TOWARDS ECOSYSTEM-BASED URBAN GOVERNANCE THE ROLE OF COMMUNITY-BASED STREAM STEWARDSHIP GROUPS

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ABSTRACT

This study endeavors to demonstrate the importance of communities and civil society, in making our cities more ecologically sustainable. Water is the ecological component that is the point of departure for this thesis. The stewardship of water, specifically, community-based stream stewardship is examined as a vehicle for using ecosystem-based governance to manage environmental problems in a systematic way to mitigate and prevent the further degradation of our urban areas.

The thesis discusses the integration of ecosystem-based management and urban governance theory. The study used a multi-method methodology including a program evaluation framework, interviews with over thirty stewardship group members, NGOs and government officials and a detailed case study. The case study includes a profile of the watershed and reviews applicable jurisdictional and legal considerations that are relevant to a discussion of stream stewardship and local governance. The program evaluation conducted examined the characteristics of "successful" stewardship groups and was applied to four survey cases. The results compiled contributed to the evaluation applied to the case study of the Hagan Creek/KENNES Watershed project located on Southern Vancouver Island, British Columbia, Canada.

The findings of this study demonstrate that community-based stream stewardship groups are making important contributions to ecosystem-based governance. They are catalysts for interdepartmental (engineers, planners and policy people), and multiple levels of government *cooperation*. Stewardship groups collect data and local historical information on an ecosystem basis and are building a *common understanding* of ecosystem issues. Stream stewardship groups are changing *social values* & *educating* both the public & government officials about local ecosystem conditions.

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ALR	Agricultural Land Reserve
BMP	Best Management Practices
CbSS	Community-based Stream Stewardship
CORE	Commission on Resources and Environment
CRD	Capital Regional District
DOE	Department of the Environment (Environment Canada)
DFO	Department of Fisheries and Oceans
EM	Ecosystem Management
ESbM	Ecosystem-based Management
FRAP	Fraser River Action Plan
FBMB	Fraser Basin Management Board
IOS	Institute of Earth and Ocean Sciences
MELP	British Columbia Ministry of Environment Lands and Parks
MOFF	British Columbia Ministry of Fisheries and Food
OCP	Official Community Plan
SIPS	Saanich Inlet Protection Society
TOL	Township of Langley

Watershed Profiles

BCES	Baker Creek Enhancement Society
LEPS	Langley Environmental Partners Society
LCW	Laurel Creek Watershed
SRWRT	Salmon River Watershed Round Table

Case Study

HCKWP	Hagan Creek/Kennes Watershed Project

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CHAPTER 1: Introduction

The world's population has more than tripled during the twentieth century, and for the first time in the earth's history, most of the world's population lives in or near cities. In 1900, only 160 million people, one tenth of the global population, lived in cities. The latter half of the twentieth century has seen the continuous transformation of the world's population into urban dwellers. The urban population has increased from less than 30 per cent of the total in 1950 (UNCHS 1999). By the year 2006, more than half of humankind will live in urban areas. Two decades from now, in 2020, about 57 per cent of the world's population will live in urban areas (UNCHS 1999).

This increasing urban pressure creates inevitable stress on the natural ecosystems in urban areas. Designing a decision-making system that can maintain local ecosystems is increasingly critical for the long-term sustainability of these human habitats.

The context for this study is the urban environment. The urban environment is essentially a human creation, built to fulfill human needs, and often planned and designed without ample consideration for the integrity of natural systems. Much economic progress has come at the cost of severe impacts on natural ecosystems. The costs of this approach become evident as urban environmental problems such as pollution, water shortages and congested transportation systems escalate. Direct impacts of urban development on local ecosystems include deterioration in hydrological function, air and water pollution and habitat loss, all of which reduce the regenerative capacity of urban ecosystems. Urban watersheds are dramatically affected by urbanization. The world's wetlands were halved during the 20th century, causing a major loss of biodiversity.[1] Human land use practices affect ecological form and function, and many water-related problems are directly linked to land use activities.

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[1] World Water Council (2000). The World Water Council is the International Water Policy Think Tank that was founded in 1996, following recommendations issued at the 1992 Rio Earth Summit. It brings together more than 300 members from about 40 countries in a unique network.

Streams are an indicator of ecological health as they are often the first component of watersheds to reveal the impacts of surrounding land use. As urban areas grow, and the impacts of poor land use decisions, and ecological destruction escalates, informed decision-making must move beyond individualized responses to isolated impacts and issues so that environmental problems can be dealt with in a systematic way.

The "conventional" approach to many environmental problems is fragmented insofar as it addresses issues on a sectoral basis. For example, housing issues are dealt with separately from water issues yet the two issues are interdependent. Administrators are accustomed to thinking about issues on a statute by statute, resource by resource, program by program, and case by case basis (Grumbine 1997). Our planning institutions, processes of decision-making and science, often stratify and simplify the natural world into discrete and mutually exclusive components. In contrast, humans and their activities are embedded in ecosystems across geographical space and historical time, not just within a political economic context. The environmental problems currently faced by modern urban society are pushing the limits of science and management in both scale and complexity. As a result, new approaches being developed that integrate the principles of the ecological sustainability within a socioeconomic and political context must be explored. This is the role of an ecosystem-based approach.

This study endeavors to demonstrate the importance of communities and civil society, in making our cities more ecologically sustainable. Water is the ecological component that is the point of departure for this paper. The stewardship of water, specifically, community-based stream stewardship can be a vehicle for helping decision-makers use ecosystem-based governance to manage environmental problems in a systematic way to mitigate and prevent the further degradation of our urban areas. A case study, of stream stewardship from Vancouver Island, British Columbia, Canada, is used to explore the challenges of using ecosystem-based management to address ecological degradation in urban areas. More specifically, this study focuses on the understanding of what works and was does not when stream stewardship groups try to address ecological degradation.

1.1 Concepts and Terms

1.1.2 Ecosystems

Urban areas are complex and do not exist outside of nature as all fall within ecological boundaries and ecosystems. Ecosystems are also complex systems. An ecosystem refers to the links and relationships that exist among different communities of organisms in a given spatial scale of analysis (Miller 1991). The origin of the term establishes the critical relationship between life and place. Arthur Tansley (1935), the founder of Ecology as science wrote:

> Though the organisms may claim our primary interest, *when we are trying to think fundamentally,* we cannot separate them from their spatial environment with which they form one physical system. It is the systems so formed which from the point of view of the ecologist are the basic units of nature on the face of the earth.

Organisms, humans included, cannot be separated from their local context where they form part of an integrated ecosystem (Rowe 1993). In order to make informed decisions about urban ecosystems, we need to know more about the functioning of those systems, about linkages between local and regional ecological processes, and about short and long-term outcomes of human activities on ecosystems.

1.1.3 From Ecosystem Management to Ecosystem-based Management

The essence of an ecosystem is the notion of a system, with functional interdependency among elements, living and nonliving, within a boundary, at a given spatial scale, over time. Ecosystem management (EM) is defined in many ways. For the purpose of this paper I will use a definition developed by the Ecological Society of America (ESA). The definition states that "Ecosystem management is management driven by explicit goals, executed by policies, protocols and practices, and made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure and function" (ESA 1996). EM has been adopted by most federal agencies with resource responsibilities in the USA. EM

provides a loose framework of ideas and principles based on the idea that producing goods and services from resources can "only be done if production can be attained with ecosystems remaining healthy - by maintaining native biodiversity, ecosystem structure and function and so forth" (Grumbine 1997). EM employs the assumption that ecosystem integrity can be incorporated into a resource management scheme.

Particular ecosystem principles are incorporated in an ecosystem management approach. The Ecological Society of America has identified some of the following principles of ecosystems.

- Ecosystems are complex, connected, dynamic and humans are an integral part of them.
- Biological diversity and structural complexity strengthen ecosystems against disturbance.
- Ecosystem processes operate over a wide range of spatial and temporal scales, and their behaviour at any given location is greatly affected by surrounding systems (ESA 1996).

EM is unlike many scientific pursuits since it emphasizes a systems approach to ecosystem research and management (Rowe 1993). A systems approach focuses on the interconnections between a complex set of variables, ecological and social, taking place over time and space (Yaffee 1996). The systems approach of EM provides a comprehensive framework for analyzing policy decisions since it does not isolate issues sectorally as do traditional resource management schemes (Grumbine 1994, 1997, Yaffee 1996).

Ecosystem-based management (ESbM) evolved out of EM. It goes a step beyond EM because it extends the core principles of an EM paradigm into all policy spheres, rather than limiting its application to resource-based agencies. A critical distinction between the two concepts is that ecosystem management assumes that economic and political processes are *of primary importance* and that institutions of government can "manage" their impacts on the environment within acceptable limits. In contrast, an ESbM approach is based on the premise that maintaining ecosystem integrity is primary, and that we need to rethink economic and political processes given what we know about the functional limits of ecosystems (M'Gonigle 2001).

EM is a new way of thinking about both science and management. From a management perspective, EM focuses on ecosystem protection rather than resource extraction. ESbM is a new way of thinking about the way social and economic systems govern how we "manage" human's relationship to the natural world. An ecosystem-based approach recognizes that management, science and economic issues do not occur in a vacuum, and thus governance becomes an important consideration for further inquiry.

1.1.4 Governance

The term "governance" has become prominent in recent dialogue all over the globe. In fact, the 1990s has seen conferences, forums and publications dedicated to discussion and reflection on this term that has been used for centuries and is interpreted in many ways. For the purpose of this paper it is considered to encompass roles, responsibilities and processes. There is often confusion between the term governance and government. One of the more fundamental distinctions is that governance is about process and government is thought of as an institution.[2] Government refers to the formal structure of representatives and officials established to co-ordinate and oversee this function. Governance is not synonymous with "government" as it supercedes the state to include the private sector and civil society.[3] Governance is the broad process of public decision-making, as influenced by a complexity of formal and informal factors. It involves the ways in a society manages its collective interests. Governance includes relations among actors and organizations including non-governmental organization (NGOs), business interests, environmental and other interest groups.

The term "good governance" adds a normative connotation to the term governance. From a Western perspective, good governance includes attributes such as transparency, the rule of law, public participation, accountability to the public, and constitutional legitimacy, to

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[2] For an interesting discussion on why this term has gained prominence see, Tim Plumptre and John Graham (2000) and John Raulston Saul (2000).

[3] For the purpose of this paper the definition being used for civil society is "activity of citizens in free association who lack the authority of the state....motivated by objectives other than profit-making although citizens may undertake income-generating activity as a means of furthering their objectives." (Swift 1999).

name a few (UNDP 1998a). Putting the attributes of good governance mentioned above into practices is not an easy task. Arguably it is more manageable to achieve good governance on a local scale.

The subsidiarity principle is defined as decision-making at the level closest to the community, which has the breadth of vision and competence to make that decision. Integrating some of the principles of good governance, subject to legislative jurisdiction and to overriding principles of social equity and ecological integrity, one would anticipate decision-making processes that reflect social, economic and ecological considerations. The subsidiarity principle recognizes that decisions should be made, or at least strongly influenced, by those who will be most directly affected by the social, financial, environmental, and cultural consequences of those decisions (Curran 1998; Brugmann 1992). Combining these approaches, we can begin to consider the potential for dividing or allocating political authority not just horizontally (i.e. between the national and provincial government) but between central and local authorities. The principle goes far beyond simply electing local governments. It recognizes that citizens must have an ongoing, established role in governance. An important aspect of governance is how the relationship between government, local community and civil society manifests.

Most citizens concur that voting in elections is not a sufficient participatory mechanism for an ongoing role in decision-making (Kirby and Marston 1995; Lowndes 1995). Citizens are not satisfied with representation that has often been incorporated into the state structures (Findlay 1993). In British Columbia, the commitment to broad public participation is mandated in the *Local Government Act* (SBC 2001). Though "people" support public consultation, there is considerable public cynicism regarding the way in which formal opportunities for public participation currently function. This cynicism exists because the public is often included in public consultations as a mandatory part of the process, not necessarily with the goal of reaching a decision that reflects local public will. The public often believe that there is no assurance that their input will be incorporated into the final decision (Warriner et al 1996). Similarly, the public is

frustrated by the inability for governments to solve complex modern problems, such as environmental degradation (Gray 1985; Caldwell 1993). Polls conducted show that the global public is becoming more worried about environmental problems each year (Pollara poll, 2000). Generally, many Canadians are unsatisfied with their ability to influence government policy, and they are unsatisfied with the outcomes of government decision-making.

This simultaneous existence of public discontent with government public process and the public sense of urgency about environmental concerns has resulted in increased experimentation with partnerships that allow government to share power with other sectors of society. These partnerships demonstrate a significant shift in governance norms. Partnerships are changing the character of government relationships with other actors. These different relationships put government in uncharted territory, and there are no clear frameworks to use for guidance.

The issue of inadequate public participation is a product of the current "traditional" governance framework. Alternatives do exist. An ecosystem-based approach requires "significant" public input and partnerships. Similarly, the work of The International Council on Local Environmental Initiatives (ICLEI), is providing an alternative model for local governance. ICLEI, founded in 1990, is an international network of local authorities that supports the creation of municipal planning schemes that comprehensively integrate social and economic objectives within a long-term community vision based on environmental sustainability (Brugmann 1992). This approach provides a framework for local public actors working in partnership with government. This planning model was developed at the United Nations Earth Summit in 1992 and is called *Local Agenda 21*. Governance which fosters and supports community involvement in solving local problems can foster a sense of stewardship in citizens about their community.

1.1.5 Stewardship

The concept of stewardship is centuries old. The *Bible* refers to replenishing the earth. Over the centuries there have always been people identified as "keepers" of a nature. Examples include the Stigweard or "keeper of the sty" in the 8th Century; husbandry in the 18th century and the landscape gardeners of 17-19th Century. Humans have always manipulated their landscape, but the 19-20th Century has marked humanity's greater detachment from the land, where we have become extreme manipulators of the natural landscape.

A modern definition of stewardship is "the act of taking responsibility for the well-being of the environment and doing something to restore or protect that well-being, including voluntary action at the local level" (Smart Growth BC 2001). The stewardship of resources in communities can take many shapes and forms. Water is a popular focus for community stewardship around the world.[4] These stewardship groups are participating in various activities to protect an essential resource.

One essential resource that communities all over the world are working to protect is water.[5] There are over 1000 community-based watershed groups across North America. In fact, over 75% of watershed-based organizations in the USA have developed in the last 10 years (Griffon and Gannon 2000). Community-based stream stewardship initiatives are a useful tool for citizens who want to participate in local decision-making. Community stream stewardship groups are taking responsibility and caring for their local streams. Community-based stream stewardship initiatives can engage local communities in the planning, implementation and management of stream and habitat improvement.[6] A truly community-based initiative requires that affected parties be invited to become

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[4] The term "communities" in this paper refers to both communities of interest and place; they are not always mutually exclusive.

[5] Major watershed stewardship initiatives include: Fraser River Action Plan, Chesapeake Bay, Grande Ronde Basin, OR , Grand River Watershed, ON. Also see C.B. Griffin and Gannon (2000). *Patterns and Trends in the Evolution of Water-Based Organizations.*

involved - general public, local government officials, First Nations, educators, industry and business, the media, environmental and community groups, the technical community and any relevant government agencies (Grumbine1994; Pratt 1996).

