Pacific Fisheries Resource Conservation Council

The Role of Public Groups in Protecting and Restoring Habitats in British Columbia, with a Special Emphasis on Urban Streams

Prepared by
Dr. Marvin L. Rosenau and Mark Angelo

September 2001

The Role of Public Groups in Protecting and Restoring Habitats in British Columbia, with a Special Emphasis on Urban Streams

Dr. Marvin L. Rosenau and Mark Angelo

For further information about this document and about the Pacific Fisheries Resource Conservation Council (PFRCC), contact:
Pacific Fisheries Resource Conservation Council
800 Burrard Street, Suite 590
Vancouver, BC, Canada V6Z 2G7
Telephone 604 775 5621
Fax 604 775 5622
www.fish.bc.ca
info@fish.bc.ca

Printed and bound in Canada

ISBN 1-897110-12-X

Pacific Fisheries Resource Conservation Council
Conseil pour la conservation des ressources halieutiques du pacifique

10 September 2001

Hon. Herb Dhaliwal
Minister of Fisheries and Oceans
Government of Canada
Ottawa

The Hon. John van Dongen
Minister of Agriculture, Food and Fisheries
Government of British Columbia
Victoria

Dear Ministers:

Enclosed with this letter is a copy of a background paper prepared for the Pacific Fisheries Resource Conservation Council. Entitled The Role of Public Groups in Protecting and Restoring Habitats in British Columbia, with a Special Emphasis on Urban Streams, it explains the trend towards wider public involvement in activities related to salmon habitat conditions.

This background paper was requested by the Council to provide information on current conditions and directions in this important aspect of salmon restoration and conservation. Authored by Mark Angelo and Dr. Marvin Rosenau, it was intended to serve as a document for the Council's consideration.

Council members are especially grateful to the Government of British Columbia for enabling Dr. Rosenau's involvement though a secondment arrangement. That in-kind contribution is most appreciated, and it demonstrates how the Government of British Columbia has begun to forge its relationship with the Council in valuable, cost-effective ways.

The paper explains how government agencies, advocacy groups and volunteers can combine their efforts and resources to achieve more effective results in stream restoration and salmon recovery. It emphasizes the new attitudes and shared responsibilities that require the joint and coordinated effort of everyone concerned about these important issues.

While the background paper expresses the views of the authors and does not necessarily reflect the position of the Council, it provides a useful reference to important matters, such as funding for habitat projects, that we will be considering in terms of future advice to your governments. We hope it will serve as a paper that your officials will consider in their development of future policies and organizational arrangements related to salmon habitat.

Yours sincerely,

Hon. John A. Fraser
Chairman

590 - 800 Burrard Street
Vancouver. British Columbia
Canada V6Z 2G7

Tel/Tel: 1604) 775-5621
Fax/TE1e: 160-1) 775-5622
E-mail: info@ fish.bc.ca
Web Site/Site Web: uww.fish.bc.ca

590 - 800 rue Burrard
Vancouver. Colombie-Britannique
Canada V6Z 2G7

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

ABSTRACT

Salmon and steelhead populations can exist and thrive in watersheds that remain intact and fully functional. However, throughout the last century and particularly during the last three decades, much riparian and instream salmonid habitat has been lost or damaged in British Columbia as a result of human expansion and encroachment. The most devastating impacts to the waterways have arguably occurred in the rapidly urbanizing areas of our province.

For the most part, government fisheries agencies have not been capable of stemming these losses nor substantively restoring habitat. These conditions occurred despite the implementation of federal, provincial and local environmental legislation, policies and regulations, and the plethora of restoration and enhancement initiatives.

In the view of many, there has often been a lack of political will by all levels of government to stem the tide of habitat destruction. In addition, governments have not demonstrated a capacity to protect these degraded habitats or to restore conditions to enable the recovery of salmon populations.

On a positive note, there has been the upsurge of public involvement in the protection and rehabilitation of British Columbia rivers and streams, and an evolution towards a more collective engagement in the management of these resources. This has begun to result in some remarkable successes. There are an increasing number of instances where individuals and community groups have passionately embraced the need to refurbish local waterways. Citizens and community groups have started to show a "sense of ownership" of local rivers and riparian areas and have become directly involved to a much greater degree than has been seen in the past. This activity has taken the forms of advocacy and stewardship, and these two facets are linked in order to nurture freshwater habitat.

When properly enacted, this "think globally, act locally" approach appears to be a potentially powerful tool with which to begin reversing losses of salmonid habitat, particularly in urban environments. Ultimately, the active involvement of public groups and non-government organizations, rather than relying on governments acting on their own, may be the only effective way to save or restore many of British Columbia's remaining freshwater ecosystems and salmon populations.

At present, many of these public groups are involved in fisheries inventory and assessment, restoring stream habitats, engaging in dialogue in the development of legislation, and effectively lobbying governments. Some of these involve roles that, in the past, were traditionally undertaken directly or solely by the various government fisheries agencies.

Examples of non-governmental organizations in the Lower Mainland of British Columbia that have exemplary records of success include the Alouette River Management Society and the Pitt River and Area Watershed Network. Like other successful public organizations involved in fisheries stewardship and advocacy, they work closely with government professionals in a spirit of teamwork.

These and other groups are also supported by various government initiatives including the federal government's Habitat Restoration and Salmonid Enhancement Program and the Habitat Conservation and Stewardship Program, as well as the BC Urban Salmon Habitat Program and Fisheries Renewal BC. Another recently announced initiative that will support this kind of endeavor is the federal Pacific Salmon Endowment Fund with its focus on restoring salmon stocks and habitat.

As a note of caution, there are some public groups that have chosen, on occasion, to pursue a "go it alone" approach and have decided against working closely with other pertinent organizations or government agencies. This can often alienate individuals and groups that might otherwise be allies, and can sometimes do more harm than good. The most successful public groups in the province have taken a more inclusive approach to their work, and this characteristic has been one of the keys to their success.

In summary, the authors take the position that government institutions frameworks and agencies at all levels in British Columbia are no longer capable of protecting and restoring freshwater environments on their own. If salmon and steelhead habitats are to be nurtured in the future, the public, through the efforts of individuals and community groups alike, must participate more directly. They must take on a greater role in the advocacy and stewardship of fisheries and natural resources and work closely with government agency biologists, engineers and managers to achieve results in terms of salmon conservation and habitat restoration.

This background paper serves as information and reference material for the use of the Pacific Fisheries Resource Conservation Council, but does not necessarily represent the views of the Council or its members.

1.0 INTRODUCTION—THE FISHERIES CRISIS

While British Columbia society is currently experiencing unprecedented economic advancement and social achievements in several respects, many freshwater populations of fish are now at an all-time low or have become extinct (Lane 1991, Slaney et al. 1996, Hyatt and Riddell 2000). The media regularly reminds us that salmon and steelhead are in a crisis situation (e.g., Simpson 2000, Glavin 1996) and the scientific community generally agrees with this conclusion (Slaney et al. 1996, Lackey 2001).

This phenomenon is not unique to British Columbia. Similar or worse fates have befallen salmon and steelhead stocks throughout the Pacific northwest of North America (Netboy 1980, Nehlsen et al. 1991, Cone and Ridlington 1996, Lichatowich 1999, Knudsen et al. 2000, Lackey 2000, 2001). Disturbingly, this trend has also occurred to an even greater extent throughout other parts of the world where salmon once existed naturally, including north-eastern Asia (Japan, Korea, China), eastern North America and northern Europe (Lackey 2001). For many people, this latter observation is reason for a pessimistic attitude about the ultimate fate of our own salmon stocks unless drastic action is taken quickly.

In British Columbia the empirical evidence for serious problems in our fisheries resources is reflected in the unprecedented and continuing restrictions on the harvest of various stocks of salmon, steelhead and other species of fish. These restrictions in catch have occurred more frequently in the past two decades than at any other time in history, as more and more fish stocks have declined.

Some of the most dramatic measures to cope with this situation include widespread fishing closures over large geographic areas to protect interior stocks of coho salmon. Another example is the recent closure of angling for steelhead on a number of east coast Vancouver Island streams. While recovery plans are being developed by government management agencies for many of these stocks in an attempt to forestall extinction, it is notable that even more restrictive measures are currently being contemplated to protect still other populations of fish.

It was this situation and the prevailing concern about the future directions of fisheries management that led the Pacific Fisheries Resource Conservation Council to request the production of a background paper dealing with aspects of public participation. It was the view of the Council that it needed more information about how a more cohesive effort can be marshaled to deal with the challenges of salmon recovery, particularly in terms of habitat restoration. This background paper is the result, and is meant to serve as a reference and as a source of information. The views expressed in it are those of the authors, and they do not necessarily reflect the opinions of the Council or its members.

Much has been written in recent scientific and popular literature about the “salmon crisis”. However, it was not too long ago that we were still optimistic about our ability to restore stocks to their historic levels. Governments poured massive infusions of capital into salmon and steelhead restoration programs in both Canada and the U.S. Pacific Northwest. As part of these efforts, the Salmonid Enhancement Program of the federal government in the 1970’s had the lofty goal of doubling salmon stocks in British Columbia. Large-scale fishery programs were also implemented on the American segment of the Columbia River to redress fish losses caused by the damming of that watershed. But, while this may have been scientifically interesting, many people believe that much of this public money was not well spent. Furthermore, while these efforts resulted in some successes, there were also costs in terms of losses of wild salmon stocks. The

bottom line is that, in spite of these initiatives and others, there have been persistent losses in wild fish production.

Robert Lackey (2001), in a seminal paper articulating our inability to restore wild salmon stocks in north-western North America, listed eight points that characterize the dilemmas that we now face. These observations crystallize many of the key issues that modern day fisheries managers in British Columbia must grapple with. They provide the backdrop to the critical need for public input into fisheries-habitat decisions, and they are paraphrased and expanded upon with our opinions below:

1. The Pacific Northwest, including British Columbia, has a growing human population that exhibits extreme pressure on all natural resources including salmon and their habitats.

As the great tide of human growth expands over the planet in an unprecedented manner (Fig. 1), the landscape, air and water—all integral components to the health of fish and other living beings—are being irrevocably changed. British Columbia is no exception to this phenomenon.

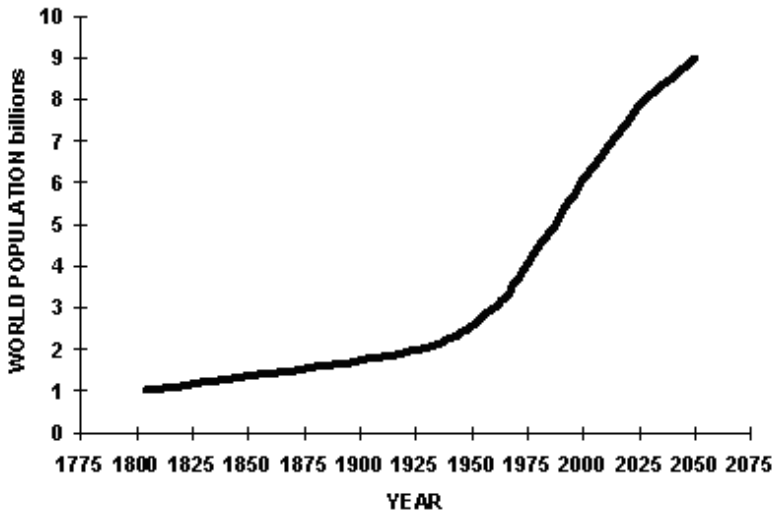
Most people are willing to accept that human activities are, with few exceptions, to blame for the repeated collapses of fish stocks around the world. With the exponential growth in human populations, salmon and their habitats are simply one of a myriad of natural resources that are disappearing from this world.

Both Hartman et al. (2000) and Lackey (2000) suggest that the human-population growth is the greatest threat to Pacific salmon habitat. Indeed, Hartman et al. (2000) demonstrated that there is a very clear adverse relationship between the development associated with the increase in numbers of people and the distribution and abundance of salmon. In other words, as we increase in numbers, salmon disappear.

In the year 2000, it was estimated that there were 6.1 billion human beings on earth. This number is expected to reach 7.8 billion by the year 2025, and 9.0 billion by the year 2050. On the Pacific coast of North America where our salmon are distributed, it has been estimated that the numbers of people will grow from a current 14 million to between 40 and 100 million individuals over the next century (Lackey 2001).

In British Columbia, the 1995 population was 3.7 million, but it is expected to increase to 4.4 million by 2010. Eighty percent of this increase will take place in the more urbanized parts of British Columbia which include southern Vancouver Island, the lower mainland and the Okanagan. All of these regions have previously-rich salmon and steelhead watersheds, but they have declined substantially in productivity and numbers of fish. Unless there are significant changes to our lifestyle and we develop more reasonable and sustainable life-style and resource expectations, this trend will continue (Lackey 2001).

Figure 1. World population growth and projections to the middle of this century. Data from http://www.overpopulation.org/.



2. The conundrum lies in the fact that, while there is public support for restoring wild salmon runs, urban stream habitat continues to be lost.

Opinion polls clearly indicate that the majority of the public is supportive of the protection and restoration of salmon in the Pacific Northwest and British Columbia (e.g., Kotyk and DiPaula 2000). Indeed, these issues are felt so strongly by the public that in recent years a number of significant opinion-poll-based political battles have been fought throughout the Pacific Northwest and British Columbia over "saving of the salmon". Ironically and cynically, this often seemed to have been done with little regard for the fish themselves. It has, unfortunately, been very easy to climb on the political bandwagon of such a motherhood-and-apple-pie issue as saving salmon without really applying efforts and resources to revive fish and fish habitat.

The question that remains is that if so many people are interested in protecting salmon, why is it not happening? The quick answer is that we as individuals and groups within society are always ready to take advantage of a public resource and its benefits, but are rarely prepared to take the blame or the responsibility. It is the other person who should tighten his or her belt. This phenomenon is known as "the tragedy of the commons" (Hardin 1968), where a relatively free-entry public resource is quickly taken advantage of by society, but is rarely protected, nurtured or restored by the populace, governments or individuals.

3. There are competing social priorities that are, at least partially, mutually exclusive.

It is our opinion that throughout the years, British Columbia society has intuitively understood when and where it was trading salmon habitat for the opportunity to extract another resource (e.g., hydro-electric power, lumber, land). That is, we feel that British Columbia society, as a whole, has always had a fairly accurate "gut feeling" when a particular resource-extraction activity was not good for fish. This statement takes into consideration our still-incomplete understanding of the science of habitat management throughout much of the last century.

Historically, and with a few notable exceptions, British Columbians have usually been willing to look the other way when these resource trade-offs were being made to the detriment of salmon and steelhead populations. That is, it has been extra-ordinarily easy to compromise when large

profits and jobs were riding on the development of this province, and a "precautionary approach" has not historically been the *modus operandi*.

The reality is that few in this province have been willing to pay the true economic price of saving fish habitat at the expense of whatever other resource was or is being exploited. Thus, in the face of legislative initiatives, policies, regulations and a plethora of institutional save-the-salmon efforts involving hundreds of millions of dollars, salmon habitat has continued to be lost even in recent years (Millar et al. 1997, Quadra 1997, Precision 1998).

4. There are entrenched policy stances in the salmon restoration debate, and these are normally supported by established bureaucracies.

