gov/owow/info/PubList/publist1.html

US EPA. Publications list on watershed protection: www.epa.gov/owow/info/Publist/publist3.html

United States National Research Council. (1992). "Restoration of Aquatic Ecosystems": Science, Technology and Public Policy National Academy Press,

Washington, D.C. www.epa.gov/owow/wetlands/restore/defs.html The NRC defines river restoration as “the return of an ecosystem to a close approximation of its condition prior to disturbance” and includes reestablishment of pre-disturbance aquatic functions and related physical, chemical and biological characteristics.

Veale, B. “Rivers for Tomorrow”, in The Third Canadian River Heritage Conference Proceedings, pp. 83-84.

Williams, Phillip (1), (2000). “Restoring Living Rivers” as posted on: www.igc.org/igc/en/hl/10004204076/hl9.html An excellent discussion of the relationship of the physical parameters of a river to ecosystem integrity. Contact: pbw@pwa-ltd.com

Ibid.(2), (2000). “Restoring Lowland River Floodplains in California”, Proceedings of the International Symposium for Living Rivers. G. Kovacs (ed.) Budapest, Hungary. Excellent discussion of theory and a case example of restoration work aimed at the concept of a “living river”. The author brings clarity and practical experience to the concept.