Stewardship groups engage in many different types of local activities. Some groups engage in advocacy, some work in partnership with local government, others work , unilaterally to rehabilitate local ecosystems. This vehicle for participation at a local level, on local problems associated with streams, water quality and quantity issues and habitat, provides a sense of responsibility and attachment to the land they live on. Citizen participation in stream stewardship efforts also gives them the opportunity to be actively engaged, learn about local issues, policies and decision-making that affect their community. The role that stewardship groups play in urban governance is an interesting point of examination because little assessment has been done to determine the practical, political, potential and legal foundations for community-based watershed initiatives (Romaine 1996; Warriner et al 1996; Francis 1996).

1.1.6 Water

The number of community groups involved in stream restoration demonstrates the high value the public puts on water and healthy streams. The recent tragedy in Walkerton, Ontario in the spring of 2000, in which thousands of people fell ill, and in which seven were killed, has put water quality high on the agenda of most Canadians. Water is critical to all forms of life, and is a linking element of any ecosystem. Water is also an important indicator of overall ecosystem health (Rapport 1997). Water captivates people's imaginations. Human activity is dependent on, and has profound effects on this resource. Water provides for a variety of human uses including consumption for domestic use (drinking, cooking, bathing, cleaning) electrical energy, transport, fishing, recreation, agriculture, and sewage treatment. Rivers dominate much of our regional landscape, and it is not surprising that concern over their quality and use has served as a focus around which public interest can coalesce. Water issues bring together many different and often disparate groups including: wilderness preservationists, landowners, First Nations, fish

and wildlife supporters, many levels of government and recreationalists. Public support for clean water and free-flowing, fish-bearing rivers can be a potent political force. There is conflict over use and demand, but most people agree that having a safe source of water available is a basic need. Within a community, most freshwater management solutions require a balance of social, economic, environmental, political and technological factors in order to be effective. This balance is best framed by clear policy direction on the part of the local government.

Fresh water is part of a complex cycle that circulates water from air to land and back again. The hydrologic cycle is the pathway that integrates physical, chemical and biological processes. The interaction between humans and water is fundamental to life yet many management plans for water do not reflect this complex, integral relationship. Water quality may be the biggest emerging water problem in the industrial world. For example, the majority of U.S. citizens (218 million), live within 10 miles of a polluted waterway (Morrison and Brugmann 2000). Similarly, during the 20th century the world population has tripled, while water use for human purposes has multiplied six-fold (World Water Vision 2000).

All watersheds are defined by natural hydrology and ultimately drain to coastal waters. The coastal watershed begins with headwaters of streams and rivers and ends in coastal regions. As rivers and streams flow to coastal waters, they are influenced by many land and water uses, such as farming, housing, business, recreation and conservation. For example, if a river or stream flows through an agricultural area, it can pick up fertilizer, manure and pesticides that run off the land from farming operations. As this same river or stream passes by urbanized areas, it can pick up untreated sewage from failing septic tanks, wastewater discharges from industrial facilities, sediment from construction sites, and fertilizers from lawns. These contaminants change the chemical composition of urban streams affecting fish habitat and water quality, and ultimately end up in coastal areas. The increasing scale of impervious surfaces has a direct impact in the hydrologic regime such as decreased infiltration, lower base flows, extreme storm events, changes to the

timing of flows, and declining biotic integrity (Derry 1998; Horner 1996). The problems of water quality, quantity and habitat loss result from degradation of urban streams (Cox et al 1996; DFO 1998; Feeny et al 1990). The complexity of these water-related issues requires a management approach integrates the relationships between land and water, surface and groundwater, and water quantity and quality. We need to develop a unit of analysis that integrates human impacts on water, to ensure a healthy supply for generations to come.

Watersheds exist at multiple scales. A watershed is an appropriate unit to address the problems associated with water governance (Schueler 1996; Dublin Statement 1992). A watershed refers to the entire catchment area, both land and water, drained by a watercourse and its tributaries. Watersheds are core components of any ecosystem as they form a basic link between land, air, and water. Using an ecosystem-based approach on a watershed basis is effective because it provides an ecological framework for land and water use planning (FRAP 1997). Planning for communities on a watershed basis has been done all over the USA, and in some areas of Canada. The States of New Jersey, Michigan, California, and Kentucky have reoriented their program delivery within several departments, including the Departments of Ecology, to work on a watershed basis (Environmental Ground, Inc. 2000). Watershed-based planning is a prerequisite to protecting many hydrological functions. Watershed planning should result in measures that collectively protect the watershed from the impacts of future development i.e. land use, site planning, riparian management and storm water management (Schuler 1996). Since the watershed is an important unit, this thesis uses a small watershed, Hagan Creek watershed, as the physical setting to examine the challenges for stewardship groups working to adopt an ecosystem-based approach to watershed management at a local level.

1.2 Case Study – Hagan Creek

Southern Vancouver Island is under significant growth pressure, and provides a concrete example of the negative impacts of "poorly" planned urban development on local water resources. This unprecedented growth has resulted in many new land developments,

thereby affecting existing land use patterns. Increased water quality problems in the coastal Saanich Inlet accompanied this changing land use. The water quality problem prompted a Saanich Inlet study that was done by the Ministry of Environment Lands and Parks (MELP) in 1996. This study resulted in a number of reports that provide an in-depth review of the condition and sensitivity of a unique and important coastal water body on south eastern Vancouver Island. This study identifies numerous environmental problems including shellfish contamination, non-point source loading of chemicals, nutrients and sediment, habitat loss and declining salmon and bottom fish populations. The Sannich Inlet study highlights that many problems stem from land use activities in the watersheds that drain into the Saanich Inlet (MELP 1996).

The deterioration of water quality and diminution in quantity affects fish populations. Around the Georgia Basin (area bordering the Strait of Georgia) over 140 streams have been identified as critical to fish, and many are facing threats from urbanization or development (Nolan 1996; FRAP1998). Some of these streams support endangered or threatened species as well as salmon. Coho salmon are teetering on the brink of extinction and 11 per cent or greater of salmon and trout populations of larger streams in BC are already extinct or are at risk of becoming extinct, 30% of freshwater fish species are threatened or endangered (FRAP 1998). In the past, Hagan Creek provided habitat for an abundant population of cutthroat trout. Hagan is an example of one of many streams in the province where important fish populations are declining dramatically as many critical urban habitats for fish species continue to disappear at an alarming rate (FRAP 1997). The escalation of the fish crisis has resulted in many government initiatives to address the problem. Considerable legislation exists to protect fish habitat.

Hagan Creek drains into the Saanich Inlet on its east side (Figure 1). It is located on Southern Vancouver Island, approximately 40km north of Victoria, and is a typical small watershed that is suffering the cumulative effects of unsustainable land use. This river once sustained a healthy population of cutthroat trout and possibly Coho salmon. KENNES, meaning "place of whales," is the aboriginal name for the area where Hagan

Creek enters the Saanich Inlet. The name attests to the former abundance of whales in the Inlet.

Currently, the watershed's landscape includes farmlands, residential neighborhoods, an industrial park, recreational parks, conservation areas, and walking trails. Most of the land in the watershed is privately owned. There is no comprehensive watershed-based planning in this region. The fragmented development occurring creates diverse demands on the area's limited resources. The land development has been planned with little or no consideration of cumulative effects to the local ecosystem. There is no integrated planning scheme incorporating hydrological and ecological considerations in land-use plans and development. In contrast, an ecosystem-based approach would actually set the character and limits of development according to the requirements for maintaining a healthy watershed. Maintaining a health watershed would require the integration practices such as integrated land use planning, riparian zone protection, limited impervious surfaces, storm water treatment systems

"Traditional" governance is limiting to watershed-based management for many reasons. Many of our governing institutions operate using norms that do not support ecosystem-based goals. Government agencies rarely collect scientific baseline data on a watershed basis and lack co-operative planning mechanisms across jurisdictions. Similarly, the legal framework does not easily integrate complex scientific principles and changing public values into workable management policies (Keiter 1994). An "ecosystem approach" is set in a fundamentally different paradigm. The current jurisdictional context in Hagan Creek demonstrates a major challenge of using an ecosystem approach. The jurisdictions involved in the Hagan Creek watershed include - the municipalities of North and Central Saanich, and Saanich, the Ministry of Environment Lands and Parks (MELP), Ministry of Municipal Affairs and Housing (MMAH), Ministry of Agriculture, Food and Fisheries. Relevant federal ministries include Department of Fisheries and Oceans (DFO), and the Department of the Environment (DOE). These agencies do not have an established, guiding framework for working together on an ecosystem basis. From an

operational perspective, this means that data collection must be done across all jurisdictions, and decision-making involves many of these actors, who have different mandates and priorities. Herein lies the challenge.

Employing an ecosystem approach at Hagan Creek requires working with all of the above agencies to evaluate and improve the state of the watershed. The health of Hagan Creek has declined over the years due to urbanization and poor land-use practices. Changing land-use patterns, including increases in impervious surfaces, have negatively impacted the local hydrology cycle. Problems with water quality have resulted from practices associated with industry, farming and sewage. Water quality in Hagan Creek is classified below recreational use (MacDuffee 1999). Riparian areas have been destroyed as a result of land development and stream channelization. The cumulative impacts of these land-use practices include habitat loss, and decreases in water quality and quantity. The dwindling cutthroat population is confined to about 1500 meters of the total 12 km stream system. Broad, but unfocused support exists in the community to address these problems.

The Hagan Creek\KENNES Watershed Stewardship Project was initiated in 1997 to address these ongoing problems. Partners in the initiative include: Eco-Research Chair of Environmental Law and Policy, University of Victoria; Institute of Earth and Ocean Sciences; and Woodwynn Farm. The objective of this initiative is to reestablish and maintain the health of the creek and the watershed by developing an integrated approach to stewardship, restoration and planning. There are four central components to this initiative:

1) stream restoration and enhancement of Hagan Creek;
2) development of a Hagan Creek watershed stewardship program;
3) the collection of baseline, historical and traditional information on the watershed; and
4) a review of laws, regulations and policies that affect land use in the watershed;

Overall these components are intended to culminate in the creation of an integrated new approach to planning and development in the area.

The Hagan Creek Stewardship Project is part of a broader trend across the globe of citizens taking a more active role in the management of their local environment (O'Meara 1999; ICLEI 2000). Community participation has been a critical component of most successful watershed management projects (Pratt 1996). Governments recognize the value of such activities and offer some programs to support community stewardship groups. The Fraser River Action Plan (FRAP) was a DFO and Environment Canada supported ecosystem initiative that supported many community-based stewardship groups. The Fraser Basin is a watershed that encompasses fully one-third of the BC provincial land mass. FRAP-supported stewardship groups have facilitated partnerships among government agencies at all levels, local businesses, industry, environmental groups and academic institutions. Many community-based stream stewardship organizations are promoting an ecosystem-based approach to urban decision-making as they see this approach as critical to the long-term integration of development into the maintenance of ecosystem health.

1.3 Goals and Objectives of this thesis

This thesis addresses the problem of urban ecological degradation. The objective of this thesis is to address how ecosystem-based management and communities can help government respond to the complex problem of urban ecological degradation. In order to try and examine this problem more closely, the goals of this include the following:

1. To consider how an ecosystem-based management paradigm can respond to the need for a more cohesive approach to dealing with the degradation of urban areas.

2. To examine the role of community based stream stewardship groups as a vehicle for applying ecosystem based management to governance in urban areas. The role of stewardship groups is examined for their impacts on local decision-making and ecosystems.

3. To develop an evaluative framework for determining what characterizes a "successful" stewardship group and then apply this framework to four case survey stewardship groups.

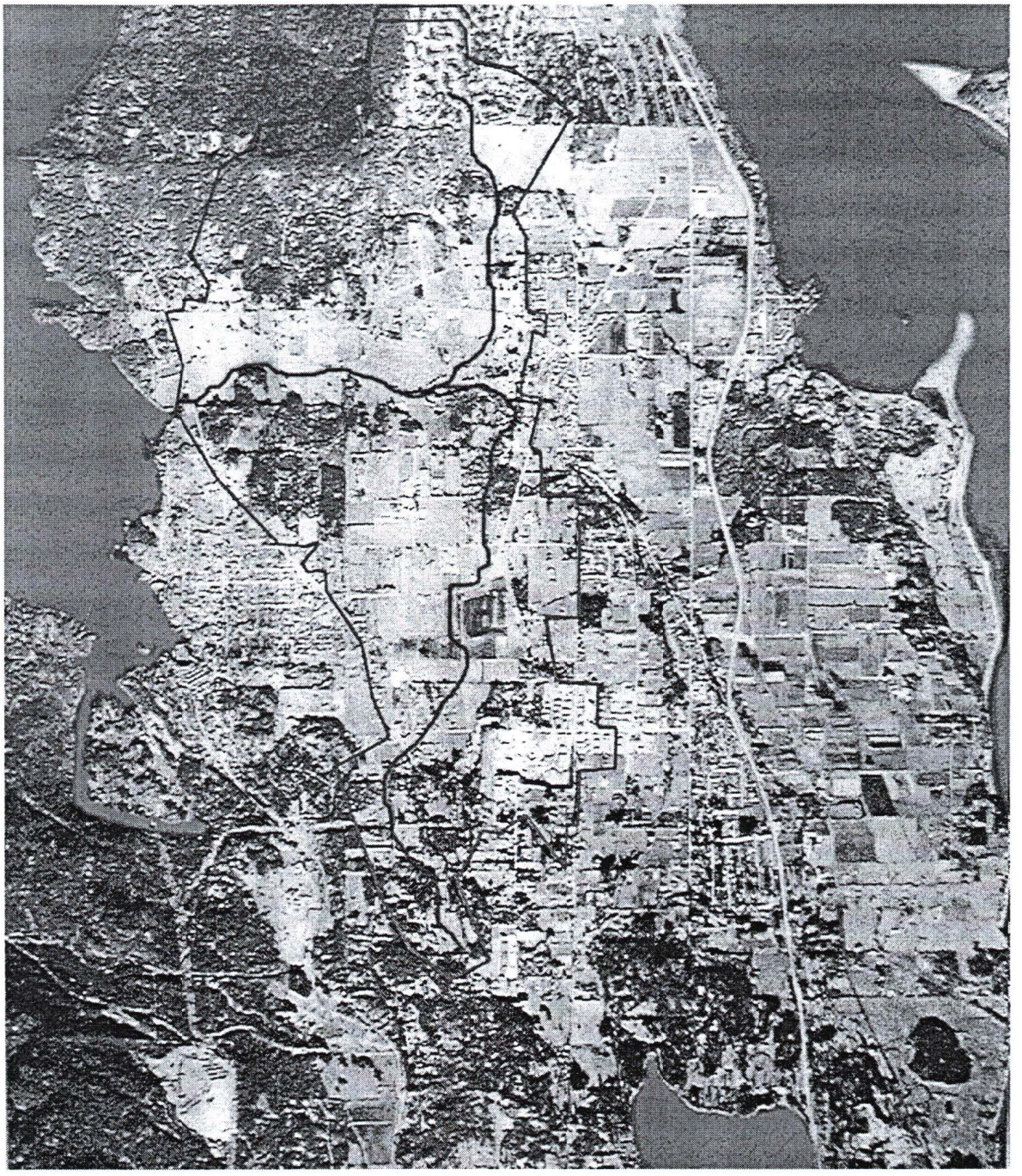
4. To document the origins and operations of Hagan Creek/KENNES project. Hagan Creek Project as an example of the political, ecological, and social challenges that community-based stream stewardship groups face.

5. To evaluate the Hagan Creek/KENNES Project, the principal case study of this thesis, using the same evaluative framework that was used to determine characteristics of stewardship success.