Attitudes and ideas change slowly and for a host of reasons in fisheries management. Many habitat protection and restoration prescriptions for salmon and steelhead are based on relatively new science and recent understanding of issues. Indeed, many of the key components of this knowledge, which must ultimately be translated into fisheries management actions, have only been available from the scientific community within the last decade or so. However, even the implementation of defensible new science and ideas can be thwarted by management and executive staff for a variety of reasons, including ego and program "turf" protection. Many fisheries programs and their personnel would be considered expendable or due for re-deployment if the policies and bureaucracies, for which they had been working, had caught up to the most up-to-date scientific information.

5. Society expects that the experts (fisheries technocrats) should be able to solve the salmon problem by using a technological scheme and not have to impose cultural or economic sacrifices, particularly with regards to life style and wealth.

In the face of major economic trade-offs, societies have rarely been prepared to pay the price for environmental protection, whether it is specific to fish and fish habitat, or includes broader perspectives such as maintaining general air, landscape and water quality (Hardin 1968). As a consequence, Hartman et al. (2000) pose the question "...[can] Pacific Northwest salmon ecosystems be maintained in the shadow of human systems that are socially, economically, and politically locked into a growth-dependent system that is coupled with rapid resource exploitation...[?]" Their reply is that "...because of globalization of many human system processes, the future of salmonids is connected to the future of the world, for which people are all jointly responsible."

Our society has quickly realized that the price of protecting fish habitat results in lost dollars to forestry companies, hydro-electric industry, agriculture and developers. A stiff political resistance has developed in British Columbia and around the world to most legislation and regulation of these latter activities. As a consequence, alternative least-cost mitigation options are usually proposed and implemented, regardless of their known efficacy.

Initially, it was viewed that man could conquer nature and technology was the answer to the human inability to limit catches or refrain from destroying the rivers, forests and landscape. This has now been discounted as a fallacy.

In practical terms, the first real activities by the fisheries agencies to address the declines in fish numbers in British Columbia included a wave of fish culture through the construction of hatcheries in the first half of the twentieth century. Hatcheries have been put forward as the panacea for lost fisheries and many of the province's habitat problems. Nonetheless, while fish culture has been able to produce salmon and steelhead, and sometimes in great numbers, it has not been able to replace the production lost through habitat destruction, nor is this activity

sustainable (Hilborn 1992). Experience over and over has shown that these techno-fixes do not, in the long run, work.

6. Political proponents routinely use "experts" and scientific "facts" to bolster their policy positions.

It is unfortunate that fisheries habitat management more often is an "art" rather than a clear and precise "science". The more complex questions usually have equivocal answers, leaving the possible recommendations by habitat protection biologists in a cloud of doubt and uncertainty. As a result, in the field of fish habitat protection, mitigation and compensation, it is extraordinarily easy for a proponent to "purchase an answer" that is palatable to the developer or a particular political agenda. This cynical acquisition of, and use of, paid habitat "professionals" in the face of more precautionary approaches has led the public to often doubt statements made by fish habitat management personnel.

7. Salmon and steelhead scientists do not have the ability to avoid being placed in particular policy or political camps.

In British Columbia, salmon and steelhead production is facilitated either through the management of natural habitat attributes, or as a result of artificial or semi-artificial enhancement activities (e.g., fish culture and hatcheries, spawning channels). Thus, fish production is more-or-less separated into two management streams for both federal and provincial fisheries agencies. Employees working for one sector tend to have very little overlap or communication with their colleagues in the other. As a result, habitat protection or restoration biologists are often viewed as conservationists, naturalists or environmentalists, compared to the production-oriented fisheries personnel who manage hatcheries, spawning channels or other such facilities.

8. There is confusion in discussing policy options, caused by couching policy preferences in scientific terms or imperatives rather than value based criteria.

There should be the option for protecting a population of fish and its habitats simply because a community, or society as a whole, wants to see it protected. This intrinsic worth should be valued in protecting these ecosystems regardless of abundance, economic and scientific worth, or the existence of legislative or policy directives. This perspective is rarely, if ever, seen in this field. The terms "performance measures" and "trade-off analysis" in habitat decision processes exemplify the approach that senior governments are taking with regards to how and when salmon and steelhead habitat protection and restoration should occur.

Table 1. Wild, threatened, endangered and lost streams of the lower Fraser Valley in settlement areas.

(from Precision Identification Biological Consultants 1998).

	Wild (existing)	Threatened	Endangered	Total	Lost	Total (including lost)
Steveston to Langley	0	8	95	103	45	148
Abbotsford to Hope	8	17	142	167	6	173
Stave River to Hope	4	34	35	73	6	79
West Vancouver to Stave River	17	16	102	135	60	195
Total	29	75	374	478	117	595
Percent of total not including lost streams	6	16	78	100		
Percent of total including lost streams	5	13	63		20	100

2.0 WHY PUBLIC GROUPS PROVIDE A CRUCIAL ROLE IN PROTECTING AND RESTORING FISH HABITAT IN BRITISH COLUMBIA

2.1 The territorial imperative and public ownership of stream habitat

There has often been a frontier mentality towards the taming and development of this province, with the implicit assumption that once a stream was dammed, diverted, or logged, there was always another pristine watershed just over the next mountain range. To many, the availability of fish, water, wood, and clean air seemed virtually limitless in British Columbia. We now know that they were not, and are not.

Given the trajectory of population growth that we continue to face in British Columbia, it is unlikely that remaining stream ecosystems will survive in any meaningful or intact way, particularly in urban areas, without major revisions to how we protect and restore watersheds. Underlying this observation is the recognition that alternative resource uses have usually taken precedence over the protection of fish habitat, and the job of protecting and restoring watersheds is simply too overwhelming for existing institutional arrangements.

Given the backdrop of all of this negativism, it is easy to understand how some would ask if there is any hope for fish habitat in the province of British Columbia, particularly in urban areas. It is our opinion that there is reason for cautious optimism despite the gloomy circumstances that currently exist. A major reason for this consideration is that a number of non-government groups have begun to take on the task of stopping or reversing the damage that is being inflicted on some of our important watersheds. These public organizations have accomplished this by using their voices and efforts as both advocates and stewards.

In a review entitled “Stream Stewardship and Fish Habitat Advocacy”, the author documents public-group involvement in this province over the last 50 years (Paish 1997). Commercial fishing organizations and fish and game clubs were among the first in this province to raise their voices over declining fish populations and the widespread damage to habitat in our watersheds (Paish 1997). Then, starting in the late 1960’s, concern for general environmental issues expanded throughout British Columbia and more public groups were also established as advocates and stewards for aquatic habitats. Even more encouraging is that in the last decade there has been a proliferation of non-government organizations that have focused on restoring and protecting aquatic ecosystems in their own communities, particularly in urban environments.

The advocacy and stewardship of public groups have made a real difference in changing a proposed course of action deemed damaging to fish habitat in British Columbia in several instances over the last half century, including:

- the cancellation of the proposed Moran Dam on the Fraser River;
- the stopping of the proposed Kemano Completion Project on the Nechako River;
- the requirement of BC Hydro to cease its water license violations on the Cheakamus River and other watersheds, and to release flows for fish;
- the halting of the Pitt River project, and the moratorium on Fraser River gravel-extraction proposals;

- the initiative on the Theodosia River to decommission a hydro-electric diversion dam, and the recognition of the impacts of this project and the potential benefits for fish through its removal;
- the passing of the Fish Protection Act and the subsequent development of stream-side habitat regulations; and
- the implementation of Water Use Planning for watersheds with BC Hydro facilities.

Individuals and organizations have increasingly felt a sense of ownership in watershed resources that had been, or were about to be, impacted. They have stood up and exercised their democratic rights as citizens to protect or restore our environmental heritage. The intervention of the public had a significant influence in the resolution of these issues, and it is our opinion that the sense of ownership expressed by these groups has often been the key to the protection and nurture of these stream ecosystems.

Hartman et al. (2000) categorize the impacts to Pacific salmon at three levels: global, regional (e.g., Pacific Northwest, Georgia Basin), and local (e.g., watershed, tributary, reach). The protection or restoration of fish stocks at the global and regional levels seems almost out of the reach for most community groups and the average person. However, public groups can easily see opportunities to restore and protect salmon and steelhead in their "own back yards", and this is at the geographically-familiar local level.

At the local level, these urban and other watersheds flow through the landscapes where we live and play. From these streams we generate electrical power and get our drinking and industrial water. These are also the rivers and lakes that provide us with recreational opportunities; likewise, they are the water bodies adjacent to where we develop urban landscapes, farms, mines and timber sources. The destruction of streams that are physically close to us is something that we, as human beings, can see and touch and potentially do something about. Consequently, public groups have begun to take up the task to protect and restore many of these watersheds. Due to sheer numbers and proximity to centers of population, urban streams have the greatest number of public stewards and advocates in this province, although they are also some of the most damaged and in need of restoration.

Impacts to fish habitat have changed, as have the attitudes and perceptions by governments as to what is required to protect and restore salmon and steelhead habitat, over the last century. The greatest transformation has been a shift from attention to large project-oriented issues (e.g., damming of the Fraser, Peace and Nechako Rivers; clear-cut logging of watersheds to the stream edge; egregious mining proposals) to recognition that the cumulative and incremental losses of critical fish habitat in our rapidly urbanizing environments are also serious and continuing issues (Paish 1997).

We now know that huge loses of fish habitat have been incurred in the heavily developed and urbanized environments—areas that were essential for maintaining species such as coho salmon and anadromous cutthroat trout. The "Summary Report on Wild, Threatened, Endangered and Lost Streams of the Lower Fraser Valley" clearly reinforces the extent of the issue, pointing out that 63% of all of the urban streams in the settlement areas listed in the report are now classified as endangered, and a shocking 20% of them no longer even exist (Table 1).

Paish (1997) very clearly articulates the insidious and serious nature of urbanization on salmon production when he states "...[i]t has become increasingly clear that this wide network of small scale aquatic systems and wetlands are extremely important habitats, not only because of their

intrinsic ability to contribute to specific fish stocks, but also because those streams are close to where people live and can contribute so much to other values important to urban and suburban dwellers. Bio-diversity, green areas, and recreational opportunities are all factors that community groups and even municipal governments are at last beginning to recognize as valuable assets that are being lost…" Because this aspect of fisheries management is close to home to those who care about fish, it is natural that anyone who wants to, or feels that they have a stake in the issue, can take part in the protection and restoration of freshwater habitat in urban environments.

Public groups have emerged, in our opinion, to counter the continuing losses that we still observe in the aquatic environment in this province. They now have become more involved than ever before in the decision-making processes with regards to the protection and restoration of habitat, particularly for the better part of the last decade. Thus, based on the experiences of public involvement in the issues listed above, as well as others, it is our view that a sense of ownership of the fish and their streams is critical in defending the needs and rights of these relatively defenseless entities. Salmon and steelhead habitat issues must become an aquatic "territorial imperative" (Ardrey 1966) by the public in order to achieve sustainability.

This ownership by the public must transcend the short-term economic gains and habitat trade-offs that in the past have so easily subsumed the rigorous protection of stream ecosystems throughout British Columbia's history, and have tied the hands of the regulatory agencies and governments. In summary, the involvement of public groups in urban, local and broader-based fish-habitat issues has been part of the evolution of fisheries management in this province.

2.2 Stewardship and Advocacy

The public groups interested in the protection and restoration of fish habitat in British Columbia have become involved in a number of ways, including stewardship and advocacy.

A steward has been defined as "one who manages the affairs or property of another". In the context of our report, this includes the management and protection of salmon and steelhead habitat or, in other words, the affairs and property of the fish. Stream stewardship groups tend to be involved in "hands on" types of activities that include:

- creating habitat by planting stream-side vegetation in the riparian zones and placing spawning gravel and large-woody-debris cover into streams;
- undertaking the inventory and assessment of fish and aquatic attributes, such as counting spawning fish, determining fry and invertebrate densities, measuring water quality and temperatures, and assessing habitat capability;
- mapping attributes using Global Positioning Systems (GPS) and computer Geographic Information Systems (GIS); and,
- educating various groups including the public, industry, agencies, local governments; and incubating eggs and releasing fry.

Advocacy has been defined as "defending a special cause". Over the last fifty years there have been various individuals, public groups and coalitions engaged in defending the rights and habitats of streams and fish habitats in British Columbia. These advocates have used techniques that include:

- extensive use of the media;

- lobbying local, provincial and federal governments at the political level;
- hiring and engaging consultants to provide technical and scientific information to bolster arguments or counter the positions of others;
- educating the public; and,
- using the legal system to undertake, or provide the threat of, court action.

In short, advocacy for fish habitat is primarily the activity of making governments accountable to existing legislation, policy and regulation, as well as using rigorous engineering and science in order to ensure the public good. These efforts are to guarantee that the interests of all citizens and the environment are well served, not just those of a project's proponent or special interest groups.

While there is rarely a public group involved in stream protection and restoration that confines its efforts solely to either advocacy or stewardship, some entities are clearly more strongly in one camp than the other. For example, many groups within the Pacific Streamkeepers Federation tend to be oriented towards stewardship. Paish (1997) indicated that the Federation has had a deliberate policy to develop a hands-on approach to fish and habitat, and it has consciously attempted to steer clear of politics. On the other hand, groups such as the Sierra Legal Defense Fund, the Outdoor Recreation Council, Greenpeace, Sierra Club, and West Coast Environmental Law are almost completely oriented towards advocacy, and they effectively use the media, law and political pressure to achieve their goals of fish habitat protection. In the middle ground are groups such as the Alouette River Management Society and Steelhead Society of British Columbia which actively and successfully engage in both stewardship and advocacy.

2.3 Who are these groups and what do they do?

Paish (1999) classified the involvement of British Columbia non-government organizations concerned for the protection and restoration of fish habitat into a continuum of geographically-based and interest-oriented groups. His categories are as follows:

Level 1. Small-scale local groups with a specific interest in a particular geographic site and usually a specific project, small stream, stream reach, etc. This, for example, is the level at which most of the streamkeeper groups operate.

Level 2. Local groups addressing the same issues in a more focused, sustained and extended manner. This again incorporates streamkeeper groups, local enhancement societies, and others like fish and game and naturalist clubs that pursue fish habitat conservation in their activities.

Level 3. Established watershed-based groups that undertake advocacy for fish habitat conservation, stewardship and protection. Such groups incorporate planning in their activities, but their principal focus is fish habitat.

Level 4. Watershed council types of organizations that incorporate the fish habitat interests of the other three groups with the interests of other watershed users and resource sectors.

Level 5. Overlapping with these four community-based groupings are the specific fish-user interest groups representing aboriginal, recreational and commercial fisheries interests as part of the "fisheries" community. Members of these groups are often involved at a local level in the other groups described above, but their interests often cut across geographic boundaries, and involve other fishery matters, such as allocation and stock management. Some of these groups

have a direct interest in habitat in terms of employment for their members on habitat restoration and inventory projects.

Below we discuss the diversity found within and amongst public groups that comprise these various levels.

2.3.1 Community groups

Community groups that were formed specifically for the protection and restoration of fish habitat in British Columbia come in an assortment of sizes and types and have various objectives and interests. They include very small gatherings with less than a dozen people, to large groups with memberships that run into the hundreds. In some instances, these groups are aggregated into even larger coalitions that draw together several entities.

Paish (1997) indicated that there were about 100 such community groups dealing with aquatic issues in the lower Fraser River area. There are also similar community groups throughout British Columbia outside the lower mainland area. Many of these are located in the developing parts of southern Vancouver Island, as well as across other settled and even not-so-populated parts of the province. For example, there are over 50 groups in the Comox Valley involved in working to resolve aquatic issues. Furthermore, new groups are being constantly formed, while others occasionally disband.