1.3.1 Thesis map

In order to engage in this discussion it is necessary to discuss and integrate ecosystem-based management and urban governance theory. This is addressed in Chapter 2. Chapter 3 discusses the methodology used in this study, including case study selection. Chapter 4 provides a profile of the main case study site, Hagan Creek. Chapter 5 reviews applicable jurisdictional and legal considerations that are relevant to a discussion of stream stewardship and local governance. Chapter 6 describes and evaluates examples of stream stewardship initiatives in BC and Ontario. The evaluation focuses on the design of the participatory processes. The purpose of this evaluation is to examine the outcomes associated with the participatory processes, in light of the evolution of the Hagan Creek initiative. Chapter 7 revisits the Hagan Creek project to explore how the stream stewardship component of that project developed. In this chapter prescriptions and recommendations for the Hagan Creek initiative are discussed. Chapter 8 concludes with reflections and areas for future research in stewardship organizational design and ecosystem-based management.

Figure 1 - The Hagan Creek Watershed



CHAPTER 2: ECOSYSTEM-BASED MANAGEMENT, GOVERNANCE AND COMMUNITY STREAM STEWARDSHIP - WHERE IS THE FIT?

There is power in local ownership of problems and solutions, and strength in a sense of responsibility derived from identification with a place (Yaffee 1996).

2.0 Introduction

This study applies several bodies of theory to the study of community-based stream stewardship and creates the conceptual framework for this study. From a overview of theory in relevant disciplines (including ecosystem[-based] management, governance, public participation theory, and urban government), the chapter examines how and why the theories apply to community-based stream stewardship and urban governance. The relationship between community-based stream stewardship and urban governance will be discussed in the context developing an ecosystem-based approach to governance in urban areas. My perspective is embedded in a geographical and temporal framework that establishes ecosystems as the context for social, economic, cultural, and political activities.

A goal of this thesis is to consider how community-based stream stewardship groups are helping to achieve ecosystem-based governance. This mobilization can influence urban governance in two ways. First, stream stewardship activities can change the awareness and attitude of the public towards their urban environment. Second, community-based stream stewardship groups can alter the norms of urban governance. This chapter addresses these two possibilities through an examination of theories of ecosystem-based management, governance, public participation, democracy, urban governance and watershed management.

2.1 Ecosystem Management

The ecosystem concept developed in the discipline of conservation biology. An ecosystem is a "community of organisms interacting with one another and with the chemical and physical factors making up their environment" (Miller 1991). One of the

early proponents of the concept, Arthur Tansley, argued that flora and fauna, along with soil and climate, form an interactive system where energy and nutrients are exchanged, consumed, transformed, and where feedback loops ensure, that within certain limits, the system will remain at equilibrium (Bocking 1993). The principal characteristics of the ecosystem concept create the foundation an ecosystem management approach

2.1.1 Origins and Evolution of Ecosystem Concept

As early as the 1930s, several visionary ecologists proposed that government management of public lands was flawed. They believed that the management design for the nature sanctuary system in the U.S was not sufficiently comprehensive. Numerous problems in the management scheme were identified. First, the imposition of artificial boundaries on parks did not encompass fully functioning ecosystems nor did they park boundaries support the biotic requirements of large mammals. These scientists also realized that the natural system needed to protect ecosystems as well as species. The ecologists identified that a comprehensive management system required interagency cooperation, and that education was needed to teach the public the value of "sanctuaries" (Grumbine 1994). This recognition of a flawed management system was influenced by the scientific evolution of the ecosystem concept.

Ongoing ecosystem research diversified the science of ecology. As scientists explored this new thinking about ecosystems, they observed that there was a lack of information and understanding of entire systems. Pivotal figures such as G.E. Hutchison, Howard and Eugene Odum and Raymond Lindeman further developed the concept by adding more operational details to the system framework. For example, Lindeman used energy flows and their transformation to discuss the relationship among short term events, such as food consumption and respiration, and long-term changes in ecosystems (Bocking 1994). This finding shifted the emphasis from a narrow focus on species activities to an investigation of the functional role of ecosystem components. Ray Lindeman bridged the gap between living and nonliving components. In the early 1970s Eugene Odum noted that there was a significant shift in ecosystem studies, "demonstrating that human activities affect not only

individual species but entire ecosystems" (Odum 1971).[7] The interaction and interdependence of humans on these physical ecosystems, and their impacts on those systems, were new ideas.

The 1970-80s saw the expansion of the ecosystem concept into the policy realm. In the US, it began in the early 1970s with a policy analyst named Lyndon Caldwell who suggested using ecosystems as the basis for public land policy. This approach, "would require that the conventional political matrix be unraveled and rewoven in a new pattern" (Grumbine 1994). In the 1980s, theoretical and legal frameworks for ecosystem management began to emerge. The works by Jim Agee, Daryl Johnson, Keiter, and Clark focused on federal land management. Their research and publications moved ecosystem management from the science of ecology, into the public policy sphere, to be considered as a management paradigm.

As a management paradigm, ecosystem management (EM) is most commonly used in resource-based agencies and focuses on ecosystem protection to manage the limits of resource extraction. An ecosystem approach is one of "holistic" management where all values, including non-economic values (cultural, recreational), are included in management and planning objectives. EM has been adopted by most federal agencies with resource responsibilities in the USA and in the parks system within Canada (BC Parks and Parks Canada website 1994). Since the concept is still rather young (approximately 12 years old), EM provides a loose framework of ideas and principles based on the tenet that producing goods and services from resources can "only be done if production can be attained with ecosystems remaining healthy - by maintaining native biodiversity, ecosystem structure and function and so forth" (Grumbine 1997). A founding principle is managing and planning human activity in accordance with natural landscape patterns. EM is unlike many scientific pursuits since it emphasizes a systems

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[7] For a detailed account of the evolution of the ecosystem concept in Britain and North America, see Stephen Bocking, Visions of Nature and Society. A History of the Ecosystem Concept. In *Alternatives* Bocking also presents an interesting overview of the interplay between the political climate and how this

approach to ecosystem research and management (Rowe 1993). Using a "systems" rather than a sectoral perspective requires a policy framework that, "focuses on the interconnections between a complex set of variables, ecological and social, taking place over time and space" and recognizes that management and scientific issues do not occur in a vacuum (Yaffee 1996: 725). The systems approach of EM provides a more comprehensive framework for analyzing policy decisions since it does not isolate issues sectorally as do traditional management schemes (Grumbine 1994, 1997; Yaffee 1996).

2.1.2 ESbM Overview

Ecosystem-based management (ESbM) evolved out of EM. Principles of EM began were integrated into disciplines outside of resource management and articles on EM were published in the urban planning community, public administration and the NGO sector (Gibson and Tomalty 1996). In 1992, an article written by the director of ICLEI stated, "ICLEI is developing an approach to municipal management which would integrate ecosystem principles and constraints into development and public management decision, thereby reducing pollution by making economic processes compatible or even synergistic with geophysical and biochemical processes. ICLEI calls this the ecosystems approach to municipal management" (Brugmann 1992:80). An ESbM approach is based on the premise that maintaining ecosystem integrity is primary, and that we need to rethink economic and political processes given what we know about the functional limits of ecosystems.

A critical distinction exists between ecosystem management and ecosystem-based management; the terms are not interchangeable. EM is based on a bureaucratic management model that assumes that economic and political processes are entrenched in their current form. There are several shortcomings to this approach, and it often does not work well due to power relations, scientific uncertainly, and the implicit role of values in our public institutions (Grumbine 1997; ESA 1996; M'Gonigle 2001). EM endeavors to

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impacted the evolution of the ecosystem concept (1930s-1970s). Grumbine (1996) also provides an interesting history of the concept.

change the way resource decisions are made by changing the structure of resource organizations. In doing so, agencies address the gap between EM goals and traditional resource management within a framework that ignores how non-resource-based policy decisions impact ecosystem integrity.[8] A second important distinction between the two approaches is EM's approach to how science fits into society, versus the a ESbM approach, which examines the role of science more critically. EM offers a valuable step by questioning where science fits into society but this consideration needs to be taken a step further to question our conventional reductionist problem solving and management norms. There are significant gaps in science, yet as a society, we often depend on science to provide evidence and answers to help us with decision-making. ESbM recognizes the limits of science and pitfalls of central management.

Ecosystem-*based* management is a paradigm that uses ecosystems as a basis for managing human activities in all sectors, not just in resource management. ESbM puts humans in the context of the ecosystem and "combines emerging ecological approaches to science with an understanding of the social and economic factors that shape human attitudes, perceptions and behaviours" (Yaffee 1996). An ecosystem-based approach recognizes that management issues do not occur in a neutral, value-free environment.

ESbM shifts the context for management from institution-centered to ecosystem-based. A central tenet of an ESbM approach is that maintaining ecosystem integrity is not feasible in the given political, economic context. Conditions in both economic and political realms need to change to address the systemic and structural factors that create the problems of environmental degradation. Lyndon Caldwell stated that, "certain elements of policy essential to ecosystem integrity are not present in any of the political systems or sub-systems. Principal among these policies is effective land-use control"

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[8] Ecological integrity refers to the soundness or completeness of the evolutionary (e.g., natural selection and mutation) and function processes (e.g. predation, competition and nutrient cycling), as well as the organisms that comprise an ecosystem (Clayquot Scientific Panel 1995). There are certain spects of ecosystem function which are unmanageable and are best left alone. Ecosystem management puts emphasis on the need to manage everything, including wildlife to achieve ecosystem integrity., which ESbM focuses on the management of human activity.

(Caldwell 1993). In terms of political conditions, ESbM supports decentralized decision-making that enforces the principles of good governance. ESbM merges eco-centric and anthropocentric perspectives. In an ESbM paradigm, ecosystems include human populations, their built environments and their economic, social and cultural systems but does not put them above or before other ecosystem component. Additionally, this approach acknowledges that all populations depend on basic geophysical and biochemical resources and processes for life (Brugmann 1992; Crombie 1992).

To recognize that humans require a healthy ecosystem to sustain human life, implies an inherent need to ensure the integrity of ecosystems in order to assure the survival of humankind. ESbM acknowledges ecosystem processes for their intrinsic values, in turn respecting ecological limits and functioning.[9] It is admittedly a radical shift from the utility maximizing perspective that is the rationale for traditional decision-making in the post-industrial era.[10] Marx argued that, "[Men] make their own history, but do not do so under conditions of their own choosing." Humans can not disregard the importance of the natural environment. It is a given, just as are the historical circumstances we are born into. Humans can, however, choose how to respond to these inheritances. Respecting ecosystem integrity is a choice humans can make given what we know about potential outcomes to the environment. We do not have to act or make a choice, but we must live or die with the consequences (O'Riordan 2000).[11] ESbM offers society a means to change our utilitarian paradigm (where nature is used by society) into one that recognizes ecosystem health is the prerequisite to social, economic and cultural health.

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[9] An ecocentric approach asserts an intrinsic value to non human nature whereas an anthropocentric approach is a human centered theory that only attributes instrumentalist values, the value something has as a means to an end.

[10] For an interesting discussion on how rationality affects environmental decision-making and policy see, Yafee 1997.

[11] Grumbine states, "Over time there is simply no way to sustain humans without sustaining ecosystems. Even if one believes in *"Homo sapien's* right to choose which elements of diversity to diminish, we are in no position to make these choices. Scientific gaps concerning keystone species and other critical elements of ecosystem structure and function will not be closed soon" (1997:43).

In the Canadian context, the first attempt at employing an ecosystem-based approach was in the planning realm. The approach was applied to the Great Lakes in the 1960s. Managers realized that there were numerous factors contributing to the systematic ecological degradation of the region, and existing problems could not be addressed within strict jurisdictional, geographic or disciplinary boundaries (Bell 1994). This resulted in the 1978 Great Lakes Water Quality Agreement. An ecosystem-based approach was also used in the Canadian Royal Commission on the Future of Toronto's Waterfront (Crombie 1992) and more recently the Fraser River Action Plan (FRAP), and the Georgia Basin Ecosystem Initiative (GBEI), in BC.[12] All of these examples demonstrate a normative desire to rectify human needs with ecosystem integrity (Crombie 1992, Bocking 1994; Brugmannn 1992). These efforts illustrate the initial realization by both scientists and policy-makers of the importance and complexity of ecosystem integrity and human impacts upon that integrity (Tomalty 1994; Gibson and Tomalty 1994). An important political implication of many of these initiatives is the necessity for broad participation in the environmental policy process (Bocking 1994). The challenge lies in developing a framework to operationalize urban ecosystem-based management.

2.1.3 General Characteristics

Though there are important differences between EM and ESbM, there are some important baseline characteristics that apply to both approaches. There is a high level of concurrence on the attributes of EM. A survey of EM literature completed by Edward Grumbine (1994, 1997) and Steven Yaffee (1996) identifies some of these key attributes.[13]

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[12] For more information on these initiatives see URL -- http://www.pyr.ec.gc.ca/GeorgiaBasin/gbi_eIndex.htm.

[13] Both authors have conducted research surveys on EM literature and projects. Their articles are quite comprehensive and are based on extensive surveys in the US. For a current distillation of these themes see Ecosystem Management Initiative (EMI) - Universityof Michigan School of Natural Resources and Environment -- http://www.snre.umich.edu/emi/collaboration/publications.htm w.
For various EM quotes see -- http://www.snre.umich.edu/ecomgt/emapproach/quotes.htm.

The key themes of EM can be categorized into four areas. The key themes include: the nature of physical interdependence, institutional considerations, information-based issues, and social considerations. The physical interdependence of ecosystems requires that problems be identified and addressed in a multi-sectoral, interdisciplinary manner. Institutions need to be able to process information from both social sciences and natural sciences to work cooperatively with appropriate stakeholders (government and community). Institutions need to promote cooperation so that information can be collected and disseminated and respond to complex problems and achieving EM goals. The following discussion of the four themes is based on EM literature. Since ESbM is based on many of the principles of EM, this discussion should elucidate the foundation of ESbM.

First, ecological integrity refers to protecting total native diversity and the ecological patterns and processes that ensure diversity. Ensure diversity requires a management approach that uses a "systems" perspective, rather than a sectoral, compartmentalized perspective because a systems approach takes physical interdependence into consideration. The system(s) of physical interrelations among ecosystem components is integral to an approach that recognizes that air is not separate from water which is not separate from fish, and so on. This interdependent relationship also exists between humans and ecosystems. In modern society, the human relationships and dependence on the natural environment has been predominantly framed and institutionalized in utilitarian manner.

Second, EM requires the use of ecological boundaries as the primary management unit. This creates many institutional challenges, as there is incongruity between ecological and political or administrative boundaries and jurisdictions. Dealing with issues on an ecosystem basis requires that governing institutions looks beyond departmental mandates and delineated political boundaries. Methodologies that target problems on an issue by issue basis fail to provide insight into the systemic issues that underlie and reproduce problems. Similarly, institutions often focus on short-term goals that do not promote

effective monitoring programs to chart progress or best practices. Working across administrative and political boundaries can facilitate cooperative efforts among interested parties to define common problems and boundaries of concern. System problems require system thinkers who can work across disciplines, be imaginative, integrative, flexible and adaptive.

Interagency cooperation requires many levels of government (federal, provincial and municipal, First Nations) and private actors to collaborate on problem definitions, legal and management goals. Cooperation requires sharing power, and over time, developing trust among interested parties. It is a struggle for public managers to implement these principles under current institutional structures and governance since ESbM challenges existing bureaucratic divisions of authority. Similarly, "cross-jurisdictional problem-solving and management which violates norms relating to agency and governmental jurisdiction, leadership control and organizational culture" (Yaffee 1996). Organizational changes required to achieve ESbM management goals include: the using collaborative decision-making approaches; supporting innovations such as the creation of interagency committees; adjusting power relations between departments; and training staff across disciplinary and program boundaries (Grumbine 1994, 1997; Yaffee 1996).[14]

Third, information collection and flow are important to support ESbM decision-making. There are challenges associated with the dissemination of existing information and management options for dealing with a lack of information. Information and data available to decision-makers (private and public) impact decision outcomes and there is a general lack of data about ecosystems and their functioning. Managers need to develop networks for sharing information between agency researchers, policy makers and academics. Where EM information does exist, it's collection, use and application needs to be monitored to enable tracking and qualitative evaluation of successes and failures. Monitoring data contributes to the knowledge pool of these management techniques.

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[14] There is a hierarchy of ministries with power in political culture. In the BC context, the Ministry of Forests tends to have more influence than the Ministry of Municipal Affairs and Housing or Ministry of Environment Lands and Parks.

Using adaptive management techniques helps deal with uncertainty and the provisional nature of scientific information thereby allowing managers to adapt to uncertainty. Lack of scientific data is often not the principal issue as political considerations are often a greater barrier to ES implementation. In reality, agencies will rarely have the amount of information they may want for decision-making, but using best management practices and a commitment to gather information and apply it to future decisions is an important step.

An important part of achieving sustainability is the acknowledgment of what we do not "know" about the impacts of our activities on ecosystems. The precautionary principle is an important concept in ecosystem-based management as it contributes to a new legal and management framework.[15] One definition of the precautionary principle is:

> Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainly should not be used as a reason for postponing measures to prevent environmental degradation (UN 1990).

The principle has been used in numerous International Agreements and Treaties. The above definition of the precautionary principle demonstrates a new perspective on scientific uncertainty and risk. It advocates a precautionary rather than reactive approach to prevent degradation of the environment and shifts the "burden of proof" to the polluter. Maintaining ecosystem health requires using technologies, regulations and processes that do not impose unacceptable risks on environmental health. This approach is a substantial shift from existing patterns of economic development and political decision-making that "externalize" these risks (Hawkins 1993).

Fourth, using an ESbM framework requires incorporating human variables such as education, values and public participation into the management paradigm. Managers, policy-makers, scientists and the public need to understand more about their environment, ecosystems, and governance. Managers need to focus on new learning and challenging the

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[15] Scholars have applied this principle to various ecological considerations. See John McDonald, (1994), Michael M'Gonigle et al (1994).

status quo, instead of increasing power, interest and control. It is difficult for people to embrace the concept of an ecosystem if they do not understand it.

People's understanding of the world is ultimately influenced by their values. Human values play as significant a role as scientific knowledge in ESbM as they are an intrinsic part of decisions in both private and public realms. As a society, we generally value things like convenience and cost efficiency more than the importance driving a car less to decrease air pollution. People are often not aware of the value of ecological functioning and the value choices they can make that impact ecological health. A shared public understanding of ecosystem priorities is needed for sustainability to succeed. An important aspect of this understanding requires awareness that humans are embedded in nature. There is a significant gap in North American appreciation of what sustaining ecosystems requires and how our decision-making infrastructure manages the impacts of human behaviour on those ecosystems. People often learn best through action and a critical component to the continuing development of an ESbM framework is public involvement. Involving the public in ecosystem-based projects and decision-making educates and empowers civil society. Effective public participation must become part of all institutional norms in order to facilitate a democratic and sustainable system of governance.

Collectively, these four themes are the keys to operationalizing an ESbM framework. The most fundamental factor to remember is that humans are the decisive factor for maintaining ecological integrity. The way that humans govern themselves is fundamental to ESbM. The need to understand and translate these principles of an ecosystem approach from the physical and management sciences into the political and legal sphere introduces important considerations of power and underlying ideological values that must be recognized and appreciated.

2.2 Governance

Governance is fundamental to a discussion about ESbM since our modern system of governance, as sustained by current institutional design, does not respond to 21st century issues and problems (Saul 2000). We need to advance a system of governance that is better responsive to the complexities of 21st century problems, particularly the impact of human activities on the natural world.

Governance is about roles, rules and relationships. Governance refers to the process whereby elements in society wield power and authority, influence and enact policies and decisions concerning public life, and economic and social development. It is a broader notion than government as it transcends the state to include the private sector and civil society. The state creates a conducive political component, including the Constitution, legislature and legal environment. The private sector generates jobs and income through an economic activity. Civil society facilitates political and social interaction. Each component has its weaknesses and strengths, and a major objective of good governance is to promote constructive interaction among the state, civil society and private sector. Governance is process through which conflicting or diverse interests may be accommodated and cooperative action may be taken.

Governance includes formal government structures as well as the diverse processes through which government interacts with a wide variety of community, business, non-profit and other interests. It is the sum of the many ways individuals and institutions, public and private, manage their common affairs. Governance is a complexity of mechanisms, processes and institutions through which citizens and groups voice their interests, mediate their differences, and exercise their legal rights and obligations. This includes the "collective results from the exercise of authority and control through multiple governmental and other organizations, each following their own decision-making processes" (Francis 1993:303).

Democracy is influenced by the way that civil society interacts with government. Growing percentages of people are more informed and want to be a part of "the decision-

making process". The recent protests against the World Trade Organization (WTO) in Seattle 1999, the subsequent WTO protests in Europe 2000 and 2001, and the Summit of the Americas protest in Quebec City 2001, are all examples of a public outcry for involvement in important decisions-making forums that are excluding them. Civil society presents a link between representative and participatory democracy. Fostering the development of civil society and good public participatory processes to empower civil society builds social capital (Lackey and Dershem 1992).[16] Governance is an increasingly important issue for local communities all over the globe as they are directly impacted by the trends of democratization and decentralization. It is for these reasons that participatory democracy is an important tool to achieving ESbM. Changes in urban governance can facilitate greater public participation and decentralize state structures to disperse power and authority (Brugmann1992, Thomson 2001).

Government functioning has a significant impact on governance. For example, government institutions can strengthen institutions for collective decision-making, facilitating and forming partnerships designed to secure collective goals, ensuring the fair expression of a range of interests and adequate arbitration between. The relationships among form, function and outcome are important when examining the relationship between government and governance. Government should be participatory, where all interested individuals (men, women, youth) have a voice in decision-making and the capacity to participate constructively. Government should be transparent, built on the free flow of information. Processes, institutions and information should be accessible, and the public should be able to understand and monitor them. Accountability ensures that decision-makers in government, private sector and civil society organizations are accountable to the greater public. Institutions and processes should be responsive to stakeholders. Government should be effective, equitable and promote the rule of law (legal frameworks should be fair and enforced impartially, particularly the laws on human

[16] Social Capital is generally defined as the stock of social relationships (between and within groups), networks and norms in a community. It is both a consequence and producer of social cohesion. "There is growing evidence that social capital has important implications for prosperity, health and self rated

responsive to new learning, but struggle to maintain control over resources, information and people (Clark and McCool 1985; Gray 1985).

Bureaucracy's culture of secretiveness and decision-making by few (rather than inclusive) does not promote transparency or accountability to the community at large. Hierarchy, and secrecy support the specialization of task in bureaucracies and this specialization does not promote holistic and interdisciplinary approaches to organizational design. Sections and departments of government have very specific goals grounded in a rationalization that focuses on efficiency.[22]

We live with a political system where the dominant belief is that the "collective good" (or the good of all individuals) can be realized in most cases by private individuals acting in competitive relation to one another and pursuing their specific goal with minimum state interference (Held 1992). The rational behind the belief that competitiveness produce the best outcome is a principal of economics. The market does not advocate cooperation among stakeholders. New forms of governance allow individual organizations more flexibility, because they are not bound to the rigidity of conventional organizational norms.[23] There is no consensus among critics of current governance about how to remedy the present inability for government to respond to complex ecological concerns.

Exploring governance at a smaller scale reveals some interesting possibilities for responding to ecological concerns. Local governments tend to focus on growth and service provision. The general good of the community is often considered in terms utilitarian values (cheap, efficient service delivery and economic growth). The Tindals' argue that, "... a different conception of municipal government is needed, one which sees the municipality as an extension of the community, as the community governing itself" (Tindal 1994). A local government that is inaccessible and too bureaucratic for the public

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[22] See Yaffee, Stephen. 1997, For a discussion of how human and institutional behaviour within the conventional bureacratic framework, does not facilitate substantial changes to promote ecosystem integrity.

[23] New forms of governance include bodies such as the Clayoquot Sound Scientific Panel, the Fraser River Action Plan and, the Georgia Basin Ecosystem Initiative in BC.

to participate in or understand takes the *locale* out of local. This situation perpetuates a model of governance where "experts" are the primary decision-makers in bureaucratic institutions, and the local citizen is forced to live with the implications of the expert decision. The lack of participation by the local population in decision-making often results in bureaucratic-created solutions that are inappropriate for the community (Papworth 1988)[24]

> While a democratic government may lay the foundation for good governance, a vigilant and active citizenry is essential to its sustenance. Nowhere is this need more evident than in the management of public sector services for which citizens are largely dependent on their government. The quality of governance is enhanced when government as a whole, and public agencies in particular, become open to new ideas and responsive to citizens. Responsiveness in turn is improved when citizens are well informed and collectively seek better performance from these agencies (UNDP 1998).

This characteristic of "modern western governance" exemplifies a commitment to the market as the key mechanism for decision-making. For example, many believe that privatizing water servicing will improve the management of the system and ultimately have a positive impact other economic, social and environmental problems associated with water servicing.

2. 3 Public Participation

Public participation refers to the role of citizens as individuals or groups in government planning and decision-making processes (Ellsworth 2000). The relationship between citizens and their government is complex, and is fundamental to any discussion about governance. Government generally only permits public input at the program or delivery levels of decision-making. Commonly, the forms of public engagement by government tends to be "consultative," having questionable influence on policy direction.[25] As one travels up the hierarchical ladder of government, there is less and less citizen

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[24] Papworth (1992) cites some good examples in British health care, crime and education sectors that demonstrate that bureaucratic solutions fall short of desired results pp.214-218.

[25] For example, the public hearing process for municipal zoning where the public input is rarely ongoing.

involvement. The effect is that a concerned citizen has limited access to government decision-makers and decision-making processes.

Public participation is considered a fundamental tenet in democratic theory. "To be a citizen is to be able to participate in decisions that affect oneself and one's community" (Thompson 1970). In fact, it is arguably the most central feature of the normative concept of pluralist democracy. Many political theorists support the importance of public participation in a democracy. Tocqueville and Rousseau believed that participation was a powerful means to educate the public in rights, laws and political good sense (Tocqueville [1935] 1980; Pateman 1970). J.S. Mill maintained that it is necessary for all individuals to learn the politics of democracy through their participation in local institutions and associations (Pateman 1970). There are several critical assumptions about the importance of broad public participation. One assumption is that public participation fulfills the democratic ideal of "opening up" government decision-making to the public. Second, it gives citizens the opportunity to practice democratic citizenship. Third, it helps guard the public interest (Shepherd 1997).

The modern roots of the movement for greater public participation in government began in the late1960s and early 1970s. Subsequently government has attempted to respond to the public's demand for greater citizen participation. There is debate about the "appropriate" role citizens should play in a democratic state. The spectrum of opinion ranges from those who believe that participation should only take the form of periodic elections where politicians are made accountable to the public, to the other end of the spectrum, where community-based management involves all community interests in decision-making through direct participation in planning and implementation of projects.

Citizen involvement in government planning or program decision-making gives individuals an opportunity to articulate their values beyond the act of partisan voting (Kretzman and McKnight 1993). It is proven that participating in local community decision-making processes increases citizens' skills, and is part of an important social

process (Lackey and Dershem 1992, Syme and Sadler 1994, Bamberger 1991). Public participation provides a basis for democratic actions, whereby citizen can cooperate, negotiate and compromise. In the words of Biddle and Biddle, participation in community development and decision-making:

> [makes] available the experiences that create the social skills needed to deal with each other, with neighbors, with experts, and with the powers that be. Some of these skills include the ability to discuss without rancor or recrimination a controversial proposal. The ability to cooperate and take satisfaction in cooperation more than conflict, and the disposition to accept a problem as a challenge and an opportunity rather than as a fearful thing to be avoided. These and other social skills can be learned, as part of the participation process (1965, 251-252).

Public involvement forums can facilitate communities' cooperation for beneficial outcomes for the public good. The concept of public participation is complex and value-laden, and the ways that it is conducted and implemented vary considerably. Arguably, public participation is often administered according to agency and/or ministerial goals (Sewell 1970). Public participation mechanisms include:

- public meetings
- referendum
- open houses
- participatory budgeting
- traveling commissions
- toll-free lines
- internet discussion groups
- task forces/groups
- briefs and reports
- referenda
- public opinion surveys & questionnaires
- citizen advisory committees
- facilitated workshops
- informal contacts and meetings

Source: Based on case studies presented at the Canadian Conference on Public Participation, Banff, Alberta: October 1977, Lomas 1995, and International Association of Public Participation Spectrum of Public Participation.

There are many critiques of public participation methods used by government. The way that government agencies conduct public participation processes has an impact on citizens' attitudes towards government and democratic processes. The public process often becomes a bureaucratic exercise to comply with statutory and regulatory requirements for public input (Shepherd & Bowler 1997). This problem is exemplified by public hearings where the public is invited to comment on issues or proposals that have restricted alternatives predetermined by government officials and thus do not allow the

public to provide substantive input. Similarly, when public input is used to gather data, the public has relatively little influence on actual decision-making. The International Association for Public Participation developed a spectrum of increasing levels of public empowerment depending on the model of public engagement used (IAP2 2000). The levels of public involvement range from informing and consulting, with a low level of public empowerment, to participatory and collaborative methods that have a higher level of public empowerment.[26]

Generally, participants prefer public processes involve two-way communication and shared decision-making (Cortner & Shannon 1993). The absence of citizen input in policy outcomes leaves citizens feeling disempowered. A study of the public consultation in the Grand River Watershed Management strategy revealed that citizens voiced "overall support for consultation *but* with infrequent rates of participation because of public doubt their ability to influence outcomes through such involvement" (Warriner et al.1996, Sewell and Phillips 1979). This lack of efficacy often discourages people from participating in government sponsored public processes (Bamberger 1991:282, Findlay 1993:158).

An important consideration in public participation process design is trying to balance the playing field. The public process chosen affects relative access to power and information and unequal power dynamics often result from a process that does not consciously address balancing power relations among stakeholders (Sewell 1979; Cortner & Shannon 1993; Cowie 2000).[27] As a result, there is often a lack of trust between the public and the agency conducting the process (Shepherd and Bowler 1997:728; Warriner et al 1996). Similarly it is typical for organizational incentives to limit managerial interaction with the

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[26] See models of Public Participation Spectrum developed by International Association for Public Participation http://www.iap2.org/spectrum.html. And, Meeting the Modern Justice/Sustainability Challenge - Discussion Paper. September 2000. Jim Ellsworth. Prepared for the Department of Justice. Unpublished . Pp. 17.

[27] The federal government's Voluntary Sector Initiative, which began in 2001, has devoted $24 million of $98 million to support the development of the voluntary sector's policy capacity so that they can better engage in policy discussions with all levels of government. See http://www.vsi-isbc.ca/ for detailed

public and affected interest groups, and therefore direct interaction with the public is not highly rewarded (Cortner & Shannon 1993).

For public participation processes to empower participants there needs to be sufficient public access to resources, expertise and support (Warriner et al 1996; Cortner and Shannon 1993; Fiorino 1990). An empowering process will facilitate individuals taking collective action to effect change, including organizations and programs to improve the quality of life and sustain community members (Papineau and Keily 1996).