Many of these groups were originally formed as a result of the efforts of the federal Salmonid Enhancement Program. Newer initiatives such as the province's Urban Salmon Habitat Program and the federal Habitat Conservation and Stewardship Program are further facilitating these activities. Community groups that have been particularly active in southwestern British Columbia include the Alouette River Management Society, Seymour Salmonid Society, Nicomekl Enhancement Society, Langley Environmental Partners Society, and Port Moody Ecological Society.

There are also a number of umbrella organizations that help to coordinate these community groups and inform the public about stream-related issues. Most notable is the Pacific Streamkeepers Federation, a non-profit society committed to supporting community groups involved in activities throughout British Columbia and the Yukon. The objectives of the Pacific Streamkeepers Federation are as follows:

- provide an information exchange for Streamkeepers and enhancement groups;
- help coordinate Streamkeepers and enhancement efforts;
- lend a larger voice to Streamkeepers and enhancement issues;
- facilitate training for Streamkeepers and enhancement groups;
- help like-minded groups get started;
- provide support for existing Streamkeepers and enhancement groups;
- foster cooperation amongst watershed stakeholders; and
- promote local management of aquatic resources.

Information on the Pacific Streamkeepers Federation can be found on the web page: http://www-heb.pac.dfo-mpo.gc.ca/PSkF/home.htm.

2.3.2 Naturalist groups

There are at least nine naturalist groups in the lower mainland, and they all belong to the Federation of BC Naturalists (Paish 1997). Naturalist groups tend to have a broader geographic base than do local stream-protection and restoration groups that, by contrast, may only concentrate on a single watershed.

Naturalist groups are not usually formed to engage specifically in watershed activities. They tend to be interested in a host of environmental attributes. Having said that, some naturalist groups have become particularly attracted to aquatic issues, and many are now actively involved in stream stewardship and advocacy. Groups such as the Central Valley Naturalists and the Burke Mountain Naturalists have undertaken strong advocacy activities for the protection of specific watersheds, such as the Fraser and Pitt Rivers.

As a further note of interest, Paish (1997) suggests that naturalist groups have generally avoided becoming another professionally-paid level of governance, and rely strongly on volunteers.

2.2.3 Fish and game clubs, societies and federations

Fish and game clubs have existed in British Columbia for more than a half a century. They were amongst the first public groups to became involved in the management and protection of aquatic resources in this province. In the formative years, the main objective of these groups was to increase game-fish species that were of specific interest for sport fishing harvest by members. Consequently, protection of the aquatic ecosystem, as a whole, was usually an ancillary benefit to the enhancement of target species such as salmon or steelhead, although some of these clubs became known for their extreme diligence in advocating protection of particular streams (e.g., Sapperton Fish and Game Club's fight to protect and restore the Brunette River and its strong opposition to the addition of chloramine to the Greater Vancouver Regional District's water). Although the focus of many of these groups has been on hatcheries, habitat issues have come into the forefront in recent years.

Fish and game clubs engage in both advocacy and stewardship, but have developed a particular niche for the former as they have often developed good skills at negotiating with governments over a variety of issues that directly concern them, such as hunting and fishing regulations (Paish 1997). Since these outdoors groups often use fisheries resources around the province, they can also deal with issues in geographic areas where there might not otherwise be a strong regional voice.

Some of the more active local fish and game clubs, and their primary target streams with respect to the protection and restoration of habitat, include the Port Coquitlam Hunting and Fishing Club (Coquitlam River), the Sapperton Fish and Game Club (Brunette River), the Semiahmoo Fish and Game Club (Little Campbell River), and the North Shore Fish and Game Club (North Vancouver streams).

Most of the local fish and game clubs in British Columbia are affiliated with the umbrella organization, the BC Wildlife Federation. This coalition provides considerable strength with which to lobby and advocate to senior levels of government. However, some of the other fishing groups also have broad-based memberships from across the province, including the Steelhead Society of British Columbia, Federation of Fly Fishers and BC Federation of Drift Fishers. Because of the larger geographic jurisdiction and greater membership represented by these broader angling groups, they tend to have even more resources and the added representational clout to fight the larger battles for fish habitat.

2.3.4 Commercial fishing interests

The Federal Assistance Program to BC Commercial Fishermen in the mid-1990s included training out-of-work fishers to engage in stream mapping and inventory. Paish (1997) reports that some of the local committees of the United Fisherman and Allied Workers have been involved in stream protection and enhancement. The T. Buck Suzuki Foundation plays a central role in coordinating this activity, as well as advocating for stream-habitat issues.

2.3.5 Legal Advocates

As threats to ecosystems in Canada continued to increase over the last half century, it became apparent that litigation could be used as an effective tool in order to achieve environmental protection. Conservation groups realized the need for legal-oriented organizations with a mandate to provide these services and, subsequently, a number of groups were organized. Those that now deal with environmental and fisheries issues in British Columbia through the legal system include the Sierra Legal Defense Fund (SLFD) and the West Coast Environmental Law (WCEL) Research Foundation.

The SLDF was launched in 1990 in Canada in order to provide free legal services to conservation groups and concerned citizens. In British Columbia, it is an independent Canadian organization that works cooperatively with groups and individuals in solving environmental issues. The SLDF has been instrumental in providing strategic counsel for several successful grassroots campaigns. These include facilitating the recent ruling by the North American Commission for Environmental Cooperation which concluded that Canada is failing to enforce its own Fisheries Act and is allowing B.C. Hydro to destroy fish and fish habitat resulting from the sale of hydro-electric power to the United States.

SLDF uses resource analysts to bring in evidence to force offenders to obey the law. These are professionally recognized and have expertise including forestry, mining, freshwater fisheries and marine fisheries. SLDF is funded by public donations and foundation grants and it currently has over 20,000 individual supporters across Canada.

WCEL Research Foundation has been providing free legal advice, advocacy, research and law reform services for environmental issues since 1974. The WCEL's objective is to empower citizens to participate in forming policy for, and making decisions about, protecting the environment.

The work of WCEL supports the right of the public to have a voice in how the earth's resources are used, from the local to the international level. Furthermore, the WCEL's Environmental Dispute Resolution Fund has given away over $2,000,000 to hundreds of citizens' groups across BC since 1989 to help them solve environmental problems in their own communities. This Fund provides financial assistance to concerned citizens and groups for three purposes including:

- litigation, or participation in administrative tribunals;
- participation in alternative methods of dispute resolution, such as negotiation, mediation, or multi-stakeholder consultation, and,
- fees to hire scientific experts, such as fisheries biologists or hydrologists, to provide expert opinion in relation to cases supported by the Fund.

WCEL has been particularly active in the development of British Columbia's new Fish Protection Act. It also assisted the Pitt River and Area Watershed Network in its fight against the development of a proposed gravel mine in the Pitt River watershed.

2.4 Roles and Responsibilities

2.4.1 The importance of advocacy

It was Paish's (1997) view that it is advocacy that is most needed for stream protection because impacts to aquatic environments result from land-use and water-use decisions that have negative effects on fish habitats and these decisions are made by one or all levels of government. Of particular interest are the consequences of municipal decisions at the local-political and regional-planning levels. The presence of a strong community of individuals who are committed to the protection of the aquatic ecosystem and who act as watchers over the planning processes can curb the more egregious excesses to watersheds or halt them before they occur.

Two strengths that public non-government organizations, and community groups in particular, have in urban environments in dealing with fish habitat issues are their familiarity with the local fisheries resources, and their ability to get to know the various individuals in the local development industry and in the regional and municipal councils who make decisions affecting fish habitat. However, community groups often tend to focus on hands-on stewardship types of activities, to the exclusion of advocacy.

The possible reasons for this lack of advocacy by many public groups interested in fish include:

- the extensive amount of time and effort that is required to undertake advocacy;
- the need to determine who the local, provincial and federal decision makers are and to get to know the personalities involved at the political and bureaucratic levels;
- the fact that advocacy does not have a physical connection to the fish and their habitats, and is more often associated with planning meetings, boardrooms and debates in council chambers, stakeholder groups, and dialogue with the media and politicians;
- the requirement to clearly understand the science of fish habitat and the legislation, regulations and policies for ensuring no-net-loss. For many, this is complex, research-intensive, and not particularly stimulating, compared to physically handling fish or walking a stream; and,
- the level of antagonism and "pushiness" that is involved in order to be effective and successful in advocacy, and most individuals do not enjoy the constant fighting and bickering that is often inherent in the effort.

The task of saving fish habitat, compared to restoring it, has been described by some as guerrilla warfare. Much of the antagonism stems from the fact that many governments view the protection of aquatic ecosystems as being anti-development and a cost to businesses and tax revenues. In many municipalities and regional districts, the local media are inclined to side with city councils and view the federal or provincial governments as outsiders trying to foist a particular political agenda on the local constituency when a difference of opinion with regards to fish-habitat protection occurs between levels of government.

It is an unfortunate fact of life that in order to save fish habitats, effective advocacy requires strong personalities and willingness to take aggressive positions and engage in confrontations at all levels of government. This is not a very enjoyable task for most people, and many are uncomfortable in such a role. Advocacy battles can be long and bitter, careers can be affected, and large amounts of money can be required to conduct the protracted effort to reach land-use or resource-extraction decisions.

Public-group advocacy can often work well in, and from, larger centers of population. For smaller communities, it is our experience that people rarely want to step on the toes of fellow citizens or neighbors who are "just trying to make a living". Thus, it can be difficult to engender advocacy for fish habitat in smaller communities. Nevertheless, when fish-habitat advocates from the local communities take up the cause and make their voices heard, they are usually far more effective at dealing with the local decision makers and influencing resolutions that impact on fish habitat than are staff from higher-level government agencies. This is despite the fact that the senior agencies normally have stronger scientific and technical information, as well as legislation and regulations in their favor.

It is our opinion that it is those who have a sense of ownership of the landscape and water in areas where they live and advocate for fish habitat are the people who are most effective in protecting these ecosystems. In summary, while stewardship provides an important "glue" for many community groups wanting to protect or restore fish habitats and provides a needed connection to the resource, it is the inclusion of the advocacy role of these non-government organizations that really makes a group effective for salmon and steelhead habitat.

2.4.2 Are some public groups becoming simply another level of governance?

Public groups have a variety of agendas and perceptions of their roles and responsibilities in the protection and restoration of fish habitat. Their view of habitat management is not always congruent with the goals and objectives of government fisheries agencies. This is not to say that one group is always correct and the other is always wrong; sometimes the differences in opinion between public groups and the agencies are simply ones of institutional and political prioritization and resource capability. Nevertheless, there are instances where public groups have moved in directions that are inconsistent with policy and legislation and existing scientific knowledge, and this constitutes a problem.

Much of the fisheries stewardship work that is now being undertaken by public groups in British Columbia involves the accumulation of physical and biological information through inventory, assessment, mapping, instream or riparian habitat restoration, and fish culture in hatcheries. Work of this sort has typically been carried out by federal and provincial governments. But, for a number of legitimate (e.g., prioritization of scarce resources) or not-so-good (e.g., inappropriate prioritization of resources, or failure to act consistently with policy and good technical rationales) reasons, these efforts may not have been undertaken for a particular watershed where a community group happened to be interested.

The stewardship of salmon and steelhead habitat by public groups is laudable, and there are clear examples where public groups can act as valuable adjuncts to governments. Stewardship activities that involve field work and public education also provide an important component in developing a sense of ownership of the resource which is critical when it comes time to defend it against habitat destruction. However, the efforts associated with stewardship can sometimes cause problems for the regulatory and management agencies, making it difficult for the orderly management of fish stocks and habitat. This occurs when the agencies and public groups do not see eye-to-eye with regards to what is required to protect and maintain the resource.

Because of the level of effort required for public stewardship and advocacy groups to undertake these types of tasks, there is usually a subsequent need to secure financial and human resources to develop the organization to accomplish this type of work. Like most volunteer organizations, even public stewardship groups still require funds in order to function. Thus, the larger the group and the more ambitious their agenda, the greater the need for these resources.

A major source of funding for many of these community groups currently is government. These monies are often used to support the day-to-day levels of community group infrastructure, as well as to fund specific projects.

However, where public groups require resources to run such an organization, the skill set they need includes the ability to raise money. This money can come in the form of government or private grants, or through public fund-raising endeavors. At some point, the enthusiasm of volunteerism may be diluted by the group's efforts to secure money in order to hire staff to undertake projects and keep the organization functioning. These government-sourced resources can also be used to supply assistance in the form of Community Advisors, Stewardship Coordinators, Habitat Stewards and Habitat Auxiliaries.

Government money that is expended on assisting public groups to manage the restoration and protection of fish habitat can be well spent. However, if it is wasted or inefficiently used, it is then no longer available to be expended by line agencies. Government staff who have been subject to fiscal cut-backs in recent years become resentful when public groups become a perceived resource drain to the exclusion of good habitat management.

Another issue is the quality of the product that is being delivered by public groups. Agency employees do not appreciate the management and execution of projects by non-government groups that are better suited to department or ministry professionals, but are funded to public groups for apparently local and political reasons. The argument that some agency employees give is that the crown hires people to deliver a professional product and it is inappropriate for lay groups to provide a lesser outcome.

To recap, there are both positive and negative aspects to having public stewardship groups provide some of the components of habitat management including:

Positives

- Much can often be accomplished by volunteers who have time and energy, and where the agencies may not have the resources to undertake a particular task;
- Regional knowledge may not be available to the agencies, but can be accessed by individuals from the local communities;
- Local groups can have a sense of ownership which stimulates them to "go the extra mile" in collecting information or restoring habitat where governments may not have the resources;
- Public groups can have access to additional money that government agencies may not have; and,
- Public groups can have a passion for the resource that paid agency professionals may not have.

Negatives

- Information from non-professional lay people can be poorly collected and collated or lost, due to an absence of qualified personnel and lack of quality control and quality assurance;
- Information that has already been collected by government agencies may be inadvertently re-collected due to poor communication among volunteer groups;
- Habitat "restoration" may be incorrectly implemented or have a negative impact on the net capability of a watershed because of a lack of professional direction or coordination;

- Activity undertaken by a community group in a particular watershed may be of low biological effectiveness and management priority;
- Each time money is vetted to public groups through succeeding layers of bureaucracy, a percentage is removed for administration and the effectiveness of each dollar can be diluted; and
- Money that is accessed to a community group can reduce the funds that are subsequently available for paid agency professionals to undertake the work in an efficient manner within an institutional framework. The habitat-restoration pie is limited in size, and what is given to one sector is no longer available to others.
- In summary, some of these public groups have attempted to become another level of government in terms of delivery of programs and projects. However, this can be counter-productive because they *"...are not the same as government, yet too frequently one of the first moves being made by both government and community groups is to appoint a full time paid coordinator, who then takes on a bureaucratic role and the organizations begin to carry out the same function as a government agency, rather than continue to pursue their original function as volunteer advocacy associations whose job it is to put pressure on government..."* (Paish 1997). Thus, it is incumbent on fund-granting institutions, government agencies and public groups to ensure that in protecting and restoring habitats, all participants attain efficiencies in expenditures and technical deployment.