Considerable cleavage exists between public participation theory and practice. Both the public and bureaucrats criticize public participation mechanisms. Overall, current governance often does not foster effective citizen participation and this is largely a product of the public process chosen (Cortner and Shannon 1993; Warriner et al 1996; Pateman 1970; Sewell and Phillips 1979). Local governments likely have the most contact with the public, more than senior levels of government. For this reason, it is important to consider the role of local government.

2.4 Urban Government

> True democracy is only possible when people have effective power over their own affairs, their own goals, and their own resources. The larger the governing unit, the less responsive it is to human needs, the more bureaucratic and inefficient its administration, and the greater the impoverishment suffered by peripheral regions, as resources, (both human and material) are drawn inexorably towards the center (Papworth 1992:28).

Local government decision-making authority plays an important role in a complex urban environment. Similarly, the role of community in problem identification and developing solutions for local problems is critical, as is community participation in implementing programs or projects. Community involvement can lead to innovative solutions and broad sectoral partnerships that would not be discovered otherwise (Kretzman and McKnight

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information about the initiative.

1993). Local government can act as the facilitator of community development, and build community capacity at the same time.

Local government can facilitate democratic activities at the local level. It has been argued that local political institutions tend to be executive centered, rather than conducive to strong public participation (Wolman 1995 citing Elkin:156). In a discussion about creating democratic administration, David Langille states:

> If the first objective of democratization is to increase *accountability*-both of bureaucracy to government and of government to citizens- the second must be to increase the *democratic capacities* of those citizens: to empower them individually and collectively so that they may assert greater control over their lives (Langille 1993:229).

Many political scientists support the idea that local government is the critical level to practice citizenship, and democratic activities. It has been suggested that citizenship has, "traditionally been centered on the idea of geographically defined communities" (Held 1993:45 in Lowndes:161). Lowndes, argues that in both practical and moral terms, "towns and cities are the key arenas for acting out the rights and duties of citizenship" (Lowndes 1995). This statement does not refute any claim that community identification may be stronger in communities of interest, or that in these times of mobile capital and infinite communication linkages that connection to place can be distorted. If one argues, however, that participation is an essential criterion to the democratic ideal, then the most likely forum for it to be cultivated, is at the local level (Lowndes 1995). As J.S. Mill stated, "A political act, to be done only once in a few years, and for which nothing in the daily habits of the citizen has prepared [him], leaves [his] intellect and [his] moral dispositions very much as it found them" (1980:229-30).

The need for citizens to participate actively in local decision-making is supported in the "... notion that democratic values are inculcated through participation in the affairs of the immediate community" (Lowndes 1995:169). Citizen participation in formal institutional structures, such as government and the market are governed by the mechanisms that those

institutions provide for general participation. In the market, individuals make decisions based on a market rational rather than collective decision-making. Public participation in the political sphere varies considerably.

Local knowledge makes it possible to mobilize resources within the community and to create partnerships with and among individuals and groups. If a commitment by local government and a core of individuals exists, other members of the public and different groups and sectors will likely follow the initiative (Kretzman and McNight 1993, Plant and Plant 1992).

2.4.1 The Context of Local Government

At this point, reviewing the jurisdictional and legal context of local government will shed some light on why this level of government is a key level of government to engage the public in local decision making.

In the Canadian context, local or urban government is a unique level of government. Unlike federal or provincial governments, urban government is smaller scale, has denser populations and a devolved form of authority. Our local governments do not have any form of constitutional recognition. Local government is often referred to as municipal, which includes cities, towns, villages and district municipalities (Bish 1992).[28] There are over 700 different local governments in British Columbia (Bish 1992). Historically, local governments have been concerned with the economic and social sustainability of their communities.[29] These concerns have diversified as the complexity of urban areas has increased. Issues such as livability, quality of life and environmental concerns have become increasingly important issues for municipalities.

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[28] For the purpose of this inquiry I will focus on urban local government. When I refer to local government, I am referring specifically to urban local government.

[29] For a good discussion on the historical development of local government and their role, in the Canadian context see Tindal and Tindal 1995.

Provincial governments were given authority over all local government in *the British North America Act* of 1867 and the *Constitution Act* of 1982. Municipalities are administrative extensions of the provincial government. In BC there are two areas that the provincial government affects the activities of local governments. First, the province determines the rules that regulate how local government can be organized. Second, local government activities are authorized under provincial legislation (Bish 1992).

The *Local Government Act* S.B.C 2000 outlines the authority and jurisdiction of local governments. Municipalities have a limited scope of functions as delegated by the Provincial government but these affect a wide range of issues (Tindal 1995).[30] Some significant responsibilities include: all land use planning (official community plans, zoning, land purchase, and development bylaws), municipal parks planning, public health regulations, irrigation and flood control, and industrial parks. Municipalities are also charged with issues related to water regulation including supply and distribution, and storm drainage and, sewage collection and treatment.

Policy decision-making in local government is the responsibility of both elected and non-elected officials. These non-elected individuals include members of boards, commissions, as well as local administrators. A significant source of the financial base for local authorities is property tax. They also acquire funds from grants or transfer payments that originate at the federal and provincial levels.[31] Another source of income for local governments *are taxation and service* provision. Municipalities are not permitted to carry any debt.

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[30] See Chapter 5 for more detailed account of the legal context

[31] A current example a grant program for municipalities is the federal government initiative called "Greening Infrastructure Program" that has committed $2.65 billion over six years to projects that support clean air and water, transportation and affordable housing. See: http://www.fcm.ca/newfcm/Java/frame.htm for more details.

2.4.2 Regional Districts in BC

In a regional district, a number of local governments join together as partners so that they can benefit from economies of scale and eliminate duplication of effort on a region wide perspective. The provincial government established the "regional district" concept of local government in 1966, recognizing that some problems transcended municipal boundaries, and that there needed to be a partnership that could step forward and deal with local issues on a region-wide perspective. It recognized that water and sewer lines crossed municipal boundaries. Similarly, there was a need to provide health and solid waste disposal services on a regional level. To meet these needs thirty incorporated regional districts were established throughout British Columbia (Bish 1992).

Regional districts provide operational support and facilities to municipalities, and play an important coordinating role in service provision. While individual municipalities may have transportation plans or master sewerage plans as part of their official community plan (OCP), the regional district coordinates these systems and infrastructure regionally. Regional Districts also provide of an effective form of local government for the 15% of BC.'s residents who live in rural areas outside municipal boundaries.

Regional planning was abolished in 1981 with the *Municipal Amendment Act, Bill 9.* In 1996 the *Growth Strategies Amendment Act* (R.S.B.C 1996) was introduced to bring regional planning back in the province. This Act does not, however, give regions the same legal basis they had prior to 1981. Hagan Creek, is located in the Capital Regional District (CRD), that is composed of fourteen municipalities including Saanich, West Saanich and Victoria. Every three years, citizens elect municipal councilors for the twelve municipalities in the district, and each municipality then appoints one elected official to sit on the CRD Board. The CRD Board is made up of twenty-two directors. The directors serve for a one year period, those from the electoral areas are elected and serve for a three year term.

2.4.3 Role of Local Government

There tend to be two major schools of thought about the role of local government. The first suggests that local government should be the primary vehicle for democratic process whereby local citizens can make decisions about their communities, and learn to balance individual with collective interests (Bish 1992; Shepherd 1997; Papworth 1992). The second school of thought asserts that the role of municipal government is to be primarily responsible for the efficient delivery of local services and goods (Wolman 1996; Tindal and Tindal 1994). The practical outcome of this dichotomy is that the political role of local government is often subsumed by the importance of service delivery (Tindal 1995). Economies of scale perspective suggests that particular services are most efficiently provided by units of regional or central control because if the service is provided on a larger scale, it is cheaper to provide as recent reforms to municipal structures that have amalgamated to meet increased service demands and reduce costs.[32]

Local governments have the responsibility for administering water management and servicing. Over the last decade both federal and provincial government's have cut transfer payments, which is then passed onto the local governments who are being allocated more responsibility without a corresponding increase in authority or resources. As a result, local governments are looking at management alternatives including public-private partnerships. The introduction of the private sector in local water management has many citizens concerned.[33]

2.4.4 Urban Political Economy

Local government concern about costs can be attributed to a larger trend in global political economy. The globalization of trade is changing the role of cities. Arguably, cities are increasingly important economic actors on the global stage (Magnusson 1996).

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[32] The amalgamation of the Toronto into a megacity in 1997 is an example of this trend. See Macleans March 17, 1997. The economies of scale argument is complex and is simplified here. The economy of scale versus the quality of service provision is an issue of debate among critiques of this argument. Papworth and Tindal both present a strong argument against this utilitarian model that does not consider specific local conditions other than the criteria that fits into a cost/benefit analysis.

Similarly, the effects of globalization on overall government organization cannot be ignored. A diverse array of municipal government initiatives and actions are now subject to a complex web of international obligations and constraints that arise from commitments established by the federal government under international trade agreements (Shrybman 2001).

Capitalism is the pervasive organizing influence of the modern city (Chorney 1991). Urban institutions tend to be geared towards the achievement of economic growth and development. Economic development and indicators often activities in urban areas. For example, land is viewed as a commodity and its value determined by exchange values (Molotch 1974; Logan and Molotch 1987; Chorney 1991). Social and environmental costs are regularly considered externalities in planning and decision-making in both the private and public sectors (Skelton et al 1995). This model of governance perceives people as actors in the market and state, and it divorces people from place, from community. When citizens attempt to integrate other values and interests such as poverty, democracy, equality, justice, or culture into decision-making related to the livability of their community, they often feel frustrated. In the urban context, there is a need to examine the character and role of local government and its institutions, and their role in perpetuating this status quo. Our local government institutional structures is a place where we can exercise our political, economic and cultural beliefs and `rights'. We need a new approach to governance if an ecosystem-based approach is to work.

2.5 Towards New Urban Governance

In order to operationalize a paradigm shift, we need an alternative means to organizing relations in our capitalist, market dictated society. We need to consider how institutions and institutional arrangements need to be modified to achieve this goal. ESbM changes the traditional role of the economy in social organization. Currently, the market is the template for all social, political and cultural relations; in essence, it is the dominating

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[33] For extensive resources on the privatization of water see Council of Canadians web site at www.canadians.org.

feature of governance. Using ESbM as a basis for urban governance implies that in order to maintain healthy ecosystems (that arguably facilitates the creation of healthier communities), economic activities become subject to the natural limits set by ecosystem processes and structures. This new perspective is difficult to operationalize even if one can see philosophically how it reorientates our priorities.

Two important factors need to be considered if society wants to make such a paradigm shift: values, and the role of citizens. Shifting management priorities requires re-framing our view of nature to reflect an ethical reorientation away from utilitarianism to preserving ecosystem integrity (Grumbine 1994). This requires shifting our current perception of what society values about our urban areas, and what institutions promote and reflect in their day to day operations. Re-framing our view of nature introduces the public into the private because the market and the state are considered public spheres that operate in a value-free environment and values are considered a part of the private domain. ESbM is a political process as it:

> involves allocation decisions between different interests in society, and in practical terms, it will not occur without political concurrence. Such concurrence requires building a shared understanding of the importance of healthy ecosystems and how humans can benefit from the long-term economic and ecological sustainability that can derive from them (Yaffee 1996).

ESbM requires a new model of governance. A comparison of "traditional" governance and "new" governance illustrates the underlying assumptions of these governance paradigms.[34] The following brief comparison between "new and traditional" governance assumptions, examines the characteristics of culture, mobilization, communication and decision drivers. The culture of "traditional" governance includes the prevalence of an administrative culture that values and rewards compliance, conformity and

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[34] This comparison is modified from : Level III: Leadership in the Facilitation of Sustainable Community Initiatives
Ellsworth, J. and Jones-Walters, L. 1998. New York: New York. As presented in the paper Meeting the Modern Justice-Sustainability Challenge.

standardization. Emphasis is placed on staying within existing systems as defined by policies and procedures. Conversely, in a "new" governance model, a leadership culture that values and rewards innovation, diversity and risk-taking prevails. Emphasis is placed on changing the system and creating new paradigms, and reinventing policies and procedures as required (Ellsworth 2000).

The "traditional" model uses a single government program/agency to mobilize a segment of community members and resources around program priorities and objectives. Whereas in a "new" model the community members developing and pursue a common agenda capable of harnessing and focusing the resources of a diversity of programs and individuals. In the "traditional" model, communication is a one-way process where participants are passive information receptacles. The purpose of communication is to promote the perspective and interests of the proponent. In a "new" model, communication is a deliberative process with all participants perceived to be information sources and active information users with the purpose of integrating perspectives and generating common understanding. The decision drivers in a "new" model ensure that those who must live with the outcomes collaborate in decision-making. Expert knowledge is always used while citizens are free to accepts or reject expert advice. In the "traditional" governance model, decision are expert driven with experts enjoying direct access to and influence over decision-makers who make decision for those who must live with the outcomes. ESbM challenges sectoral specialization and the notion of expertise.[35] This comparison demonstrates the differences between key characteristics that drive the processes of current governance and what could be possible if we embraced a "new" model of governance.

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[35] Steven Yaffee, with his graduate students, completed an assessment of 77 ESbM projects in the US. He identified the following characteristics to be the five tasks which need to be addressed for successful implementation of ESbM: collaborative decision-making approaches; developing information and information networks; mobilize organizational change and innovations (3rd greatest obstacle to progress); educate and be educated; empower individuals. Yaffee 1996:725. Also see Fiorino 1990, he states that the technocratic orientation of bureaucratic decision making, "ignores the value dimension of policy analysis and disenfranchises the public who, in a democracy, ought to control that policy."

The governance characteristics discussed above incorporate principles of community driven, collaborative decision-making models of cooperative partnerships that are responsive and innovative to ESbM challenges. The following section contains prescriptions for facilitating ESbM urban governance. There are several reasons why it would be appropriate to apply an ecosystem-based model at the urban level. First, the scale of ecosystem boundaries that are implied in this discussion are relatively small (i.e. small watersheds). In a discussion of governance, such an ecosystem would not require collaboration between provinces, but partnership among local levels of government in collaboration with senior levels of government. Second, key barriers to implementing an ecosystem-based governance model include ill-fitting political boundaries, lack of cooperation among government agencies and lack of citizen input into decision-making. All of these barriers would be best overcome by addressing them on a local scale. Third, urban population growth is increasing the pressure for water supplies. Local governments are responsible for the servicing and distribution of water, citizens have to be vigilant about how local government decision-making impacts their water source. Senior levels of government have significant authority over the water management but local government operationalizes senior government policy on a local level. The local level is an important place for citizens to influence how these services are delivered.

Governance based on cooperation rather than competition is a key to overcoming the overlap of political and jurisdictional boundaries. Inter-jurisdictional and interagency cooperation requires sharing knowledge and information that affect a given ecosystem. An important part of cooperative decision-making is the integration of local knowledge and information. To implement successful ecosystem-based governance, communities should be involved in decision-making. Stephen Yaffee determined that a key component to successful implementation of ESbM was collaborative decision-making approaches that includes involving the public effectively through "multiparty, interdisciplinary and interagency process" (Yaffee 1996). In fact, Yaffee argues that ESbM can leave a "legacy of democratic process and a rebuilding of community-scale values that traditional agency procedures tend to erode.",

Giving local communities greater authority in decision-making requires that local input be an integral part of a participatory governance structure.[36] It has been proven many times over that when communities are involved in the identification of local problems, the decision-making process and implementation, there is stronger commitment and acceptance of decisions (IAP2 2000; Cowie 2000). The subsidiarity principal promotes the integration and important benefit of using local knowledge in decision-making. Local knowledge provides information and data based on observations of local residents about where they live and the changes they see happening to the ecosystems around them; they have an excellent knowledge base and many areas of expertise to impart to decision-makers. Involvement of local citizens can also reinforce the accountability of government to the local population.

To grant local communities more power and employ local knowledge in decision-making, devolution of authority to local governments would be required. Granting communities more decision-making authority needs to be coupled with the decentralization of administrations to give local government real authority rather than just devolved authority from the provincial government. An ESbM approach would fundamentally changes the way that local institutions function (Gray 1985). Senior levels of government would also need to change their relationship with local governments to include more collaborative and partnership initiatives. Under these conditions, the role of regional governments would change as well.[37]

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[36] This includes the use of local knowledge such as Traditional Ecological Knowledge. See Fikret Berkes, "Traditional Ecological Knowledge in Perspective" pp. 1-9 and Chief Robert Wavey, "International Workshop on Indigenous Knowledge and Community-based Resource Management: Keynote Address" pp.11-16 in Julian T. Inglis (ed.), *Traditional Ecological Knowledge.* (International Program on Traditional Ecological Knowledge, International Development Research Center 1993); Martha Johnson, "Research on Traditional Environmental Knowledge: Its Development and Its Role" pp. 1-16 in Martha Johnson (Ed.) *LORE: Capturing Traditional Ecological Knowledge* (DENE Cultural Institute and the International Development Research Center, 1992); For a treatment of the relationship between local control and preserving ecosystem integrity see: Judith and Christopher Plant (1992) *Putting Power in Its Place* (1992); Evelyn Pinkerton and Martin Weistein (1995)*"Fisheries That Work-Sustainability Through Community-Based Management"* .

[37] A reconfiguration of government structures is beyond the scope of this study, the point here is merely to point out changes that would be necessary.

The working assumption behind using an ecosystem-based paradigm is assuring that urban areas remain livable and that ecosystem goals are an integral aspect of governance. A mechanism for achieving strong local governance is *Local Agenda 21*, a planning model developed at the United Nations Earth Summit in 1992. Municipal planning that comprehensively integrates social, environmental and economic objectives and is driven by a long-term community vision is called Local Agenda 21 Planning (Brugmann 1992). *Local Agenda 21* identifies a need for local governments to undertake comprehensive planning in order to achieve sustainability. It noted that "[l]ocal authorities construct, operate and maintain economic, social and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations, and...as the level of government closest to the people, they play a vital role in educating, mobilizing and responding to the public to promote sustainable development." The report stated that local governments must therefore be charged with comprehensive sustainability planning (UNCED 1993). Over 1800 communities worldwide have undertaken *Local Agenda 21* or similar planning exercises (ICLEI 2001).

Some characteristics of local government challenge the implementation of ecosystem-based governance. The disjointed decision-making and planning models used in more complex bureaucracies are mirrored even at the local level. A common problem is that, policy tends to disintegrate into functionally defined policy communities, which determine their own priorities (Keiter 1995). It is difficult to relate land use and water planning to social, environmental and political priorities. If local governments do not consider ecosystem health as an integral factor in all land use and water management decisions, the status quo will not be truly challenged.

2.5.2 Why Watersheds?

Land use planning policy demonstrates the disintegrated nature of policy at the local level. Land, as a unit of analysis, is central to the values associated with "traditional" governance (characterized by bureaucratic design, utilitarianism, and capitalism). Land is a fixed unit; a spatial measure that can be easily given a monetary value and this has been

so for hundreds of years of western capitalism. Water is an integrating ecosystem entity in relation to land since watersheds are defined by water flows. Water pricing however, does not reflect true costs though there is a thrust to implement full cost water pricing as water scarcity increases and management complexity increases.[38]

Where and how will changes from traditional to new governance come about? A type of community-based organization that provides an interesting case study for developing ecosystem-based governance are stewardship organizations. Community-based stream stewardship provides a means to integrate water resource planning with municipal land use planning.

2.6 Activating "New" Governance: Community-based Stream Stewardship Organizations

Community, which comes from the Latin roots of common and unity, refers to all citizens (including government) who share a sense of place, purpose and communal values. Its spatial boundaries can be as small as a neighborhood, it can be a rural village, urban center, a watershed, an ecosystem, a coastal zone, or an aboriginal homeland (Ellsworth 2000). Stewardship as defined in the introduction, means to take care of and maintain the well being of the earth, to pass it on in a condition that will benefit our children's children. Stream stewardship is a practice that applies stewardship principles specifically to streams and watersheds so that they may be passed onto future generations. Local streams are often an important source of local water, habitat or a central feature in the landscape of communities, either as recreation areas or important cultural sites. Many communities have taken it upon themselves to ensure that their local streams are protected. These community stewards have many different roles and responsibilities.

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[38] There is growing debate world wide about the privatization of water and the fight against its commodification. Many declarations world wide have been written by concerned organizations and citizens. One example is the "Water - The right to life Manifesto" declared by the Global Committee for the Water Contract (headed by the former President of the Republic of Portugal). See www.canadians.org for more information. There were riots in Cochbamba in Bolivia when the government tried to implement a full cost recovery pricing system. Communication from the Commission to the Council, The European Parliament and the Economic and Social Committee (February 2000). "Pricing policies for enhancing the sustainability of water resources."

Concerned local groups and individuals pool skills and resources to provide hands-on environmental care and pressure decision-makers to act in environmentally responsible ways (Lerner 1992).

Community-based stream stewardship provides an interesting opportunity for effective, empowering, and local decision-making. Stewarding is about the relationship between humans and their natural environment. This concept of community stewardship challenges the norms of our dominant western capitalist belief that are based on competition, private property rights, and the rights of individuals. Community-based stewardship gives individuals an opportunity to work together, in cooperation for community interests.

2.6.1 Characteristics of Community-based Stream Stewardship Groups

There is no set formula for stewardship groups but they do have some consistent characteristics. Stewardship groups tend to be driven almost entirely by volunteers. The more stable projects do have some staff but volunteers are critical for the work. Community-based stream stewardship (CbSS) groups are generally inclusive, consensus-based with the general objective of achieving long-term sustainability on a watershed basis. Most groups work with government agencies in some capacity. The groups take many different forms - some play an advocacy role, some focus on education and others focus on "action", such as fieldwork and in-stream activities. These community groups are becoming the stewards of our watersheds.

The fact that stewardship groups are locally based has great significance to urban governance. Local stewardship initiatives allow people to work in their own community at a local level, provides an outlet for those, "looking for small improving steps on a path to a more "sustainable future". CbSS groups can give local stakeholders the opportunity to develop a detailed-shared analysis of key issues related to their community. CbSS can help foster a sense of community, based on a common interest that is fundamentally linked to people's sense of place. CbSS can educate people to understand the impact of

certain practices and activities on local ecosystems, especially practices that affect people's livelihoods, their recreational pursuits, or their use of the land. Community involvement is fundamental to any true participatory effort, that is what makes it different from government-led public consultation or auditing that are usually top-down, expert-driven, information-gathering activities. Stewardship groups serve as emotional, ethical and political training ground for grassroots organizations. These are often people who in turn demand comprehensive proactive community and watershed planning (Lerner 1992)

The contributions of community-based stream stewardship groups are numerous but they fall into two distinct categories, both equally important. One, the groups produce tangible results from their countless hours and years of work in stream monitoring, enhancement and rehabilitation, habitat protection, research, fundraising, and organizing community (Lerner 1992). A study in the US of 1200 watershed groups revealed that the areas that the groups actively work on include: animal manure, septic tanks, riparian areas, stream banks, urban runoff, grazing, channelization, irrigation and shoreline erosion (Griffin and Gannon 2000). Local groups and individuals pool their skills and resources to provide hands-on environmental care for our ecosystems. An extremely important aspect of their work is the contribution of public education.

Two, community-based stream stewardship groups have an important political role. It has been proven time and time again that people tend to have strong concern for and commitment to anything in which they invest time and effort (Cortner and Shannon 1993; Lerner 1992; Schueler 1996). Specifically in the area of stream restoration and enhancement, stewards develop a strong skill-set and a stronger sense of their relationship with the natural environment and essentially, develop a new consciousness about their local landscape.

2.6.2 Enacting Community-based Stream Stewardship Organizations and ESbM Urban Governance

Community involvement and participation in decision-making on a watershed basis raises two important considerations about governance. First, public participation in stream stewardship initiatives is making incremental changes in governance. Second, the changes in governance demonstrate a move towards "new" governance that integrates principles of ecosystem-based management. To scrutinize these two considerations it is necessary to juxtapose the themes of ESbM identified in section 2.1.3 (physical interdependence, institutional design, information-based considerations, and social issues/values) with the work that CbSS groups are doing. This comparison will demonstrate how community stream stewardship groups are changing governance.

In an ecosystem-based approach, social and political relations are embedded in an ecological context. Responding to this integrated physical interdependence requires the integration of information. Institutions need to be able to process information from both social sciences and natural sciences and ensure that they can work cooperatively with appropriate stakeholders (government and community). When dealing with an ecosystem unit such as a watershed there is often a lack of information and documentation of all ecosystem components of river systems (water, sediments and habitats). Often water is the only ecosystem component that has been adequately documented. As a result, communities and local residents are one of the best sources to document the trends, standards, thresholds, carrying capacities and tolerance limits in a local watershed. Also changes that have occurred in uses and biological resources within a territory are also best obtained from residents (Burton 1995). Sharing information among agencies lowers cost and promotes the partnership needed for implementing integrated management.

Many watershed groups work to collect data so that different government agencies and levels of government can collaborate to create a comprehensive database of the watershed. The Georgia Basin Ecosystem Initiative (GBEI) is currently pursing a data integration initiative to create a database for local government and community use. The CbSS groups are often the catalysts for local engineering departments to discuss issues with other relevant department such as the planning and parks departments. CbSS groups

focus on the interconnections of relationships such as how the conditions of fish habitat are affected by riparian conditions, water quality and flows that in turn may affect municipal water management, land use, and industrial activities.

Integrating information across agencies, mandates and jurisdictions raises concerns about the second theme, which is institutional design. Institutions need to promote collaborative decision-making to develop problem solving approaches that are interagency, multiparty, interdisciplinary and that share authority. CbSS creates new forums for decision-making through round tables or councils, which provide forums and approaches to watershed management problems that require interagency cooperation, education, public participation and organizational change. Stream stewardship round tables often bring together a mixture of people to sit at the same table, to work on a consensus basis.

CbSS groups promote problem solving and decision processes that promote advocacy and avoid adversity. CbSS can promote "strong democracy" as they get people into community forums to create face-to-face democracy that moves politics away from its adversarial norm where interest groups square off in conflict and lobbyists speak for their constituents (Wolman 1995 quoting Berry et al: 156). Similarly, most CbSS groups utilize a decision-making model that is based on cooperation instead of competition. Management and authority are less defined by agency tradition because these forums derive leadership from a cross section of the community and thus breaks with tradition in form, process and context. For example, FRAP-supported stewardship groups facilitated partnerships among government agencies at all levels, and among local businesses, industry, environmental groups and academic institutions.

Finally, social issues affect the implementation of ESbM. Using a governance framework that focuses on the interconnections between a complex set of variables, ecological and social, taking place over time and space, links people and their activities to nature (Yaffee 1996:725). CbSS organizations have a significant impact on changing social values. Through their regular activities, citizens involved in CbSS help create the political will

for the implementation for ESbM. Local volunteers drive CbSS groups. CbSS organizations educate those involved, and the community at large in a range of areas; from learning how the local ecosystems functions and are impacted by different human uses, to educating those involved about democratic processes.

> In the case of public involvement in the development of water resources policy, this suggests that, in the long term, the water authority and the various interests in the community will use the process to learn about each other's needs and their interdependence. This knowledge will, over time, through the public involvement process, lead to knowledgeable and purposeful interaction between the authority and the community and consequently better decisions (Iacofano 1990).

Many of the criticisms that the public and academics articulate about public process are addressed in stream stewardship forums. Citizens are not just consulted about issues that will impact their community and watershed; they can become active participants in the decisions that are being made. There is a definite need for process evaluation in the realm of public process and this is increasingly being addressed. Here in B.C we have heard the numerous criticisms of the Commission on Resources and the Environment (CORE) and more recently the Land Resource Management Plans (LRMP). CbSS groups are an evolving and new forum for public participation. CbSS forums can be an empowering experience in many ways. A CbSS can give residents the opportunity to leverage resources to work on a local basis, educate people and build social capital. CbSS provide citizens an opportunity to exercise values that are not solely based on economics considerations but rather brings people together to discuss, compromise and cooperate to ensure that local ecosystems remain healthy. These multi-stakeholder forums give communities the opportunity to define the public good for themselves. CbSS are a somewhat recent phenomenon and because of this they are not entrenched in the activities of local urban governments, though they are more so with each passing year in BC.

The profile and potential of CbSS identified here in this chapter are based on the best of the best, and clearly not all groups fit the characteristics mentioned above. Important variations such as leadership and resources have an impact on the ability for groups to

function in this "ideal" manner. These variations are dealt with extensively in Chapter 6. The intention of these arguments is not to imply that communities are waiting in the wings to participate on behalf of their common interest (Panitch 1993:11). Many CbSS do not have a strong advocacy component to their work. One reasons for this is the complexity of working in such an inter-jurisdictional basis. Groups who have strong leadership and participants who are familiar with the issues are often more successful in advocacy. Another reason for the absence of advocacy work is the restriction from obtaining Charity Status as organizations cannot engage in advocacy work. Many groups can not compromise their charity status because it is an important aspect of their funding base. Another shortcoming is that, "little attention has been given to the capacity of these consensus designs to produce ecologically appropriate policies and decisions" (Francis 1993:307).[39] For this reason, it is critical to evaluate collaborative processes used for watershed management (or other ecosystems) to try and determine if a model could be developed.

3.0 Summary

To ensure long term sustainability, it is important that maintaining the water quality and quantity of river, groundwater and wetlands, providing protection from flooding and erosion, ensuring the viability of fish and wildlife habitat, protecting valley and stream systems and headwaters are management priorities, and perhaps most importantly, that British Columbian residents have adequate and safe water supplies. Certainly the ban on Coho salmon fishing in BC in May 1998, and a potential ban on all salmon fishing is a blatant reminder that we must be careful with this precious resource that we all depend on - water. There is conflict over use and demand but most people agree that water quality and quantity issues are significant.

Watersheds are distinct ecosystem-units that provide an ecological template for urban governance. Watersheds are an appropriate ecosystem unit for urban areas, particularly in BC where the impact of urbanization on the fisheries resource is a great concern.

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[39] For an excellent and interesting evaluation of stakeholder involvement see, Cowie 2000.

Community-based stream stewardship presents a unique opportunity for citizens to participate in the process of decision-making about water and land use in their watershed. ESbM projects offer a new way of thinking and insights into appropriateness of policy tools (Yaffee 1996:725) They also are the, "catalysts of energy and enthusiasm on the ground rather than in government office buildings, ... their progress is the future of ecosystem management" (Yafee 1996). And, I argue, potentially the future of governance. CbSS groups are changing people's consciousness about community, public process, democratic decision-making and the environment.

A major impetus for this study was to investigate the argument that CbSS can indeed provide a mechanism for implementing ESbM urban governance. The remainder of this thesis further explores the arguments presented in this chapter. The following chapter discusses the research methodology employed in this thesis. Chapters 6 and 7 will both further explore, using case examples, how the design of CbSS vary. The theoretical premises discussed in this chapter inform the subsequent inquiry.