2.4.3 New and changing leadership within public groups

A significant component of the current human demographic in this province includes a gradual shift in the population age-structure which is now providing a new and invigorated level of leadership for community groups that has not been seen in the past. The leading edge of the aging baby-boom is now moving into retirement age, and many of these individuals are looking for activities that involve volunteer roles in the protection of the environment. A not-surprising number of them are former natural-resource professionals who were induced into retirement at an early age due to government downsizing initiatives. These people continue to have an enormous wealth of knowledge, enthusiasm, commitment and resource ethic that they are simply not willing to forget and lie fallow. Many public groups that deal with habitat restoration and protection are now enlisting these individuals to the benefit of salmon and steelhead.

Also, a cadre of fisheries-resource stewardship and advocacy professionals has emerged in the past decade. They have taken on tasks to actively protect or restore fish habitat under the aegis of non-government organizations rather than government agencies. These managers and employees come with skill sets that complement, and sometimes overlap with, their counterparts in the federal and provincial civil service. For these individuals, this work constitutes a career and a full time job. Public groups often find that these paid professionals are critical in providing a level of rigor and expertise not found when only volunteers are involved. It should be noted that in order to keep these individuals gainfully employed, advocacy and stewardship groups normally have had to resort to fund raising.

3.0 GOVERNMENT INITIATIVES THAT ENCOURAGE PUBLIC INVOLVEMENT IN PROTECTING AND RESTORING HABITAT

3.1 Legislation

Legislation, policy and regulations are some of the keystones in protecting public resources. Non-government organizations can get involved in the protection of fish habitat by being aware of the relevant laws and associated policies and regulations that pertain to this issue, and by ensuring that the regulatory agencies uphold these precepts. Furthermore, public groups can also get active in the legal venue by intervening in the courts where needed, and by providing input to environmental reviews and planning initiatives.

Legislation enacted specifically to address fish habitat issues includes the *Canada Fisheries Act*, the *Forest Practices Code Act of British Columbia* and the *British Columbia Fish Protection Act*. The *Canada Fisheries Act* has a number of provisions within it to protect aquatic environments from pollution (Section 36–3), provide for minimum flows (Sections 21, 22, 66), and protect against destruction of fish habitat (Section 35). The *Canada Fisheries Act* has three main functions that include deterring activities that might destroy aquatic habitat, penalizing those who break the law, and setting boundaries and guidelines for developers. Charges can be laid and private prosecutions can be initiated by private citizens or groups under the *Canada Fisheries Act*, and the government has the option of assuming the prosecution on behalf of a citizen or group, or terminating the proceedings by entering a stay. This is what has typically happened when a public group has taken an alleged offender to court over an infraction.

The *Forest Practices Code Act of British Columbia* was enacted to protect ecosystems and fish-habitat attributes while still allowing the extraction of timber from our province's crown forests. The *Act* is delivered through the Forest Practices Code and its regulations and guidebooks. Provisions in it provide the opportunity to protect fish. They include the designation of Riparian Management Areas around fish-bearing streams, discretionary limits to the size of harvested areas and the rates of harvest, and regulations on road building to help reduce slope disturbances and limit the effects on a watershed's hydrology.

Individuals and public groups can bring forward their differences of opinion and complaints with regard to how the Forest Practices Code is being implemented to the Forest Practices Board and the Forest Appeals Commission. These bodies can rectify circumstances where the Code was improperly executed and resulted in impacts to fish habitat. The Board provides British Columbians with objective and independent assessments of the state of forest planning and practices, as well as compliance with the Forest Practices Code and its intent. Thus, these opportunities are very important tools whereby public groups can get involved in ensuring that fish habitat is protected where forests are being harvested.

The *Fish Protection Act* was approved in the 1997 sitting of the British Columbia legislature. The *Act* provides powers to ensure water for fish, protect and restore fish habitat, and strengthen riparian protection and local planning. Stewardship and advocacy groups have been extensively involved in the development of this *Act*, and it is safe to say that its genesis was spearheaded by the efforts of individuals and groups that were concerned about fish habitat. This *Act* allows for the designation of a stream as "sensitive" and the public has had much influence in the choice of designated streams. The *Act* will also allow for the issuance of streamflow protection licenses to community groups. The Streamside Protection Directive was also developed under the

authorization of this *Act*, and various individuals and public groups had considerable influence in the evolution of this important component for the protection of riparian habitats in areas of land development.

Other environmental legislation with collateral, but important, influence on how fish habitat will be protected and managed, and which public groups should be aware of and become involved in, includes the *Local Government Act Act*, the *Water Act*, the *British Columbia Environmental Act*, and the *Canadian Environmental Act.* These Acts contain provisions whereby fish habitat can be protected under specific and relevant circumstances and the public can have a critical role in influencing the outcome of agency decisions.

For example, it has been recognized that some of the greatest impacts to fish habitat in British Columbia have arisen as a result of land development in our local communities. In this province there are over 150 municipalities, around 1,000 mayors and councilors, 27 Regional Districts, almost 200 electoral area directors plus municipal directors (Dovetail 1999). Most of the land use decisions under these circumstances are made, at least in part, by municipal governments.

When local land is being developed, the official process usually takes the form of a public hearing as specified in the *Local Government Act of British Columbia*. Changes to the *Local Government Act* in the late 1990's provided for stronger powers for local governments to protect fish habitat, and the public can input their thoughts and positions in these activities. The *Local Government Act* details how the public process must be undertaken and provides for legal recourse when the practice is not followed. Public groups and persons who are attempting to protect fish habitat must address this land-use decision process and understand the legal issues in order to increase their impact on the outcome of the decision.

The *Water Act* is another piece of provincial legislation that impacts on fish habitat in a major way. This *Act* has had a major impact on the habitat capability of steelhead and salmon streams in the province of British Columbia even though it is not specifically a fisheries *Act*. The *Water Act* influences fish in that it regulates the diversion, damming and abstraction of water from streams, as well as the construction of works in and about a stream—important components of managing fish habitat. Over-allocation of water, to the detriment of fish, has been a perennial problem in this province in many streams (Rosenau and Angelo 1999). Much riparian and instream habitat has also been lost over the years as a result of authorizations to work in and about a stream. Nevertheless, public groups have some influence in how the legislation and regulations of *Water Act* are enacted through political lobbying, appeals to the Comptroller, and through submissions to the Environmental Appeal Board for specific decisions by the Water Management Branch of the Ministry of Environment, Lands and Parks.

Finally, the *Canadian Environmental Assessment Act (CEAA)* and the *British Columbia Environmental Assessment Act (BCEAA)* are two similar pieces of environmental legislation administrated by the federal and provincial governments. They address effects to the environment relating to specific projects, and these include impacts to fish habitat. Because these statutes are so similar between levels of government, harmonization agreements by Ottawa and Victoria minimize the overlaps in jurisdiction. Specifically, there are criteria whereby magnitudes or types of projects are dealt with by one or the other level of government's legislation. The public are often given the opportunity through these statutes to provide meaningful input with regards to impacts to fish habitat for specific projects.

3.2 Resource initiatives by senior governments to facilitate public groups

Governments have come to realize that there are both practical and political benefits from supporting stakeholder groups in the protection, restoration and enhancement of freshwater streams in British Columbia. As a result, both the federal and provincial governments have, in recent years, become involved in developing support programs that allow public groups to be involved in stewardship and advocacy. Some of these programs provide equipment and technical guidance, while others provide money outright for projects, as well as to facilitate the hiring of technical and administrative support. Below, we review some of the higher-profile efforts by the federal and provincial governments.

3.2.1 The British Columbia Urban Salmon Habitat Program

The Urban Salmon Habitat Program (USHP) was initiated in 1995 as a component of the BC Salmon Habitat Conservation Plan. The primary focus of this program was to protect and restore salmonid fish habitat in the urban areas of the Georgia Basin. The program supports habitat and stewardship coordinators in provincial fisheries regional offices and provides direct funding to community-based stewardship groups and local governments. Also, educational materials and initiatives are raising awareness of conservation issues and promoting stream stewardship.

The USHP was designed to help municipalities and community groups in urban environments and is predominantly focused towards establishing training programs relating to fish populations and fish habitat most threatened by our rapidly increasing population. The USHP had a five-year plan encompassing three major initiatives:

- The British Columbia government will encourage stewardship projects by providing funds and technical resources to community-based organizations for activities such as public education, habitat resource assessment, landowner contact programs, watershed planning, monitoring, evaluation, rehabilitation, and restoration;
- Partnerships amongst the province, regional districts, municipalities and communities would be forged under the USHP through cost-sharing for staff. Provincial funds were to be available to help support local governments in strategic Georgia Basin urban centers; and
- Eight new government staff were to be hired to act as resource bodies for locally-based salmon habitat conservation initiatives.

The development of USHP was viewed by the British Columbia government as a “missing link” in a common effort by a variety of individuals, groups and levels of governments to save our salmon.

3.2.2 Fisheries Renewal BC

Fisheries Renewal BC (FsRBC) is a crown corporation created in 1997 under the *Fisheries Renewal Act* to lead the rebirth of British Columbia’s fisheries resource. The corporation works with partners to make strategic investments in programs that improve fish stocks and habitat. It is also charged with developing new fisheries, diversifying and marketing products and services, creating jobs, and strengthening fishing communities through training, education and technological development. The mandate of FsRBC includes both marine and fresh waters, all fish including non-finned species, and commercial, aboriginal and recreational sectors. Of its three programs—Salmonid Renewal; Planning and Partnership; and Development and Diversification—it is the renewal effort that is of interest to this report.

The Salmonid Renewal Program uses watershed-based Partnership Groups to choose and deliver projects in their areas. These projects are supposed to increase the numbers of salmon and trout and other freshwater species of fish that are currently at risk, for use by First Nations, commercial and recreational fisheries. The Partnership Groups have a broad-based representation from First Nations, commercial and recreational fishers, municipalities, the environmental community, government, and other interests.

Projects funded under the Salmonid Renewal Program include:

- inventory and mapping;
- habitat restoration;
- stock/habitat assessment;
- stewardship and community planning;
- stock enhancement; and,
- education and public awareness.

Table 2. Habitat project summary for the Salmonid Renewal Program of Fisheries Renewal BC.

	1998/1999	1999/2000
Salmonid Renewal Program Projects	231	453
Stream Habitat Restored (km)	53	224
Stream Stock and Habitat Assessed (km)	1,027	2,917
Training Opportunities in Salmonid Renewal	207	1,898
Volunteers in Salmonid Renewal	492	1,898

The Partnership Groups must make sure that the program has the support and involvement of the local community. FsRBC funds the start-up of the Partnership Groups, aids in defining a long-term vision, creates leadership, and uses inclusive planning processes. Partnership Groups use FsRBC staff to solicit, evaluate and select proposals. These Groups must then be responsible for funding, monitoring and auditing the projects, reporting on the results of the projects, and managing administration. The Partnership Groups rely on help from Ministry of Environment, Lands and Parks, and Fisheries and Oceans Canada for delivery. These agencies also help with the review of proposals, implementation of projects, and assessment and evaluation of the completed work.

In 1999/2000, there were 21 Partnership Groups receiving a total of $10.25 million from the Salmon Renewal Program. This amount was assigned mostly to south and central British Columbia with some representation from the north.

3.2.3 The Federal Salmonid Enhancement Program

The Salmonid Enhancement Program (SEP) was the basis of many attempts to rehabilitate salmon and steelhead stocks in British Columbia throughout the 1970's and 1980's. While much of the work focused on large projects, such as hatcheries and lake fertilization, a considerable amount was in smaller community projects, such as incubation boxes, instream restoration and hatcheries.

Artificial enhancement was a cornerstone for much of the community-based support by SEP, but the program also funded stream stewardship programs, how-to manuals, and training programs.

Much of the technical support by SEP to the communities took place through Department of Fisheries and Oceans employees in positions known as the Community Advisors or CAs. The CAs generally had technical expertise and were particularly active in setting up hatcheries, assisting in capturing broodstock, and helping in the incubation and raising of fish. They were rarely active in providing advice on advocacy towards fisheries habitat issues. In short, the support people provided to the communities by SEP did not convey an understanding of the intricacies and subtleties of government process, legislation, policy and regulation, but were strong on technical issues, usually in artificial propagation. Nevertheless, the exercise gave the federal and provincial governments the understanding that they could assist community groups through funding mechanisms and technical assistance, and could provide a way for people to become directly involved with fish and their habitats.

As an important consideration, it is our opinion that the focus on the artificial restoration methodologies by the SEP in regards to the public group initiatives, as compared to the restoration or protection through advocacy of habitat, may have done more damage than good over the years. It gave the public the perception that unnatural human intervention is sufficient to maintain stocks of fish in the face of increasing watershed degradation.

3.2.4 The Federal Government and "A New Direction"

In 1998, the federal Minister of Fisheries and Oceans announced a plan aimed at restoring the health of Canada's fisheries on the Pacific coast. Entitled the "Canadian Fisheries Adjustment and Restructuring (CFAR) Plan", it was focused through twelve policy statements, and various fisheries adjustments and restructuring measures. The policy principles had three primary categories: Conservation, Sustainable Use, and Improved Decision Making.

Conservation

- Conservation of Pacific Salmon stocks is the primary objective and will take precedence in managing the resource.
- A precautionary approach to fisheries management will continue to be adopted.
- DFO will continue to work towards a net gain in productive capacity for salmon habitat in British Columbia (and the Yukon).
- An ecological approach will guide fisheries and oceans management in the future.

Sustainable Use

- The long term productivity of the resource will not be compromised because of short term factors or considerations—tradeoffs between current harvest benefits and long term stock well being will be resolved in favour of the long term.
- All sectors—First Nations, recreational and commercial—will use selective methods to harvest salmon.
- First Nations requirements for food, social and ceremonial purposes will continue to have priority after conservation.
- Whenever possible, the recreational fishery will be provided with more reliable and stable fishing opportunities.
- The commercial fishery will be a more diversified (less dependent on salmon) and economically viable sector, better able to withstand fluctuations in the cycle of the resource and the market.

Improved Decision-Making

- Clear, objective and relevant information on major issues requiring decisions will be provided to the public with sufficient time and opportunity for review, comment and feedback. Periodic review of progress and achievements will be initiated to facilitate accountability for the sound management of the salmon resource and its habitat.
- Government and stakeholders will together be responsible and accountable for sustainable fisheries.
- Enhanced community, regional and sector wide input to decision-making will be pursued through a structured management and advisory board system.

A sum of $400 million was allocated for this work. Within this plan, the policies were to be carried out through two main components: the Coho Response and the Pacific Fisheries Restructuring Program that had three elements:

- Industry restructuring and adjustment such as fleet buy backs;
- Economic and social impacts of changes in the fishery on individual fishers; and,
- Resource rebuilding.

The Minister in charge of this initiative, David Anderson, took the position that "...[s]uccessful long-term habitat protection requires us to effectively plan and manage the way we use water and land in our watersheds. This means balancing the needs of fish with the needs of other users. Land and water use planning can benefit from local communities, stewardship groups and others who care about fish and habitat working together and providing input to watershed councils, roundtables and other decision-making bodies. Habitat auxiliaries and stewardship coordinators can help make this happen. These groups can also make valuable contributions to developing fish production plans and local watershed management plans."

Of the $400 million, $100 million was allocated to the five-year Resource Rebuilding Strategy. That strategy had four sectors including:

- Habitat Conservation and Stewardship Program—designed to form partnerships to enhance habitat protection and expand community capacity for stewardship and conservation ($35 million). This funding included opportunities for Habitat Auxiliary positions, Stewardship Coordinators, and promotion for the establishment of fisheries habitat planning and management boards, councils, or equivalents at the watershed scale;
- Habitat Restoration and Salmonid Enhancement Program—to provide funding for projects that improve or create habitat, rebuild or conserve stocks, or promote local resource and watershed stewardship ($23 million);
- Endowment Fund—independently operate a long-term habitat fund to ensure a stable source of funding for projects developed by local stewardship groups ($30 million); and,
- Strategic Stock Enhancement Program—to provide funding for the immediate use of existing hatcheries to conserve or rebuild endangered salmon stocks ($12 million).

The first three initiatives outlined in the above bullets have strong stewardship components and are discussed below.

3.2.4.1 Habitat Conservation and Stewardship Program

The Habitat Conservation and Stewardship Program (HSCP) was designed to establish partnerships to enhance habitat protection and expand community capacity to steward fish habitat resources. It was to represent a proactive approach to habitat protection that focused on developing local capacity in habitat conservation and stewardship. This focus was to be on encouraging people to embrace a conservation and stewardship ethic in their communities by providing a support system. Developing that requires a focus on people rather than projects or funding, and this Program was designed to build community partnerships for conservation and stewardship.

The HCSP created Stewardship Coordinator, Habitat Auxiliary and Habitat Steward positions throughout Pacific Region to work with communities on watershed management planning and habitat protection activities. Near the completion of Phase 3 of the Habitat Conservation and Stewardship Program, there were over one hundred Stewards established throughout BC and Yukon.

The HSCP Program's Vision continues to be to seek to establish partnerships to enhance habitat protection and expand on the community capacity to steward fish habitat resources. Planning and implementation of HCSP are being guided by the following principles:

- strategic delivery in priority areas including watersheds and marine zones;
- scientific and technical information exchange with stakeholders;
- local design and delivery;
- building long-term community stewardship capacity;
- clear linkages with existing and effective habitat protection programs;
- communication across governments, First Nations, industry, and communities; and,
- adaptability to local opportunities, abilities, and fish benefits.

The HCSP objectives are to:

- incorporate fish habitat protection requirements into local land and water use plans;
- increase public and stakeholder awareness of fish habitat requirements;
- improve habitat mapping and inventory data required for land management and resource planning;
- increase local stream surveillance and monitoring;
- improve compliance monitoring of development projects;
- provide technical information, advice, and support to partners and communities;
- pilot the development of watershed management plans for several priority watersheds;
- enhance and restore habitats as part of watershed management plan(s); and
- increase community responsibility for watershed management.

The HSCP is coordinated by a Program Manager in the Pacific Region headquarters and delivered by six Area Coordinators located within area offices throughout British Columbia and Yukon. The Program Manager has an advisory Steering Committee consisting of four regional representatives, as well as a recording secretary. There is also an Implementation Committee, as well as support staff and Area Chiefs.

A number of sub-committees, which report to the Implementation Committee, have been formed to facilitate the implementation of the Program and oversee initiatives such as: Training, Evaluation, Website, and Watershed Governance. There are also other support initiatives that have been funded through the program, including the Stewardship Centre, Streamteam, and Salmonids in the Classroom.

Because a primary goal of the HCSP is to protect fish and fish habitat, watershed management planning is a key means to reaching that goal. HCSP stewards (i.e., Stewardship Coordinators, Habitat Stewards, and Habitat Auxiliaries) are expected to help community groups represent fish and fish habitat interests in local, regional, and other planning processes. Examples of these planning processes include Official Community Plans, Land and Resource Management Plans, Water Use Plans (B.C. Hydro), Marine Protected Areas/Integrated Coastal Zone Management, and Yukon Land Use planning.

To accomplish watershed management planning, the HCSP stewards are to partner with community groups and supply information and data, attend planning meetings, coordinate with DFO staff, as well as provide local technical support and advice on habitat protection requirements and restoration opportunities.

3.2.4.2 Habitat Restoration Salmonid Enhancement Program (HRSEP)

The Habitat Restoration and Salmon Enhancement Program (HRSEP) was established in 1996 as a part of the Pacific Salmon Revitalization Strategy. The main objective of the federally funded HRSEP was to revitalize salmonid populations in the Pacific Region through habitat restoration, stock rebuilding and resource and watershed stewardship. At that time, $15 million of funding was secured for the 1997/98 and 1998/99 fiscal years. In September of 1998, Fisheries and Oceans injected an additional $2 million into HRSEP under the Resource Rebuilding initiative, part of the Pacific Salmon Fisheries Restructuring Program. Also, as part of the Pacific Salmon Fisheries Restructuring Program, HRSEP was granted an additional $20 million to continue community restoration and enhancement partnership programs over the next three fiscal years. Over the past four program years, HRSEP has funded projects for a total value of over $32 million. Each year, HRSEP has funded over one hundred habitat restoration works, stewardship initiatives and stock rebuilding activities operated and administered by a variety of community groups and agencies. The 2001/2002 fiscal year is the final year of HRSEP funding.

Public groups can apply for money to undertake fisheries habitat projects. In order to be considered for funding, applications must meet this broad program focus: “Increasing the quantity and quality of salmon habitat and conserving salmon stocks in British Columbia and the Yukon”. All proposed projects should fall into at least one of these categories:

- Habitat Restoration: Restoration activities that improve or create freshwater and estuary habitat for spawning and rearing can improve salmon survival. Projects include stabilizing stream banks, improving fish access and water flows, building side-channels, fencing, planting riparian vegetation or improving spawning and rearing habitats.

- Salmon Stock Rebuilding: Stock enhancement projects help bolster weak populations and stock assessment projects assist in gathering vital fisheries information. Projects include incubation and rearing programs, marking and enumeration initiatives.

- Resource and Watershed Stewardship: Stewardship refers to community-based initiatives that promote sustainable salmon populations. Projects include stream inventories, habitat mapping and watershed planning. These projects enable proponents to develop their watershed knowledge and give them the tools to provide regulators and developers with the information required to make informed decisions on stock conservation and habitat protection and restoration.

3.2.4.3 Pacific Salmon Endowment Fund (PSEF)

The Pacific Salmon Endowment Fund (PSEF) was announced in February 2001 as "the first-ever long-term funding mechanism designed to achieve sustainable salmon stocks in British Columbia and the Yukon". The capital for the fund was set at $30 million and was contributed by the federal government. Wheelchair athlete Rick Hansen of the Man-in-Motion World Tour was chosen to assemble a team to prepare and implement a strategy to make this Fund work. A non-profit Pacific Salmon Endowment Society was also set up to act as the custodian and to set program priorities for the Fund.

It was set up to focus on priority geographic areas and activities specifically the Thompson-Shuswap, Georgia Basin and Central Coast. The work is intended to integrate habitat protection and restoration, harvest management, salmonid enhancement and improved land-use practices for the benefit of fish. The approach is designed to help salmon by working with stakeholders, volunteers, interested groups and local communities in a coordinated and complementary fashion.

The starting point for work in these priority geographic areas is the development of recovery plans for specific watersheds. The plans will include an understanding of:

- the current state of salmon in their habitat;

- biological limits to recovery;

- local and regional fisheries; and,

- the potential and requirements for recovery.

The PSEF intends to develop and implement these plans by including community groups, stakeholders, fisheries experts, and First Nations. The use of scientific principles and technical data are to be the keys for success of the recovery plans.

The money from this fund will be managed by the Vancouver Foundation and it will be invested according to specific guidelines. The annual interest, in the short term, is estimated to be about $1.5 million. The Pacific Salmon Foundation will be the program manager, and it will manage funding applications, review and select projects, allocate funds, and monitor and evaluate projects.

Because this fund was just announced, it is too early to determine the efficacy of the proposed process and work.

4.0 PROFILES OF THREE SUCCESSFUL PUBLIC GROUPS THAT HAVE MADE A DIFFERENCE

4.1 Alouette River Management Society (ARMS)

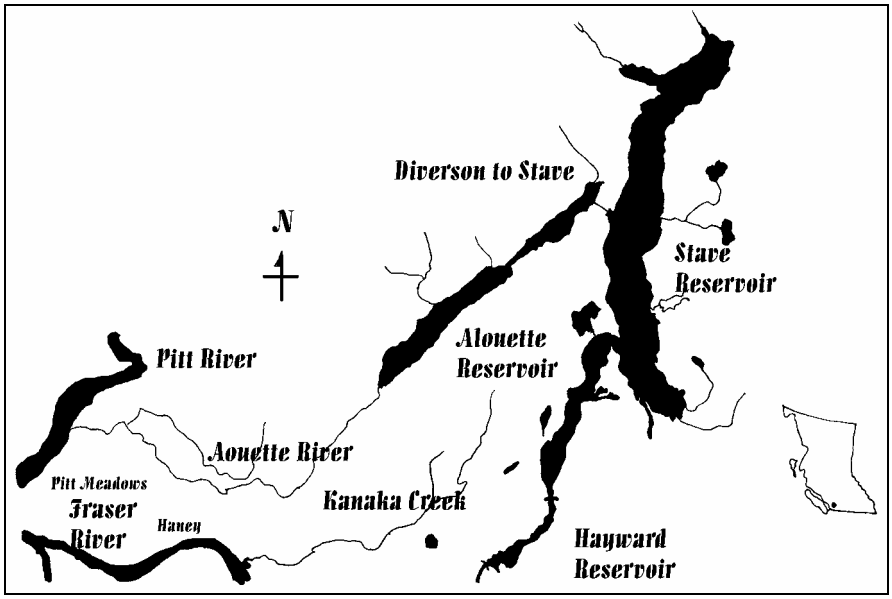
4.1.1 Introduction

One of the most successful stewardship and advocacy groups in the lower mainland is the Alouette River Management Society (ARMS). ARMS has been in existence less than a decade, but it has achieved much during its short duration. Its accomplishments include: negotiating improved flows from BC Hydro's Alouette River reservoir; building an impressive environmental community center; and, engaging in various stream restoration and protection initiatives throughout the Alouette River watershed.

4.1.2 History of the Alouette River watershed

The Alouette River is a lower mainland British Columbia stream that flows westerly through Maple Ridge and on into the Pitt River. From there, the water then discharges into the lower Fraser River (Fig. 2). The Alouette watershed is now divided into two distinct units by a hydro-electric diversion dam. The majority of the streamflow above the dam is diverted through a tunnel into a power station at the east end of the reservoir. Gold Creek and upper Alouette River are the major inflow streams into the reservoir. The Alouette water that is utilized for power is released into the Stave Reservoir where it is re-used twice more for hydro-electric power at the Stave Falls and Ruskin Generating Stations. Tributaries downstream of the Alouette Reservoir dam include the North Alouette River and Blaney Creek plus a myriad of smaller streams which drain the north and south slopes of the basin.

Figure 2. Map of the Alouette River watershed.



The Alouette River and its tributaries appear to have comprised a fish-rich watershed since the last ice age. The Katzie First Nation considers it to be part of their traditional territory and, by all accounts, it was an important fishery from time immemorial. No accurate enumeration of the

historic fishery is available. In all likelihood, however, it would have been considerable and could have reached into the hundreds of thousands of salmon per year. Prior to European contact, this watershed was home to all five species of Pacific salmon, along with steelhead and other salmonid and non-salmonid fishes.

Following European settlement, the Alouette watershed was initially impacted by extensive timber harvesting at the turn of the century. At the time, it was reputed to be the site of the largest logging operation in the British Commonwealth. The removal of the wood from this watershed area, and specifically from the riparian zones, had a significant impact to the quality and quantity of fish habitat. Historical photos around the time of the intensive and extensive logging show a broad floodplain devoid of much natural instream woody debris and other high-quality habitat features. This is likely the result of clearcutting to the edge of the stream and the subsequent loss of the integrity of the stream banks due to erosion, dragging timber through the stream with its concurrent damage to the channel shape, and the scouring impacts caused by the transport of logs by floating them down this watercourse.

In 1926 the Alouette River was impounded for hydro-electric power. Virtually all of the flows at the point of diversion were re-directed out of the watershed and into Stave Reservoir to the east through a power generating station. The salmon and sea-migratory trout and char that had previously spawned upstream of the dam were completely blocked from access to the upper reaches by the structure. As a consequence, any remaining migratory fish stocks normally spawning and rearing in this stream were confined to the lower 25 kilometers of river and were sustained only by flows arising from downstream tributaries. Releases of water from the dam to the lower river occurred in the form of minor seepage (less than 1% of the average yearly flows) and as the result of an occasional flood.

Historical records suggest that in the years subsequent to the construction of the dam, large numbers of fish congregated at the base of the structure having nowhere to spawn. Extinction of upstream stocks of chinook and sockeye salmon occurred as a result of the impoundment. The Katzie First Nation who had historically lived in the area lost the opportunity to harvest these fish without any compensation.

Due to the impoundment of the upper watershed's inflow of water, the lower Alouette River flood flows became attenuated. This was because the reservoir was able to capture many, although not all, of these high flows during flooding events. As a result, the landowners in the downstream Alouette River basin began to settle various properties in the riparian area and were inclined to develop much further into the floodplain because of reduced discharges of water.

Thus, in addition to the effects on the aquatic environment arising from the logging and damming that had occurred in the Alouette River basin in the early years of European settlement, development of the riparian landscape for agriculture and human habitation further impacted the fish habitat of this watershed in many negative ways. For example, the developed properties in the floodplain, from time to time, were affected by large flooding events. As a result, property owners continued to dike riparian areas and armor the banks of the Alouette River and its tributaries, causing even further damage to fish habitat.

Further impacts to fish habitats in the Alouette watershed increased dramatically as a result of the intense urbanization that began to occur in the basin during the 1980s and 1990s. By the latter part of the twentieth century, a mere remnant of the fish populations remained in the Alouette River watershed. Over time, this stream had been devastated by human activities and, in spite of all good intentions, government agencies did little to rectify conditions.

4.1.3 Initial public concern

Over time, a number of the local citizens began to raise concerns that this hydroelectric project had severely disrupted their community by destroying and severely impacting on the fish runs in the Alouette watershed. While there may have been some concern expressed when the dam was first built, the first real call to action can be documented in the 1960's when some people in the area lobbied governments for more water to protect fish from warm summer-water temperatures. Only small flow concessions were granted.

Prior to the 1960's, the Alouette Generating Station was privately owned. With the nationalization of the hydro-electric industry, this facility became a part of the BC Hydro Crown Corporation. By the late 1980's BC Hydro began to recognize that it had a significant responsibility to ensure that its structures operated in a more environmentally sensitive manner. Specifically, it needed to address the effects of the production of electricity on fish and fish habitat. As a result, BC Hydro began, in a modest way, working with government agencies to address some of the more egregious impacts of its facilities on the Alouette River watershed.

BC Hydro's positive work in the Alouette watershed included an increase in base flows from a mere trickle to a still unassuming twenty cubic feet per second of water. This increase, although positive, was considered by most fisheries biologists involved in the issue to be just an initial step, given that the average historical inflows into the reservoir were about eight hundred cubic feet per second. BC Hydro also added spawning gravel to the lower reach of the river in an attempt to redress some of the other impacts that would have arisen as a result of the damming of the river. It also contributed to a number of other habitat related projects.