"Everyone shares responsibility for getting extraordinary things done through ordinary means." Author unknown

CHAPTER THREE: RESEARCH METHODS

3.0 Introduction

This chapter describes the research design of this thesis, which employs a multi-method approach including, a literature review, program evaluation, interviews and a case study. This chapter explains the rationale for the research methods used and then explains the research tools and why they were chosen. Next, there is a detailed description explaining how these methods were applied to this study. An explanation of how the results were analyzed concludes the chapter.

3.1 Rationale for Developing the Project

Despite the popularity of stream stewardship activities, little assessment has been done to inform these partnerships between local communities and various government agencies (Romaine 1996; Warriner et al 1996; Francis 1993). Yet it is important to examine the roles for local groups in reshaping institutions and decision-making processes.

Two high profile watershed management plans have existed in Canada since the early 1990s, the Fraser River Action Plan (FRAP) in British Columbia and the Grand River Strategy (GRS) in Ontario. No assessment has been done specifically on the stewardship aspect of the Fraser River Action Plan projects. The GRS, in Ontario utilized a public consultation model for its community input into the overall strategy. A study was completed on the public consultation process used in the Grand River Strategy (Warriner et al 1996). The results indicate that overall, though people share support for idea and principle of public consultation but this was coupled with considerable public cynicism regarding the way that formal opportunities for public participation actually happen in reality.

FRAP was a federally sponsored interagency partnership between Environment Canada and the Department of Fisheries and Oceans (DFO). The aims of the initiative were to achieve a cleaner, more productive Fraser River Basin and to develop a management

system that would preserve ecological integrity in the future (FRAP 1994). Another arm of the FRAP, the Fraser Basin Management Program attempted to improve coordination among four orders of government -- local, provincial, federal, First Nations, and also non-governmental stakeholders. FRAP supported local stewardship initiatives, although no comprehensive research has been undertaken to assess this model of public participation in relation to achieving ecosystem-based management in urban watersheds. In 1997, during the FRAP program, the Hagan Creek/KENNES project began.

The Hagan Creek project partners were in need of guidelines for developing the stewardship component of the project. This inspired the need for this research project.

3.1.2 Research Objectives

There are several objectives for this thesis. A central objective is to consider how an ecosystem-based management paradigm can respond to the need for a more cohesive approach to dealing with the degradation of urban areas. One way to do this is to examine the role of community based stream stewardship groups as a vehicle for applying ecosystem-based management to governance in urban areas. To complete such an assessment it is necessary to develop an evaluative framework for determining what characterizes a "successful" stewardship group and then use this framework to assess stream stewardship groups.[40] The final objective is to document the origins and operations of a case study, the Hagan Creek/KENNES Watershed project, and evaluate it using the same evaluative framework that was used to determine characteristics of stewardship success. To meet this objective, the research design for this thesis uses a multi-method approach.

3.2 Rationale for Multi-Method Approach

The multi-method approach in this thesis uses literature review, program evaluation, interviews, and a case study of Hagan Creek and to respond to the gap in research about community stream stewardship groups. These methods are qualitative.

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[40] Though "success" is a normative word, and a difficult term to define, it was chosen to deliberately avoid the "efficiency, effectiveness, equity," genre of evaluation criteria that are generally defined in terms of cost benefit.

> Qualitative research is multi-method in focus, involving an interpretive naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them (Denzin and Lincoln 1994:2).

A qualitative research methodology allows the researcher to seek diversity when pursuing information about "successful" stewardship initiatives. Researchers cannot reach absolute conclusions; rather they can only develop their own perspective based on the multiple perspectives of program participants (Denzin and Lincoln 1994). To understand the information, the researcher is influenced by personal experience, beliefs and thus the background of the researcher limits all research (Guba and Lincoln 1994). It is difficult to quantify what people believe to be critical to a successful stewardship project. Characteristics vary from community to community, and project to project. It is difficult to quantify because the measures being used are participant's opinions about. The approach taken in this thesis is not a positivist approach, which attempts to remove the researcher's bias. I acknowledge that my perspective is outlined in the conceptual framework developed in Chapter 2 and this perspective will serve to inform the analysis. This perspective is based on the principles of good governance, and how applying these principles to a community stewardship organization may have an impact on the ability for a stewardship group to engage "the public" and in turn, impact their relationship with local decision-makers.

First, a literature review was conducted in the areas of ecosystem-based management, public participation methods, and program evaluation. It was determined that to make recommendations to the Hagan Creek/KENNES Project, a survey of other stream stewardship was required to supplement the learning derived from the literature review about stream stewardship group design, functioning, and factors influencing success. Second, a program evaluation framework had to be developed to apply to the stream stewardship groups with the anticipated result being a better understanding of the characteristics of "successful" stream stewardship groups. This third phase involved the selection of four profile stream stewardship groups. Fourth, interviews were conducted

with participants involved in the profiled stewardship groups. Fifth the results, or "lessons learned" from the survey groups were used to aid the analysis and program evaluation of the case study of the Hagan Creek/KENNES Project and further interviews were conducted with Hagan Creek participants. The following sections explain the methods used.

3.2.1 Literature Review

A literature review in the areas of ecosystem-based management, governance, public participation methods, and program evaluation provide the foundation for this thesis. This literature review identified a research gap in the area of public participation and stream stewardship evaluation. The literature informed the theoretical foundations for this thesis and the design of the evaluation framework.

3.2.2 Program Evaluation

Evaluation is a systematic assessment of an organization, program or process to determine if it has met certain identified objectives i.e., specific impacts, overall rationale or cost effectiveness. By definition, evaluation is synonymous with feedback, and feedback is the return of information about a process or product. Program evaluation uses a set of standards to contribute to the improvement of a program or policy, and examine its effectiveness. "Program evaluation is major site of qualitative research…..[It] is the critical site where theory, method…action and policy all come together" (Denzin and Lincoln 1994).

Program evaluation literature identifies several key areas of evaluation, including: need, process, outcome and efficiency. The areas addressed in this thesis include process and outcomes. *Process evaluation* evaluates the way that a program is implemented and whether or not it is able to reach its target population. This type of evaluation focuses on understanding if a program is operating as it was intended, recognizing program strengths, and weaknesses (Patton 1987). *Outcome evaluations* can assess the achievements of projects and programs based on measures of success. Evaluation, like

many other types of research, attempt to describe and understand the relationship between variables, and to identify causal sequences between variables. The interpretation of these relationships is based on subjective judgment acknowledged to be inherent in this type of research.

Both formative and summative evaluation methods are used. Formative, or process-focused evaluations examine how a program activities and procedures are unfolding. Formative evaluation focuses on program design, program implementation and operational efficiency (Patton 1990). Formative evaluation is conducted while a program is ongoing and thus feeds back into the process or program. Summative or outcome evaluation, examine the results or impacts of a completed or established program or process. A challenge in outcome evaluation is identifying appropriate indicators of impact so that results can be measured. The evaluation conducted in this thesis is formative because evaluates the design of the stewardship groups. The evaluation focuses on understanding the relationship between process and outcomes, not exclusively outcomes. This evaluation also evaluates the processes that the groups have used, and attempts to apply these findings to the ongoing Hagan Creek Project.

The area of public participation evaluation reveals a dearth of research. Rosener (1981) who completed a general review of public involvement suggested some of the following answers for the deficiency of public participation evaluation:

1. "the participation concept is complex and value laden;
2. there are no widely held criteria for assessing success and failure;
3. there are no agreed upon evaluation methods; and,
4. there are few reliable measurement tools."

Though Rosener's research is twenty years old, his findings are still relevant. Public process is very complex to evaluate and many of the issues that Rosener suggests are considered "soft" measurables. There still are few agreed upon measurement tools or indicators for measuring community capacity (Dundee Study 2000). Syme and Sadler (1994) completed research on evaluation literature on public involvement in water resources and their research identified that very little comprehensive evaluation exists in

the area of public involvement in water resource management. Though these problems in evaluation exist, the evaluation can still answer important questions about stream stewardship groups.

3.2.2.1 Purpose of the Evaluation

Key questions identified below guided the development and design of this research project and informed the development of the evaluative framework. The questions also helped to shape the questionnaire that was used for participant interviews (Appendix A). As a researcher, I tried to elicit information and answers to these questions from the interviewees.

- What makes community-based stream stewardship groups successful and achieve established goals?
- What improves community participation in stream stewardship groups?
- What do groups identify as barriers to stewardship success?
- What is the significance of stream stewardship groups to urban governance? Is the presence of stream stewardship organizations changing urban decision-making, and does it facilitate the incorporation of ecosystem-based goals?

3.2.2.2 Evaluation Components and Framework

The first step in the evaluation process is to determine the components for the evaluative framework. Several fields of academic literature informed the development of the evaluation components for this study. The components were derived from process and program evaluation theory, public participation theory, watershed management and good governance literature (Rosener 1981; Sewell and Phillips 1979). Components developed out of discussion with stewardship group participants and thus were flexible and evolved as necessary, depending on the information that respondents provided. The components selected were identified in the literature as important factors for "successful" public participation, partnerships and stewardship groups. The components were put into the format of an evaluative framework (Table 1).

The evaluation of the stewardship groups (this term includes all types of stream stewardship initiatives as some take the form of Councils, round tables, etc.) has two parts. Part I of the evaluation is the *program description and process characteristics*. This part of the evaluation provides background information such as: the sociopolitical

and economic context; leadership, budget, size, and time frame. Procedural issues such as main project activities, staffing, administrative arrangements and decision- making procedures are also addressed in this section (Syme and Sadler 1994). The characteristics evaluated in Part I are as follows: process design, decision-making, representation, terms of reference, resources, and political support.

In Part II of the evaluation, *outcome characteristics* are examined. These outcome characteristics refer to impacts or changes that have resulted from the project either directly or indirectly. The evaluation components used are education, attitude change, structures, empowerment and substantive impacts. All of the evaluation components and criteria in Part I and II of the evaluation are weighted equally in the interpretation of results. Each component was then evaluated based on a series of sub-questions and these components are discussed in detail in Chapter Six.

Table 1 -Evaluative Framework

Framework for the Evaluation of Stream Stewardship Groups

I Program Description and Characteristics

1) Process Design
   a) Does the process framework include aspects of both planning and action?
   b) Who is responsible for process design and management?
   c) What is the nature of process (E.g. open/closed; inclusive/exclusive; fair/arbitrary)?
   d) Is the process accessible to all participants (language used)?
2) Decision-Making
   a) What is the breadth of stewardship group's decision-making authority? (eg. Internally? Externally? With regard to watershed management?)
   b) What kind of decision-making process is utilized? (e.g. Shared? Consensus?)
   c) Does it serve in an advisory capacity to government or NGOs?
   d) Where does leadership come from?
3) Representation
   a) Range of Interests
   i) Who was involved in public process?
   ii) Who determined who could be involved?
   iii) Were all relevant interests involved?
4) Terms of Reference
   a) How clear are terms?
   b) Are there clear and measurable goals?
   c) What is the scope of project?
5) Resources:
   a) What resources were available?
      i) financial
      ii) information:
         i) What is the access to data, contacts/experts, sources of information?
         ii) Was data: relevant, available, accurate, technical?
   b) What were the sources of resources? (government/private sector)
6) Political Support
   a) Was there general support for project in principle or active involvement from:
      i) interest groups represented/participants?
      ii) different levels of government?
      iii) community at large?

II Outcome Criteria

1) Education:
   a) What is the extent that interested parties, community at large, and relevant governmental authorities have developed an understanding and awareness of the need for stewardship group objectives (i.e. stream restoration and health, land management, planning)?
   b) What is the extent of visible behaviour modification of process participants and community as a whole as a result of project education efforts?
2) Attitude Change:
   a) What is the extent of process participants, community members, and relevant governmental authorities' commitment to the objective of the stewardship group?
   b) What is the extent of attitude change among community members about watershed health in their community?
3) Institutional Infrastructures:
   a) Have the appropriate structures (example planning bylaws, administrative arrangements) been put in place to allow substantive outcomes to be achieved?
4) Empowerment:

a) Are participants, community members, and governmental authorities using the tools/resources to achieve outcomes?
b) Do participants feel empowered through process?

5) Substantive Impacts:
a)What is the extent of measurable successes achieved in:
i) altering the pattern of environmental damaging development?
ii) stream health indicators are showing a positive change?
iii) planning decisions for future are changed?

3.2.3 Selection Process for Stream Stewardship Group Profiles

The purpose of profiling four stream stewardship groups is to develop a better understanding of what characterized successful stream stewardship groups. The purpose of using several comparable groups is to draw out some generalized rules or conclusions about successful stream stewardship (Glass, McGaw and Smith 1981). For each profiled group, the evaluation focus is on context, process and key design features of stewardship groups. The four groups were surveyed to access what factors stewardship participants felt made their stewardship and public involvement successful. The results of this survey would then help to inform the analysis of the case study, Hagan Creek.

The selection of the groups includes different types of community-based stream stewardship projects in British Columbia and one in Ontario. General criteria were used to select the cases. The first selection objective was to include cases from Canada's two major watershed management initiatives, the FRAP in BC and the GRS in southwestern Ontario. There is general agreement that the FRAP initiative is innovative and representative of the "watershed movement" in British Columbia (Romaine 1996). Similarly, the GRS is another watershed initiative that addresses the issue of achieving sustainability in urban watersheds. FRAP projects have similar goals to the Hagan Creek Project, namely, developing a community-based initiative to establish overall ecosystem health on a watershed basis. For this reason, three demonstration stewardship groups from FRAP were selected for this study. Groups that had characteristics similar to Hagan Creek were selected. Characteristics included: rural/urban watershed facing problems associated with farming activities and watersheds facing land development pressure. The last selection objective was to find groups where the stewardship and public involvement

varied and used different formats. The groups reflect a representative range of stewardship groups, while providing some comparative perspective.

3.3.2 Profile Stewardship Groups

A primary assessment was completed of all eight FRAP demonstration projects and three chosen according the objectives described above.

The cases chosen include:

1. Baker Creek Enhancement Society- Quesnel, BC

Baker Creek was chosen because it is located in a small urban area that includes rural land uses. The Baker Creek Enhancement Society was a pilot project for the FRAP .

2. Langley Environmental Partners (LEPS) (Salmon River)- Langley, BC

Langley has similar biophysical characteristics to the Hagan Creek watershed. The watershed is a mixture of rural and urban land uses and experiences similar problems associated with agricultural land use near streams. Langley is also an area subject to development pressures as is the Hagan Creek watershed. LEPS has a very different organizational design and is an interesting contrast to the other cases. LEPS was a FRAP pilot project.

3. Salmon Arm Watershed Project- Salmon, Arm, BC.

The Salmon Arm Roundtable was a FRAP pilot project for the use of an ecosystem approach to a stream restoration and stewardship initiative. It is touted as the best example in the province of a community-based ecosystem approach to watershed management.

4. Laurel Creek- Waterloo, ON

Though Laurel Creek is located in an urban center, it provides a valuable, out of province initiative to assess. Similar to the Hagan Creek watershed, development poses a threat to the integrity of this watershed. This project utilized a municipally driven public consultation model that is different from the other cases.

3.2.4 Case Study

The case study of the Hagan Creek project was chosen because there was a need expressed by project instigators, to better understand how to proceed with the development of the stewardship component of the project. Case study analysis based on fieldwork provides a richly textured historical record on how the stream stewardship groups develop and meet their goals (Lincoln and Guba 1985;Yin 1985, 1994). By using the case of Hagan Creek, the evaluator can tell a story where a real life context is used to explore a situation where there is no clear outcome. This thesis uses a case study to "inquire into the phenomena, population or general condition" of successful stream stewardship groups (Stake 1994).