4.1.4 The genesis of ARMS

Despite the new direction by BC Hydro to redress some of the fish issues on the Alouette River, many people within the Maple Ridge area felt that it was almost too little, too late. The primary focus of these citizens was that flows were still inadequate to provide protection and restoration of fish habitat, and more had to be done. As a result, local stakeholders and interested parties started to take action at a community grass-roots level and the Alouette River Management Society (ARMS) was formed in 1993 with the specific goal of increasing flows to the Alouette River from the dam.

In 1995, ARMS, along with other stakeholders including the District of Maple Ridge, Katzie First Nation, government agencies, and others, became involved in a series of intense negotiations with BC Hydro to determine a legitimate and scientifically defensible flow release for the lower Alouette River that all groups could support. While ARMS was not the only group at the table, it led the charge with respect to the protection of the aquatic resources and restoration of fish flows in the Alouette watershed. As part of its strength, ARMS was linked with the Katzie First Nation, and this created a powerful advocacy group for the salmon. ARMS effectiveness as a lobby group also arose because of its tenacity, its ability to work closely with all stakeholders, and its success in attracting charismatic, strong-willed and technically competent leaders.

The goal of increased flows was finally achieved in 1996 when the base discharge from the dam through the low-level outlet was increased fivefold and water equaling just over 10% of the mean annual discharge was released. BC Hydro generated a lot of goodwill and positive publicity from this initiative, and the response of the fishery to these increased flows has been encouraging.

As part of this initiative, a technical management group named the Alouette River Management Committee was formed by BC Hydro, and it includes ARMS, the Ministry of Environment, the Department of Fisheries and Oceans, the District of Maple Ridge, and the Katzie First Nation.

One of the committee's mandates is to implement a monitoring program in order to assess the effects of the flow agreement. The 1999 monitoring program consisted of four components: (1) adult enumeration; (2) salmonid smolt assessment; (3) substrate monitoring; and, (4) temperature monitoring. While these studies received financial support from BC Hydro as part of the flow agreement, ARMS was instrumental in ensuring that these projects got underway.

Since its success in attaining flows for fish in 1996, ARMS has also become involved in many other aspects of watershed stewardship, including inventory and monitoring, habitat restoration, and lobbying for the protection of aquatic habitat. ARMS has become very active within the community, and often communicates directly with private property holders in order to assist landowners with the implementation of sound stewardship practices on their land so as to protect riparian fisheries values.

ARMS is a broad-based organization committed to the protection and enhancement of the Alouette River watershed through advocacy, education and coordination. It has been highly visible and prominent in an advocacy role in the community, helping to elect an environmentally conscious local council and mayor during the most recent election. Part of its strength in communicating its message with the public has been a positive working relationship with the local media. This has enabled the group to educate and inform a considerable number of people in Maple Ridge and surrounding area.

Today, ARMS is based at the Rivers Heritage Center in east Maple Ridge near the Alouette River Correctional Unit. The Center was the result of the vision and dreams of a core group of dedicated individuals who recognized that the kind of work that ARMS is now doing required a core location and a facility where meetings could be held, equipment stored and offices maintained. The Rivers Heritage Centre was officially opened on Rivers Day 1999.

The center is staffed by the ARMS Watershed Coordinator and an Administrator. As well, a Stewardship Coordinator, funded through the federal Habitat Conservation and Stewardship Program, operates from there. The Center is intended to be a source of environmental stewardship, information and advice for the community. Activities at the Center have included Streamkeepers training, workshops dealing with sustainable development practices, school field trips, and public events, such as Rivers Day. In addition to its core staff, ARMS consists of a President, twelve Directors and three hundred members. The Society receives funding from several provincial and federal sources, and also receives a considerable amount of in-kind support.

4.1.5 Local projects managed by ARMS

At a technical level, ARMS is also involved in projects, specifically the mapping and inventory of fisheries resources of the watershed. Objectives of this project include:

- identifying user groups, priorities, information gaps, and available resources;
- collecting useful and reliable information for the Alouette area;
- updating and evaluating the spatial accuracy of existing district hydrology maps;
- facilitating decision making with the timely collection, transfer, and query of information; and,
- establishing a repository for future inventories.

Partnerships for this project include the District of Maple Ridge, and funding is provided by the Urban Salmon Habitat Program (USHP) and the Habitat Restoration and Salmon Enhancement Program (HRSEP).

Volunteers, students and special work crews have all contributed to planting projects along the Alouette River and its tributaries. Plant stock is either salvaged from existing stands of trees or lots slated for development. Occasionally, rooted stock of larger plants is purchased for a specific project. ARMS has also received funds for planting projects from Shell Canada and Fisheries Renewal BC, and is in the process of constructing a native plant nursery at the Rivers Heritage Centre.

ARMS has also worked with its partners to replace some of the instream large-woody debris that has been lost over the last century. One of the most critical components of salmonid habitat is cover, particularly for rearing juveniles. Root wads, slash bundles and trees were secured at key locations within the stream to increase the amount of submerged and overhead cover for rearing fish. Loose root wads were also be placed in protected pools, like those behind beaver dams, where there was no danger of having them wash downstream.

As of 1998, a total of fifty-eight large, woody debris structures had been placed by ARMS in the Alouette River from Allco Park in the upper reaches of the lower river to the Alouette Reservoir Dam. An additional seven structures were installed in the lower Alouette River as well. This work developed 3,440 square meters of large woody debris covered habitat that was not previously available to juvenile fish. An assessment of these structures later showed that both coho and steelhead parr were using this new habitat. In fact, coho were nine times more abundant under the woody debris than in untreated open areas of the river, while steelhead were twice as abundant.

ARMS also works with the District of Maple Ridge and volunteers to improve fish habitat in roadside ditches that are providing some of the most accessible and productive habitat for fish. In the past, municipal ditch maintenance policies have not been fish friendly, as overhanging vegetation was routinely removed and substrates were sometimes disturbed. The partnership that has evolved between the municipal government and stewardship groups is paying off in substantial habitat improvement opportunities.

ARMS has initiated a program to construct small rock weirs in ditches which will create pool and riffle habitat where there was once nothing but a straight channel. Plans are also in the works for planting and maintaining overhanging vegetation for cover. Funding for materials has been provided by HRSEP, USHP and Fisheries Renewal BC.

Other efforts by ARMS that are connected to the aquatic health of the area around the Alouette watershed include the lobbying of provincial and federal governments to withhold approval of a gravel mine in the Pitt River drainage (this issue is dealt with further in this report). ARMS was also intensely involved in lobbying various levels of government to purchase the piece of land that comprised Blaney Bog, a biologically unique and precious part of the lower watershed, for protection in perpetuity. Pressure from the Pitt Polder Preservation Society, ARMS, Silver Valley Neighbourhood Association and Alouette Field Naturalists was instrumental in saving the Bog for future generations.

Most of Blaney Bog was purchased for $3.57 million by the municipality of Maple Ridge, the Province of British Columbia and the Greater Vancouver Regional District. The deal preserves 91 hectares of the pristine one hundred and twenty hectare bog, located at the north end of 224th Street. The land's former owner had earmarked the property for an expansion of its adjacent cranberry farm. Blaney Bog is the only documented bog-fen wetland system in the region, and

one of the last pristine bogs in the lower mainland. Its four different ecosystems—riparian, marsh, fen and bog are overlapped by sensitive and rare transitional zones called ecotones. It is home to a variety of plants, animals, fish and birds. The area will now be called Blaney Creek Regional Park and will be managed by the Greater Vancouver Regional District.

Much of the above material has been taken from, and can be reviewed in more detail, the ARMS website at http://www.alouetteriver.org.

4.1.6 Reasons for success

ARMS can be viewed as a community group that has a balanced mix of advocacy and stewardship. It is clear that this has been one of the best examples in British Columbia where a community group has made a recognizable difference in protection and restoration of fish habitat in its area.

The reasons for the remarkable success of ARMS in such a short time period can be distilled down to a number of key points.

- The community of Maple Ridge had a long history of concern for the river, and residents were finally galvanized around the primary issue of flows.
- A series of strong individual personalities, who saw the issue as one of protecting the Alouette River, took the initiative and spent the time lobbying governments and local leaders for the protection and restoration of the stream;
- Once ARMS was formed, it developed a good organizational capacity to facilitate the lobbying of governments, accessing money and human resources, and getting people out into the field to do the work.
- ARMS developed strong linkages with the local media to spread its message and provide political leverage.
- ARMS connected with all components of government—federal provincial and local—at the management, technical and political levels.
- This group became very skilled at accessing funding from many sources in order to accomplish its technical goals.

If there is an area of weakness with ARMS, it is that the group is relying too strongly on certain individuals. Those persons provide an enormous amount of volunteer time and effort without pay, and ARMS is vulnerable should those individuals ever leave the group.

The society is also vulnerable to the good favors of various government and non-government fund-granting groups. Ironically, at the time of the writing of the final draft of this report, a major funding group has pulled its support due to fiscal cutbacks, and the future of ARMS as we now know it is in jeopardy.

4.2 Pitt River & Area Watershed Network (PRAWN)

4.2.1 Introduction

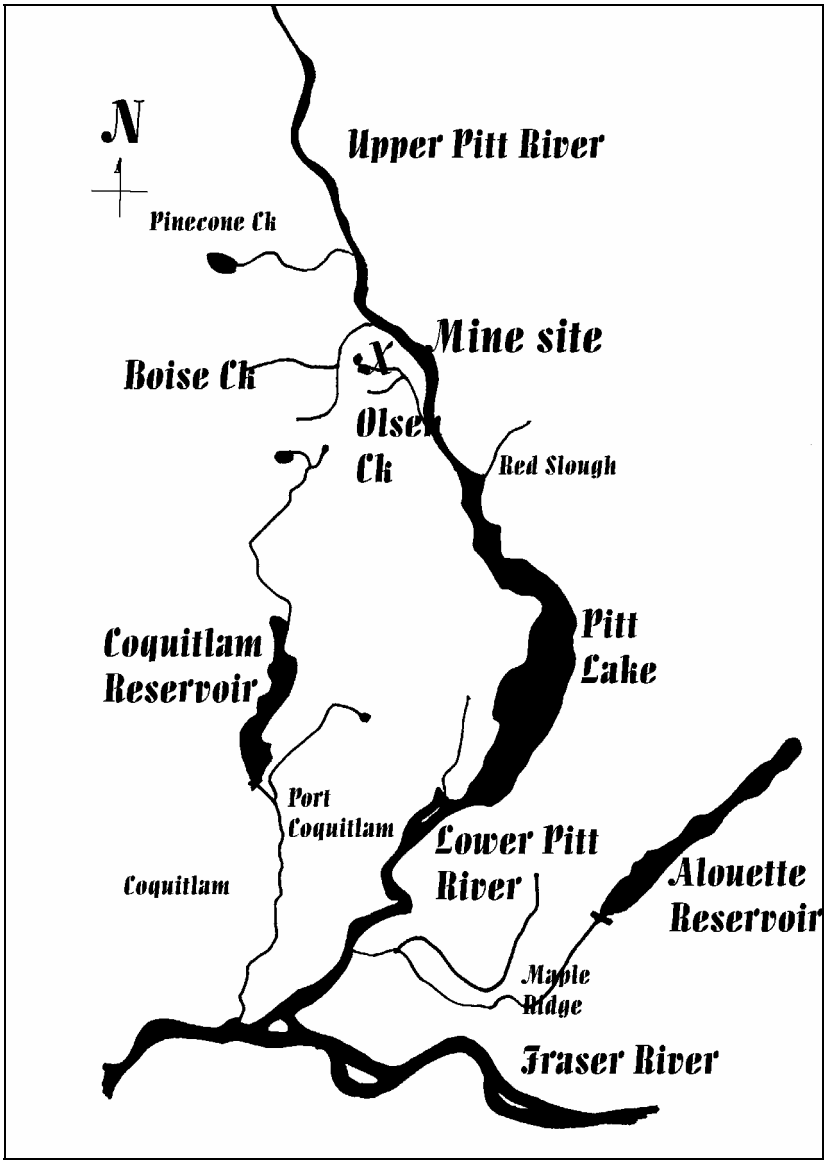
One of British Columbia's most contentious fish-habitat confrontations in recent years revolved around an attempt to develop a gravel mine in the upper Pitt River watershed. Because of the Pitt watershed's wilderness attributes and high fishery values, as well as its close proximity to the greater Vancouver area, many individuals and organizations opposed this mining proposal. What

resulted from this initial public outcry was the formation of a unique coalition of advocates and fish-stewards in an advocacy group to protect the fisheries values of this special watershed. The acronym adopted by this group was PRAWN, short for Pitt River and Area Watershed Network.

4.2.2 Fisheries attributes of the Pitt River watershed

The upper Pitt River is a salmon and steelhead stream which flows southward into Pitt Lake, and then discharges into the Fraser River (Fig 3). Unlike most watersheds in southwestern British Columbia, it has received little impact from urban, agricultural or industrial development. To date, logging has been the only industrial activity in the watershed. The upper Pitt River has escaped any significant degree of development primarily because of rugged surrounding terrain and the isolation created by Pitt Lake which separates the upper river from the rest of the lower mainland. The river is located only 30 kilometers from Vancouver.

Figure 3. Map of the Pitt River watershed.



The Pitt watershed has several attributes that are found nowhere else in British Columbia. For example, Pitt Lake is one of the larger tidal lakes in North America, although salt water does not actually reach the lake. Rather, the Fraser River backs up with the tide, and the lake's tidal fluctuations are totally comprised of fresh water. This, in turn, has allowed a unique aquatic ecosystem to be created. Even more remarkably, the river has remained an intact salmon and steelhead stream immediately adjacent to a large metropolitan area, probably the only one in North America.

The Pitt River and its tributaries support significant populations of sockeye salmon (5,000–40,000), coho salmon (2,000–10,000), pink salmon (less than 1,000), chum salmon (less than 1,000) and chinook (less than 1,000) salmon. The coho salmon population is the largest run of wild fish left in the entire lower Fraser system. The run of sockeye that spawns and rears in this watershed is exceptional insofar as it is comprised of large fish that spend up to six years at sea. It is also one of the few disease free stocks in the province.

The Pitt watershed also supports the largest remaining populations of wild migratory bull char (Dolly Varden) and cutthroat trout in the lower mainland. Steelhead are also found in the Pitt River in abundance. The composition of Pitt Lake fish-species also includes the white sturgeon, currently listed as vulnerable on Canada's endangered species list, as well as one of only two known land-locked populations of longfin smelt (Spirinchus thaleichthys) in the province. Other local animal species of significance include grizzly bears, eagles, and great blue herons.

4.2.3 Gravel mining opportunities in the Pitt River watershed

Besides having an extra-ordinary ecosystem, the Pitt watershed contains extractable resources, including both timber and gravel. The demand for gravel in the lower mainland has been extensive and intense given the human growth rates that it is now experiencing (Rosenau and Angelo 2000). Prior to the 1990s a substantial amount of gravel was discovered near Olsen Creek, a tributary of the Pitt River. It was recognized that the material could be economically extracted, processed and barged down Pitt Lake to the lower mainland markets.

A permit for the removal of gravel was issued in 1990, but the proponent did not immediately start exercising its options to start extracting the material. The permit was passed on to another company as a result of a will and a lawsuit, and the new owner subsequently applied to the BC Ministry of Energy and Mines to have the permit transferred. The BC Environmental Assessment Office took the position that the more recently passed 1996 *BC Environmental Assessment Act (BCEAA)* should not apply to this mine because it was determined that the permit was "grandfathered" under the 1990 legislation pertaining to environmental protection for these kinds of mines. The earlier legislation was felt to be much less rigorous than the newer BCEAA.

The proposed mine had an extraction of maximum of 300,000 cubic meters per year, and was to be situated between two small lakes (Cougar Lakes) and Olsen Creek, a tributary to the upper Pitt River. Both lakes are salmonid bearing (rainbow trout) as is Olsen Creek (coho, steelhead, cutthroat, possibly chinook). However, as the issue came to the forefront, the proponent decided to have the size of the mine and length of tenure increased.

4.2.4 The emergence of the Pitt River and Area Watershed Network

When it became clear that a mine might actually be opened in what was deemed a sensitive area and fish-bearing watershed, a substantial number of people became concerned and began to mobilize their opposition. A mining operation at this location was believed to have the potential to adversely impact on these fish stocks and their habitats. Furthermore, it was felt by opponents of the mine that the proponent's studies outlining the environmental effects were inadequate. For

example, it was unclear how the excavation would impact on water levels in Cougar Lake due to groundwater leakage. There were also ongoing concerns about the potential for increased turbidity in Olsen Creek, as well as in the Pitt River, as a result of siltation from the mine. Major gravel pits in the adjacent watershed, the Coquitlam River, have been a constant source of fine-sediment pollution in that stream over the last-half century. Opponents of the mine felt that the Pitt gravel extraction proposal was simply going to be a mirror image of the Coquitlam situation where fifty years of gravel extraction from and adjacent to the river had had devastating impacts. What was equally galling to the detractors was the fact that only 6 full time jobs were to be created by the mine.

PRAWN was formed as a result of initial discussions by some of the concerned citizens who were intimately familiar with the watershed. This advocacy group became one of the most eclectic entities ever to rally around the protection of fish habitat. The participants in PRAWN included groups that were often at odds with one another, such as First Nations fishers and commercial fishing interests. The PRAWN list, included ecotourism guides, boom operators, naturalists, streamkeepers, a natural history society, a sturgeon conservation group, wilderness advocates, First Nations and anglers, among others. It also encompassed a fishing union group and traditional conservation and community organizations.

Political intervention and advocacy were used extensively by both sides in an attempt to influence this issue. Indeed, PRAWN picketed the government party's convention in Burnaby as one of the tactics to get its message across to the public and the politicians. The media was also engaged in order to bring the message to the public. PRAWN spearheaded a letter writing campaign that generated some five thousand letters that were mailed or delivered personally to politicians. PRAWN also initiated additional biological and mapping studies to identify possible impacts of this proposal to counter what was thought to be inaccurate information presented by the proponent.

One of the key groups in PRAWN was the Katzie First Nation, and it played a pivotal role in the advocacy of this issue. The Katzie First Nation asserts that they hold aboriginal title and rights to the Pitt Lake watershed and, according to Katzie traditions, the entire Pitt Lake watershed was created for their sustenance and has been used by them from time immemorial. It was their position that "...Katzie First Nation holds aboriginal title and rights to the Pitt Lake watershed as well as the rest of our traditional territory… As stewards of this land, we have utilized and cared for its resources in a sustainable manner. Now we are asking Ministry officials to do the same thing..."

Because of the land claim, Katzie First Nation had a recourse that the other members of PRAWN did not have. There was some indication that the Katzie First Nation itself was prepared to set up a roadblock in protest of the mine. It is not clear whether this tactic was actually going to be used, or was simply a strategic position, or what influence the threat had in the final outcome of the government's decision.

It should be noted that the Burke Mountain Naturalists and the Alouette River Management Society also played major roles in the organization and progress of PRAWN. This had probably as much to do with geographic proximity of these groups to the site, as well as their experience in seeing what gravel mining had done to the Coquitlam River in their own back yards.

4.2.5 PRAWN's position towards the mine

PRAWN had serious concerns when it was discovered that the proposed gravel mine did not fall under the BC Environmental Assessment Act, which would have required a full public review. PRAWN took the position that an environmental review was required before any authorization

for this mine. PRAWN also felt that the biological, environmental and engineering reports that were funded by the proponent were seriously flawed and deliberately failed to reveal the true extent of the potential impact. PRAWN managed to secure a modest amount of money to hire its own consultants and engage its own lawyers to challenge the mine from both technical and legal perspectives.

A summary of reasons for PRAWN's opposition to the mine included the following concerns:

- Impact on fish and wildlife—Gravel extraction was thought to have the potential to drain Cougar Lakes and affect the rainbow trout populations therein. The siting of the mine in this area had a possibility of leading to the discharge of silt into Olsen Creek and impacting on fish and fish habitat. (This area of the lower mainland is known for its extremely high yearly rainfall (c.a. 3 meters). Silt from gravel extraction and road hauling would enter the Lower Olsen Creek drainage. The loading facilities of the gravel at Pitt Lake had the potential to impact on fish values along the foreshore. It was felt that there was a good probability that the mine site might significantly reduce headwater flows of Olsen Creek.
- Noise from road hauling, barge loading and barge traffic.
- Environmental spill risk from barging thousands of litres of diesel and other fuels through Pitt Lake for the operations.
- Delays in commuter road and rail traffic (bridge openings to allow barge traffic at least once per day).
- Loss of eco-tourism and adverse effects on existing recreational facilities.
- Widening and upgrading the haul road through Peter Slough, a sensitive marsh on the lower reaches of Olsen Creek (200 gravel trucks per day). This road is the only access point from Pitt Lake to the Boise Creek hiking area in Pinecone-Burke Park.
- Construction of a loading and docking facility adjacent to Red Slough (red listed habitat).
- Adverse impact on traditional Katzie First Nations territory.

4.2.6 Results of the PRAWN efforts

The results of this coordinated effort by PRAWN was effective. Four of the surrounding municipalities sent resolutions to senior government requesting a full environmental review. The federal government, through the Department of Fisheries and Oceans, announced that a Canadian Environmental Assessment Act review would be required prior to obtaining the proper permits. The councils of Coquitlam, Maple Ridge Port Coquitlam and Pitt Meadows all agreed to oppose the mine. Four of the local MLAs also supported a full environmental review, and the leader of the Opposition would not support the mine.

In April 2000, the British Columbia Outdoor Recreation Council released its annual "Endangered River List", and the Upper Pitt was deemed to be the province's most endangered. This list is based on input from the Council's 120,000 members, as well as from resource managers from throughout the province. During the past decade, it has proven to be an effective means of profiling river environmental issues. The listing of the upper Pitt River complemented the efforts of PRAWN and generated added publicity on the threats confronting the river.

On May 18, 2000, various parties, including PRAWN as the key public group, were informed that the BC government had struck a deal with the proponent to abandon its proposal to mine the Pitt

watershed. As part of this announcement, the government provided an alternate site to obtain gravel and the proponent agreed to this arrangement. The provincial government also committed to conducting a review of how gravel mining proposals are assessed, and it agreed to engage in dialogue with stakeholders around the province on the issue.

Subsequent to the announcement by the government, PRAWN decided to push forward with a community-driven plan for the Pitt River watershed. This will hopefully identify sensitive areas to avoid in the future and provide proper integrated resource management by senior, local and First Nations governments.

4.2.7 Reasons for success

PRAWN can be viewed as a community group whose primary focus has been advocacy. Indeed, it became one of the most successful fish-habitat advocacy groups ever in the history of British Columbia, especially in light of what it achieved in a short time frame. The strengths of PRAWN were:

- its single issue focus;
- the inclusion of a broad cross-section of groups;
- its highly passionate and committed members;
- the minimum of infighting amongst member groups in spite of contrasting views on other matters;
- an effective use of the media;
- its use of technical information (what little there was for both sides) and arguments.
- its intensive and extensive lobbying of all levels of government;
- the articulate individuals serving as spokespersons;
- the clear and tangible identification of what the impacts were likely to be;
- a strong First Nations presence; and,
- the good legal representation.

While PRAWN can be seen primarily as an advocacy group, it has now moved into the area of stewardship. Although PRAWN has committed to the development of a watershed plan, it is not clear from the perspective of the authors of this report whether or not such a diverse group of stakeholders can continue to work together to accomplish this next important task. It appears to us that PRAWN's forte was the former, rather than the latter. That is, now that the major battle has now been won, the various constituent organizations that comprised PRAWN may not find it necessary to continue working together. A truly local stewardship group may have to take on this new task and undertake this stewardship work.

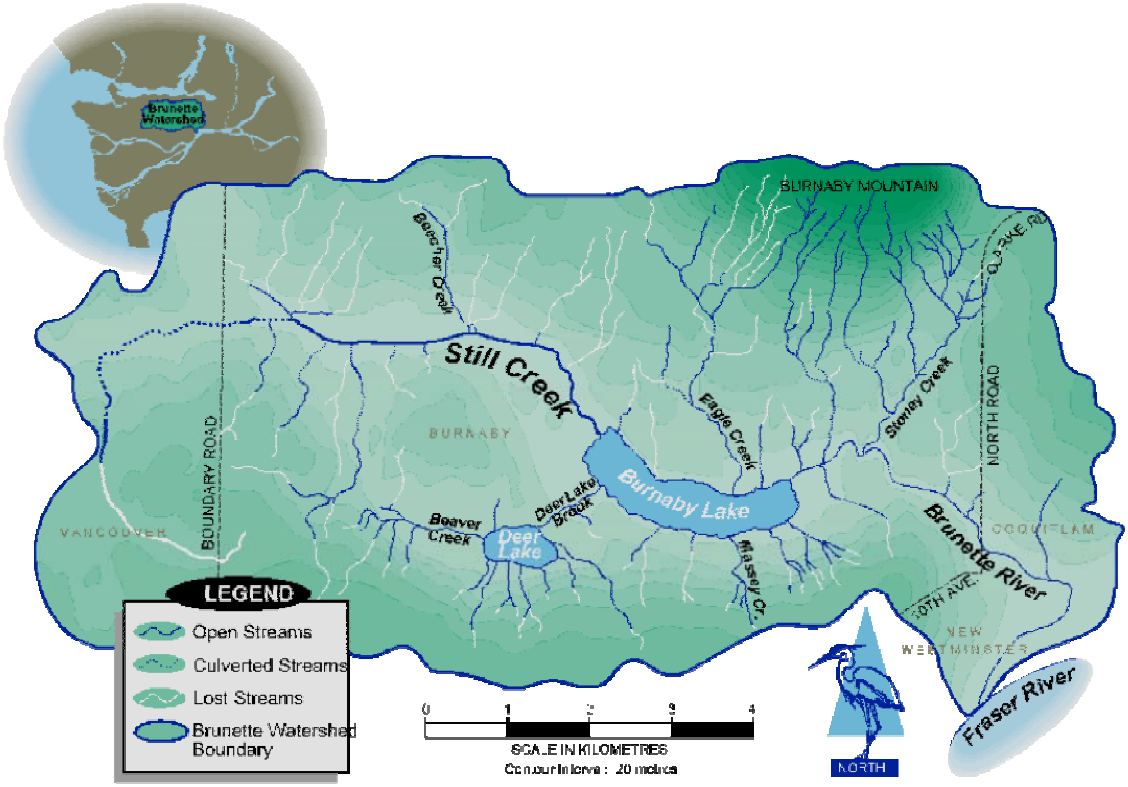
4.3 The Burnaby Lake System Project (BLSP)

4.3.1 Introduction

The Burnaby Lake System Project (BLSP) is an industry-sponsored community and watershed enhancement and restoration project with the goal to catalog, monitor, enhance, restore and

protect terrestrial and aquatic habitat in the Brunette Basin (Fig. 4). Initiated in 1993, and coordinated by the British Columbia's Institute of Technology's Fish, Wildlife and Recreation Program, the BLSP works through community partnerships and all levels of government to steward the aquatic and riparian natural resources of the Brunette River Watershed, of which Burnaby Lake is a part. More than tens of thousands of volunteer hours have been contributed to the local community since 1993 and the project has been acknowledged by the province of British Columbia as "one of the best examples of environmental stewardship and community partnerships".

Figure 4. Map of the Burnaby Lake watershed.



Project sponsors such as BCIT, the City of Burnaby, the Greater Vancouver Regional District, Department of Fisheries and Oceans, and Ministry of Environment, Lands and Parks are key partners in all of the BLSP's initiatives. A number of corporations and foundations have also contributed to the success of the BLSP. The large number of partners has enabled the BLSP to undertake more initiatives than would otherwise have been possible.

4.3.2 BLSP field projects

The Burnaby Lake System Project is now at the forefront of stream inventory work in the Brunette Basin. Over the past eight years, the BLSP has conducted juvenile salmonid sampling in the Brunette Basin. A juvenile population study was completed in the Brunette River watershed during the spring of 2000, including four tributary systems. This provided information about juvenile populations in the basin and developed an appropriate methodology for assessing smolt and fry outmigration in an urban system. The resulting report has been distributed to the City of Burnaby, the Ministry of Environment, Lands and Parks, and Fisheries and Oceans Canada. Streamkeeper groups in the basin will also receive copies of the report.

Fisheries and aquatic resources in over 90% of the streams within the Brunette River watershed have also been inventoried using Global Positioning System (GPS) technology. The Greater Vancouver Regional District and the City of Burnaby have incorporated the data into their Geographic Information Systems (GIS) database. The City of Burnaby is also using the data for an interactive map query website that will be available to the public in the coming months. The BLSP intends to complete the inventory work in the Brunette River Basin and begin work in other areas of Burnaby.

The BLSP's extensive work with many local community groups and stewardship organizations has enabled it to undertake and complete a wide variety of "on the ground" projects. For example, riparian planting and instream-habitat work has been implemented throughout the watershed. Planting projects are still being conducted along Still Creek, Guichon Creek, Beaver Creek and Beecher Creek, all tributaries of the system which had been heavily impacted over the past century by industrialization and urbanization.

The BLSP has also been involved in a project to facilitate the removal of purple loosestrife, a noxious aquatic plant that had been introduced into the watershed some years ago. The releases of a biological agent to control this introduction have been initiated in partnership with the provincial Ministry of Agriculture, Food and Fisheries. Sites have been inventoried by the BLSP for the release of the biological agent, as well as measuring the extent of purple loosestrife infestation, and the project will be continued in partnership with the City of Burnaby.

The Guichon Creek project is another initiative of the BLSP, also a good example of a partnership with BCIT. Guichon Creek, which is part of the Burnaby Lake watershed, had been extensively damaged during the construction of the BCIT campus in the early1960's. The BLSP has worked with BCIT's Technology Centre, Physical Plant department, Student Association and Pioneers to resolve, enhance and protect this stream.

Presently, BCIT foregoes significant development options along the creek corridor in an effort to protect it, and has established its own version of a protected area along the upper portion of the creek. In the future, as redevelopment occurs on campus, BCIT has also expressed a willingness to consider daylighting downstream portions of the creek that have already been culverted. Many consider the restoration of Guichon Creek to be an excellent example of the positive work that can be undertaken by an effective and extensive community partnership.

4.3.3 Legislation and policy

Fisheries and Oceans Canada and the British Columbia Ministry of Municipal Affairs contracted the BLSP to apply, refine and assess the Streamside Protection Policy Directives using the Brunette Basin stream inventory data. The results were presented at a Union of British Columbia Municipalities' conference, and the method developed in the report was used as a model for pilot tests throughout the province. It is critical that the stewards with hands-on experience of the fisheries resource, such as the BLSP, are able to provide meaningful input into legislation and policies, such as the Streamside Protection Policy Directives.

4.3.4 Engendering the support of the public to protect aquatic resources

In 1999, the BLSP implemented the Watershed Pledge Program in an effort to increase public awareness and engage residents to become more active in maintaining the health of the watershed. The Watershed Pledge Program was modeled after a similar program in Whatcom County in Washington State, where it is being used to protect natural resources.

The BLSP was looking for a program that encouraged the commitment towards, and the adoption of, best management practices by the local community. A formal promise, or "Pledge" to protect fish habitat through such practices, provided the opportunity for broad participation from all sectors of the community. There are three components—residential, business and school—of the Watershed Pledge Program. Each is being implemented in phases and contains the key elements of awareness, education, action, and recognition.

4.3.5 Reasons for success

The BLSP can be viewed as a community group that has had a strong focus on stewardship and has made significant inroads in the restoration and inventory of aquatic resources in the watershed, as well as providing extensive public awareness. This initiative has been effective in this regard, and its major strengths include:

- an extensive partnership that has allowed it to undertake a number of key initiatives;
- strong level of support and involvement from both grassroots and political levels;
- the successful engagement of the public in a number of community and participatory events;
- the effective use and support of local media;
- extensive community support for its river restoration activities; and
- an emphasis on the importance of a watershed approach to management.

5.0 DISCUSSION

An essence of a democratic system is the transparency of the decision-making process for choices made by governments. This includes judgments affecting how natural resources, such as fish habitat, are to be protected and managed.

Canadian governments have the right and duty to protect fish habitat under the Constitution Acts of 1867 and 1982, and this legislation affords the federal government the authority to pass specific Acts in this regard, and make decisions affecting fish habitat. Indeed, the protection of fish habitat in Canada has been deemed to be so important that special legislation, policies and regulations have been crafted and passed in Parliament and the BC Legislature, including the *Canada Fisheries Act*, the *British Columbia Fish Protection Act*, the *Forest Practices Code Act of British Columbia,* the *Canadian Environmental Assessment Act*, and the *British Columbia Environmental Assessment Act*. The *Canada Fisheries Act*, for example, is generally viewed as being among the strongest pieces of legislation in the world. Thus, it is the mandate of legally elected governments and their civil servants to fulfill their obligations to society by adhering to, and ensuring that, the directions laid out by legislation, policy and regulation to protect fish habitat are carried out as a normal course of duty.

How is it then that despite the apparent efforts of various levels of governments through legislation and other restorative initiatives, freshwater salmon and steelhead habitat has still been lost to the degree that it has over the last three decades? Is it that the pertinent legislation and its policies and regulations are not adequate, or is it that there is not the will to enforce what has been enacted?

A number of federal, provincial and public audits have suggested that, despite the statutory direction and program initiatives, government departments and agencies are not doing enough to protect and restore fish habitat (Rosenau and Angelo 2000). As recently as 2001, in his decade-ending report to Parliament, the Auditor General of Canada stated that over the last 10 years:

> *"…[t]he Department[of Fisheries and Oceans'] planning was poor and it was slow to develop sustainable fisheries policies and the frameworks to integrate them. It had limited knowledge of…habitat to determine conservation requirements and… it failed to take precautions when its own scientific advice was warning of stock declines. This led the Department to partially or completely close some fisheries without adequately consulting stakeholders. Confidence in its ability to manage the resource slipped further as a result. The situation was made worse by the Department's weak enforcement of the Fisheries Act and regulations and its failure to develop an effective, comprehensive process of consultation with stakeholders".*

In short, historic institutional arrangements were not capable of maintaining fish habitat in the face of continuing population growth in Canada and British Columbia.

The statements of the Auditor General and others imply that habitat compromises are being made by the regulatory agencies where compromises are not acceptable or required as a result of either inadequate efforts on the part of the agencies, or inappropriate decision-making in the favor of the proponent. The Auditor General also clearly indicates that consultation with the public stakeholders has not been adequate to protect habitat from many of the egregious impacts that have been taking place.

In order to redress these outstanding issues, it has been the view of many, both within and outside government, that in order to protect fish habitat the public must become more involved in the

decision-making process. One of the basic assumptions of the "New Direction" initiative by the Department of Fisheries and Oceans in 1999 was that public stakeholders had to be involved in the decisions. Indeed, Minister David Anderson's statement that "Land and water use planning can benefit from local communities, stewardship groups and others who care about fish and habitat working together and providing input to watershed councils, roundtables and other decision-making bodies…" demonstrates the view that public participation needs to be an essential part of the process.

However, while the public can play a role in "watching the watchers" it is also important to note that it is not normally within the capacity of individuals or groups outside of government to review all decisions relating to the myriad of small or even large-scale projects that might affect fish habitat. Nor would it be advisable. Reviewing project proposals and ensuring that habitat mitigation and compensation occurs, as required under legislation, regulation and policy, is the legally designated task of government environmental agencies.

However, when there are large gains to be made by a proponent as a result of a particular decision to approve or not approve a project, or an aspect of it, the potential for either subtle or direct influence in the decision-making process is very high. Thus, it is imperative that these processes, and the resulting decisions affecting fish habitat, be transparent to the public and be scientifically and legally rigorous in order to ensure no-net-loss of habitat decision.

Public groups can play a role in ensuring that governments apply a rigorous and diligent approach to the management of habitat. They can do this through the activities of advocacy. Advocates provide a "watchdog" role to ensure that governments at the political and technical levels carry out their constitutional mandate and provide a precautionary perspective on fish habitat.

Paish (1997) was very clear in his understanding of this issue as he stated: "…[w]hen people begin to understand…[how the]…government system operates, they will soon realize that there are effective forces representing the activities that adversely impact fish habitat. These counter-forces know the rules, are able to deal with those rules in an objective way, and when necessary know how to intervene in political and legal processes. Until such time that those groups and individuals who wish to protect habitat play the same game and understand the rules whereby habitat can either be protected or destroyed in exactly the same manner that the other players in the game understand those mechanisms, community involvement in fish habitat protection will remain far less effective than it could actually be. The potential is there; it just has to be realized."

To follow through on this concept, a public commitment to protect fish habitat must come from within individuals and communities. It must arise from a "territorial imperative" that recognizes that there is a need to protect, preserve and restore the natural resources of this planet regardless of short term social or personal gains. Because of the complexity of Canadian regulatory bureaucracy, the most appropriate route for activism to nurture salmon and steelhead habitat will normally be through participation in an organized group or non-government organization, although there are historical instances where individuals carried the yeoman's burden to protect fish habitat (c.f., Rafe Mair and the Kemano Completion).

Furthermore, it is our view that the internal commitment by individuals to be protective of fish habitat does not necessarily spring *ex nihilo* from within an individual, but must be cultured either through a serendipitous exposure (e.g., angling or commercial harvest) to the value of a functioning ecosystem or through directed education.

In urban environments, such as the Lower Mainland, however, this kind of exposure is becoming increasingly more difficult to attain due to a loss of connectivity among many residents and the

natural environment. Consequently, stewardship groups can play an important role in providing a personal linkage between the broader public and local fish stocks and associated fish habitat.

This connection can help to provide local communities with a greater understanding and a sense of ownership of the resource that otherwise may not exist. This, in turn, helps to nurture increased public advocacy for the protection of fish habitat and, in urban areas particularly, is essential to the future health of British Columbia salmon and steelhead stocks.

We see the role of stewardship groups as being instrumental to provide this important personal and individual linkage of human beings to fish and their habitats. Catching a fish to eat is one way to maintain that connection, but harvesting is no longer an option for many remnant stocks. This connection has provided people with the understanding and a sense of ownership of the resource that would not have been there otherwise. Stewardship enables a bonding to the resource and encourages individuals and groups to advocate for the protection of fish and their habitats.

Thus, other initiatives are needed to compensate for the past inadequacy of governmental institutions to address the declines in the productive capacity of our freshwater fish habitats. If salmon and steelhead habitats are to be nurtured in the future, the public, through the efforts of individuals and community groups alike, must take on a greater role in the stewardship and advocacy of these fisheries resources and work hand-in-hand with the agencies to create a positive environmental legacy for our children.

6.0 REFERENCES

Ardrey, R. 1966. The Territorial Imperative. Atheneum: New York.

Cone, J., and S. Ridlington. Editors. 1996. The northwest salmon crisis: a documented history. Oregon State University Press, Corvallis, Oregon. 374 pp.

Dovetail Consulting Inc.1999. A new direction: habitat conservation and stewardship forum summary report. Prepared for: Fisheries and Oceans Canada, Vancouver, B.C. By: Dovetail Consulting Inc. 57 pp. & appendices.

Glavin, T. 1996. Dead reckoning: confronting the crisis in Pacific fisheries. The David Suzuki Foundation, Greystone Books, Douglas and McIntyre. 181 pp.

Hardin, G. 1968. The Tragedy of the Commons. Science 162:1243–1248.

Hartman, G.F., C. Groot, and T.G. Northcote. 2000. Science and management in sustainable fisheries: the ball is not in our court. In: Knudsen, E.E., C.R. Stewart, D.D. MacDonald, J.E. Williams, and D.W. Reiser, Editors. Sustainable Fisheries Management: Pacific Salmon. Lewis Publishers, Boca Raton, Florida. pp. 31–50.

Hilborn, R. 1992. Hatcheries and the future of salmon in the Northwest. Fisheries 17:5–8.

Hyatt, K.D., and B.E. Riddell. 2000. The importance of "stock" conservation definitions to the concept of sustainable fisheries. In: Knudsen, E. Eric, Cleveland R. Steward, Donald D. MacDonald, Jack E. Williams, and Dudley W. Reiser, Editors. Sustainable Fisheries Management: Pacific Salmon. Lewis Publishers, Boca Raton, Florida. pp. 51–62.

Knudsen, E.E., C.R. Steward, D.D. MacDonald, J.E. Williams, and D.W. Reiser. Editors. 2000. Sustainable Fisheries Management: Pacific Salmon. Lewis Publishers, Boca Raton, Florida. 724 pp.

Kotyk, M., and A. Di Paula. 2000. Benchmark assessment of public awareness, knowledge, attitudes and behaviour. Habitat Conservation and Stewardship Program.

Lackey, R.T. 2000. Restoring wild salmon to the Pacific Northwest: chasing an illusion? National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency, Corvalis, Oregon. 55 pp. Internet paper at: http://www.epa.gov/wed/pages/staff/lackey/pubs/illusion.htm

Lackey, R.T. 2001. Defending reality. National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency, Corvalis, Oregon. 5 pp. Internet paper at: http://www.orst.edu/instruction/anth481/ectop/lackeyms.htm.

Lane, E.D. 1991. Status of the white sturgeon, Acipenser transmontanus, in Canada. Canadian Field-Naturalist 105:161–168.

Lichatowich, J. 1999. Salmon without rivers: a history of the Pacific salmon crisis. Island Press, Washington, D.C. 317 pp.

Millar, J., M. Child, L. Duncan, N. Page, D. Modien, J. Robertson. 1997. Urban referral evaluation: an assessment of the effectiveness of the referral process for protecting fish habitat (1985–1995). Prepared for: British Columbia Ministry of Environment, Lands and

Parks, Victoria, B.C., and Canada Department of Fisheries and Oceans, Vancouver, B.C. By: Coast River Environmental Services. 100 pp. & appendices.

Nehlsen, W., J. E. Williams, J.A. Lichatowich. 1991. Pacific salmon at the crossroads: stocks at risk from California, Oregon, Idaho, and Washington. Fisheries 16:4–21.

Netboy, A. 1980. The Columbia River salmon and steelhead trout: their fight for survival. University of Washington Press, Seattle, Washington. 180 pp.

Paish, H. 1997. Stream stewardship and fish habitat advocacy: an assessment of current and potential community group involvement in the lower Fraser Valley. Prepared for: Fraser River Action Plan, Fisheries and Oceans Canada. By: Howard Paish and Associates. Urban Initiative Series 09:50 pp. & appendices.

Paish, H. 1999. Habitat conservation and stewardship: an assessment of community-based processes and organizations. Prepared for: Habitat and Enhancement Branch, Fisheries and Oceans Canada, By: Howard Paish and Associates. 54 pp. & appendix.

Precision Identification Biological Consultants. 1998. Wild, threatened, endangered and lost streams of the Lower Fraser Valley summary report, 1997: Lower Fraser Valley Stream Review, Vol. 3. Prepared by: Precision Identification Biological Consultants, Vancouver, B.C. For: Fraser River Action Plan, Habitat and Enhancement Branch, Fisheries and Oceans Canada, Vancouver, B.C. 15 pp. & appendices.

Quadra Planning Consultants.1997. No net loss of habitat: assessing achievement, workshop proceedings. Prepared for: Fraser River Action Plan, Fisheries and Oceans Canada. By: Quadra Planning Consultants Ltd. 60 pp. & appendices.

Rosenau, M.L., and M. Angelo. 1999. Pacific Fisheries Resource Conservation Council 1998–1999 Annual Report: freshwater habitat. Pacific Fisheries Resource Conservation Council Background Paper No. 1999/1a pp. 3–92.

Rosenau, M.L., and M. Angelo. 2000. Sand and gravel management and fish-habitat protection in British Columbia salmon and steelhead streams. Pacific Fisheries Resource Conservation Council Background Paper No. 2000/3. 70 pp.

Simpson, S. 2000. Steelhead in crisis: BC plans stream closures. Vancouver Sun, December 15, 2000.

Slaney, T.L., K.D. Hyatt, T.G. Northcote, and R.J. Fielden. 1996. Status of anadromous salmon and trout in British Columbia and Yukon. Fisheries 21:20–35.

ABOUT THE AUTHORS

Mark Angelo, OC, OBC

Mark Angelo is a noted river conservationist, outdoor leader, teacher and writer. He is Program Head and Instructor of the Fish, Wildlife and Recreation Department of the British Columbia Institute of Technology. He is a recipient of the Order of Canada and the Order of British Columbia, in recognition of outstanding achievement in preserving Canada's waterways. Mark Angelo was also the first recipient of the National River Conservation Award as Canada's most outstanding river conservationist in the past decade. His involvement with river conservation in British Columbia spans three decades, and he has published more than 200 articles and editorials on the issue. He speaks regularly at conferences throughout Canada and in other parts of the world.

Dr. Marvin L. Rosenau

Dr. Marvin L. Rosenau is a fisheries biologist with the BC Ministry of Water, Land and Air Protection. He has had a varied career in fisheries science over the last 25 years in both British Columbia and New Zealand, where he obtained his doctorate degree working on the world famous Lake Taupo rainbow trout fishery. Much of his work has concentrated on habitat issues in streams and lakes in this province. In his role as a provincial biologist, Dr. Rosenau is currently involved with the protection of fisheries habitat with regards to Fraser River gravel removal. He has also been working on various inventory and assessment issues surrounding white sturgeon in British Columbia. Marvin has previously written four reports for the Pacific Fisheries Resource Conservation Council. Dr. Rosenau is also the recipient of the 1999 Murray A. Newman Award for Excellence in Aquatic Conservation given out by the Vancouver Public Aquarium each year. He currently lives in Abbotsford with his wife, Charlotte, and 4-year old son, Albert.

590–800 Burrard Street

Vancouver, British Columbia

Canada V6Z 2G7

Telephone: (604) 775–5621

Facsimile: (604) 775–5622

E-mail: info@fish.bc.ca

www.fish.bc.ca