The original intent of this research project was to integrate the results directly into the Hagan Creek project. As a graduate student with the EcoResearch Chair of Environmental Law and Policy, I was to act as a participant observer with the Hagan Creek Project, with the goal of developing guidelines for the stewardship component of the project. To meet this goal, I decided to draw on the experiences of other stream stewardship groups, designed the evaluation framework and conducted the research that resulted in Chapter 6. Due to differing opinions and changing objectives for the Hagan Creek project, I became an observer rather a direct participant in the project and the results were not integrated into the development of a stewardship component of the project though I believe this research has informed the process in some capacity.

The profile stewardship groups inform the case study. The investigation on the case study took place between June 1997- January 1999. Documents about Hagan Creek were collected from the project's inception until January 1999. Any events that occurred on the Hagan Creek project after that date are not considered by this thesis. The specific details of the Hagan Creek case study selection are discussed in Chapter 4. As a researcher, I was involved in some of Hagan Creek's activities and collected information and observations from my personal involvement. Informal discussions throughout the

project between 1997-1999 with various participants of the project also contribute to background information about the project.

3.2.5 Interviews

The interview process developed out of the completed evaluation framework. An informal, semi-structured interview method was used for this thesis. Using this interview technique, the questions are usually open-ended and the evaluator seeks the respondents' facts, opinions and insights. This method of interviewing allows the respondents to expand on what they feel is salient to the discussion, and allows the researcher to probe their answers. Interviews were conducted with the profile stewardship participants and then later were conducted with participants from the Hagan Creek/KENNES project.

The objective of the interviews was to identify key components that contributed to the success (or lack of) of the community-based stewardship initiatives. The interview questions were developed after the evaluative criteria and an initial evaluative framework were established.[41] The focus of the first part of the interviews was to try to understand what happened in the project. The focus of the second part was to find out what worked and what did not and why? The questions were used to prompt conversation and to refocus discussion as needed. The respondents answered on the basis of their experience and opinions on how to make stream stewardship groups work effectively, and sometimes this required probing to clarify why they felt the way they did. A more technical and rigid approach to interviewing would not have allowed for the casual yet focused discussions with participants.

There are many ethical considerations to take into account when including people or "human subjects" as part of the research process. Careful consideration must be given to participant's wishes for confidentiality and comfort level with the interview process. Prior to conducting any interviews, the University of Victoria requires that students undergo an ethics review process. Once permission from the ethics review committee

was given, the interview process began. Prior to all interviews, the interviewees were read a letter of consent (Appendix B). The interviewee list is provided in Appendix C. Since some participants did not wish to be directly quoted, two different approaches were taken to accommodate this situation. In the profiles groups discussed in Chapter 6, quotations are only identified by group affiliation, not interviewee name. In the case study of Hagan Creek discussed in Chapter 7, the interviewees are identified using numbers (1-9). I realize that stripping participant context affects the analysis of the interview but in light of participant's confidentiality, I decided this was the most appropriate way to proceed. The only person clearly identifiable is the project coordinator, because historically, there has only been one coordinator and thus the role is clear.

The questions for interviews were developed in the spring of 1997. Three different sets of interviews were conducted. The initial set of interviews had to be conducted first in order to feed into the second phase of interviews that were done for the case study, Hagan Creek. The timing for the second and third set of interviews were a product of the timing of the researchers availability. During the summer of 1997, 20 people from the four profile groups identified in 3.3.2 were interviewed.[42] The telephone interviews were 60 to 90 minutes and with participant permission, interviews were audio taped and transcribed. The selection of people interviewed was "somewhat organic." Many of the initial interviewees had been identified in the community or literature as "key actors" in the given projects. An average of four people from each project were interviewed. In order to diversify the perspective of the interview pool, interviewees were sought from different backgrounds. The interviewees included: coordinator/staff/director of the group, volunteer members of the organization, a government participants (local, provincial, federal), staff from the larger watershed management programs i.e. FRAP, FBMB or GRS) and some one who was not supportive of the project or public initiative. In certain

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[41] See Appendix A to review the questionnaire

[42] The University of Victoria requires that students complete a research ethics review prior to engaging in research that involves human subjects. The ethics review committee approved the research proposal submitted for this thesis.

cases it was not possible to achieve this cross-section of interviewees, but attempts were made to achieve a balanced perspective. Determining who should be interviewed was an evolutionary process whereby interviewees identified others who could provide a useful perspective for the evaluation. The people interviewed were generally project or process coordinators, participants and government representatives.[43]

A second set of interviews was conducted in 1999 and the third set in 2000. The second and third set of interviews focused on participants of the Hagan Creek Project. A group face-to-face interview was conducted on January 22nd 1999 with 8 steering committee members, including the project coordinator. This was not intended to be a focus group, it was merely a way to facilitate an interview with busy committee members. An additional 6, one-on-one interviews were conducted with Hagan Creek project participants including staff, volunteers and the project coordinator. Since the researcher was not comfortable with the ability for all participants to speak freely in the presence of the project coordinator, a third set of interviews were conducted in the fall of 2000 and spring of 2001. One of these interviews was conducted in person. In total 32 people were interviewed. The interviews were approximately 60-90 minutes long. All requested interviews were granted except for a City Planner from Kitchener-Waterloo, ON, who did not respond to many requests (by phone and fax) for an interview. All interviewees were initially contacted by telephone, asked if they were interested in participating in the interviews and then a suitable interview time was established.

3.2.5.1 Interviews Analysis

Interview data and case documents were used to complete a qualitative evaluation of the information. Results gathered from open-ended interviews were prepared into verbatim transcripts. An analysis of the transcripts was then conducted and the verbatim transcripts were read carefully numerous times. The transcripts were analyzed to determine common and variable patterns that linked or explained the data (Patton 1990). The first step was to correlate the results with the evaluation framework and this required interview data for its correlation to the evaluation framework outlined in Table 1, and for answers to the

[43] See Appendix C for list of people interviewed.

questions identified in section 3.2.2.1. The transcripts were colour-coded according to sections of the evaluation framework. For example, the parts of the transcript that answered questions associated with process design were coloured pink, those that answered questions about representation were coloured green). The data was then broken down into 6 sections for Program Description and Characteristics and 5 sections for Outcome criteria.[44] This re-organized data was assessed for commonalties and patterns in wording, frequency and emphasis (ie. someone saying, "it is absolutely critical that x happen"). The 15 key words or phrases were then colour coded and listed in order of frequency of occurrence and emphasis (see Chapter 6). The interpretation of the data was completed manually.

3.2.6 Document Survey

In order to diversify qualitative data sources (interviews), several methods of additional data collection were employed. Secondary data supplemented the interview data. Using multiple sources of evidence and cross-referencing them to address validity can increase the reliability of information collected (Yin 1994). The first step in data collection was obtaining background information on when the groups started and why. Secondary data included documents produced by organizations involved in the cases listed above and discussed in detail in Chapter 6 and Chapter 8. Records include process documents, meeting minutes, educational materials, videos, official and technical reports, planning documents, media chronology, and public education materials (Krause 1996). Requests were made to groups for documentation that groups had about their organization. This data was self-selected by the groups. These documents were also supplemented by additional research (web sites and media) on each group and government documents. The documents collected were not exhaustive but provide a more complete picture than the interviews alone.

3.2.6.1 Document Survey Analysis

The data were collected and reviewed. An analysis of the information provided in the documents was completed along with the interview data using the same criteria for

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[44] Consult Table 1 for the specific components.

evaluation that are discussed in Section 3.2. All documents were used to verify interview data, and gain more insight into the cases being evaluated. The objective of this process was to study the variables and causal links between variables.

The collected data were organized for analysis. The information was sorted into two categories. The first category was process data, that included information on the group's organizational characteristics (process design, decision-making, terms of reference), background information on the project and community and participant characteristics. The second category was outcome data that was subdivided into the categories described in Table 3 such as education, attitude change and institutional infrastructure. Once the data were organized, summary sheets were prepared on each case. The summary sheets were used to search for patterns related to characteristics of success. Summary sheets were also used to cross-reference the data. The last stage was to take the results of the initial evaluation and apply them to the Hagan Creek/KENNES project. The results from the evaluation of the four case studies resulted in a list of lessons learned, those lessons learned were then used to inform the analysis of the Hagan Creek/KENNES project.

3.0 Community Benefits

It is anticipated that there will be several community benefits as a result of this research. One, the conclusions from this study, will contribute to the EcoResearch Chair's work regarding the significance of ecosystem-based management and community driven stream stewardship for overall urban ecosystem health. Two, many participants have expressed interest in the research findings. Each project, including Hagan Creek will receive a copy of Chapter 6, which includes most relevant information for community groups. Three, interest in the research results has been expressed by other organizations and individuals working on watershed management, including government agency representatives at DFO and Environment Canada. Four, the results of this research were presented at the 1998 Healing the Land Conference and published in conference proceedings (1999). Five, this research informed a paper presentation to the international Coastal Zone Management Conference, St. John's, NB in September 2001.

CHAPTER 4: HAGAN CREEK

4.0 Introduction

This chapter provides a detailed background of the case study Hagan Creek and, sets the context for the evaluation of Hagan Creek undertaken in Chapter 7. The information presented in the first half of the chapter is technical, to provide the reader with a picture of Hagan Creek watershed. The topics profiled in this chapter include: land use, geology and soils, climate, water quality and stream flows, riparian condition, and riparian and stream habitat. The second part of the chapter reviews the historical landscape and First Nations historical uses of the watershed. The chapter concludes with a reflection on why the Hagan Creek watershed is significant locally, provincially and nationally.

4.1 The study area - Hagan Creek Watershed

Hagan Creek is located on Southern Vancouver Island, on the west side of the Saanich Peninsula (Figure 1) in British Columbia, Canada.[45] The Hagan Creek Watershed is approximately 30 minutes north of Victoria and drains into the Saanich Inlet on its east side. The drainage basin is approximately 1769 hectares, making it one of the largest on the peninsula. The creeks of this watershed once sustained a healthy population of cutthroat trout and possibly coho salmon.

The Hagan Creek watershed drains a 17 square km area from the heights of Mount Newton to the Saanich Inlet. The watershed is comprised of 12 separate sub-basins. Each sub-basins varies in size, topography, geology, geomorphology, land use, soil and vegetation. The diversity of the landscape makes it both unique and complex as far as the hydrological system is concerned.

The two main tributaries in the watershed are Hagan and Graham Creek (Figure 2 & 3). Hagan Creek's north arm, originates on the slopes of Mount Newton at an elevation of approximately 150 metres and drains down to the flats west of George May Park at an elevation of 20m (Newbury 1995). Here the creek joins with Graham Creek and flows

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[45] This profile of Hagan Creek is based on several reports: Dayton and Knight 1996 , Katrina Bennett 2000, and the Central Saanich Resource Atlas, 1998.

west to Farley Creek, Peel Brooke, Bannock Brook, Ronald Brook and Stephen's Creek. Graham Creek (south arm) originates approximately 8.5 km from Hagan Bight at an elevation of about 125 metres, between West Saanich and Old West Saanich Road and flows through Maber Flats at an elevation of 50m (Newbury 1993). These headwaters are located just south of Old West Saanich Rd. and are known locally as Latinin swamp. Graham Creek flows north for approximately 5 km from this point, emptying into Hagan Creek at the northeast section of the watershed. The Creek flows primarily through agricultural lands (Dayton and Knight 1994). It has been reconstructed between Kersey Road and Centennial Park. Hagan Creek then drains through the Mt. Newton Valley and into the Saanich Inlet at Hagan Bight, down a steep rock face just north of Brentwood Bay. Hagan Creek and Graham Creek are first order streams at the headwaters, and come together to form a second order stream at the confluence to the mouth of Hagan Creek at Hagan Bight. Sections of the Graham and Hagan Creek have been channelized, including a stretch between Kersy Road and Wallace Drive. This area was moved approximately 250 metres west of its former position to drain a previously existing lake at Maber Flats. The creek between Peel Brook and Ronald Brook has also been reconstructed into a straight channel. This brief description provides an overview of the physical aspects of the Hagan Creek watershed, and more detailed information can be obtained from the Dayton and Knight study (1994).

4.2 Current Land Use

The land use data is taken from the District of Central Saanich Resources Atlas.[46]

Table 2 - Allotment of watershed area into land use categories

LAND USE PRACTICE	AREA (ha)	% of TOTAL
Agriculture	924 ha	53%
Recreational and Natural Protected Areas	186 ha	10.5 %
Residential - Single Family	78 ha	4.4%
Rural Residential	27 ha	1.5%
Estate Residential[47]	278 ha	15.7%
Industrial/Commercial	110 ha	7.2%
Extraction of Sand, Gravel and Clay	31 ha	0.64%
Transportation, Communications and Utilities	2 ha	0.1%
First Nations Reserves	133 ha	8.7%
TOTAL	1769	

Source: District of Central Saanich Resources Atlas, 2000

4.2.1 Agriculture

Approximately 60% of the Hagan Creek watershed lies within the Agricultural Land Reserve (ALR). The land area zoned for agricultural lands is 924 ha. Approximately two-thirds of ALR land is active farmland. The dominant agricultural activity is hay production although there are also pasture and cash crops including corn and carrots. Other agricultural activities in the watershed include: greenhouses, poultry, tree farms, daffodil and hobby farms (Dayton and Knight 1994; pers comm with Bob Maxwell 2001).

There is a portion of flat agricultural land within the basin. This area, known as Maber Flats, has an elevation of 50 meters. The area used to be a wetland, seasonal lake and was a key area for Aboriginal medicinal plant harvesting. Currently this land is used for agriculture with vegetable and forage fields. This former wetland played an important role

[46] The land use data is approximate since several sources were used, none of which have been collected exclusively on a watershed basis. GIS data that has been done for the Hagan Creek Project has not been mapped out to show the watershed land use exclusively.

in the water cycle, regulating both the flow and quality of water between higher and lower elevations in the watershed. Maber Flats floods annually due to natural drainage conditions, extensive habitat alterations, insufficient downstream capacity in the channelized portions of the creek, and seasonal rainfall.[48]

4.2.2 Urban Residence

In Central Saanich, 27 ha or 1.8% of the total watershed is zoned residential, 278 ha or 18.0% of the total watershed is zoned Estate Residential. Large and medium r esidential areas are situated in the east and west central areas of the watershed. The northwest area is zoned estate residential. There are approximately 3000 residents in the watershed.

4.2.3 Industry

The Commercial/Industrial lands in the watershed comprise 110 ha or 7.2% of the total watershed. The industrial area is located in the southeastern area of the watershed. One of the largest industrial activities in the area is a gravel pit that has been in operation since the 1930s. This activity also affects seasonal flows as gravel moraines typically provide cold water retention for the summer months. The area has other commercial buildings and includes activities such as a meat packaging factory, a recycling depot, and a Pepsi bottling plant.

4.2.4. Recreation

There are several natural parks in the watershed. Approximately 187 ha or 10.6 % of the total watershed is zoned for parks. These recreational areas include walking trails for wildlife viewing. John Dean Park, a Class A provincial park, includes one of the few remaining stands of cedar and mature growth riparian corridors. Centennial Park is a municipal park of approximately 40 hectares, within the District of Central Saanich. Centennial Park is used by local residents and sport organizations primarily for recreational purposes. Centennial Park has an extensive trail system used by foot traffic,

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[47] Estate Residential zoning has four different classifications that range from 0.8 hectares to 4 hectares.

[48] See Cutthroat Trout Habitat Enhancement Proposal at Hagan Creek website, which has extensive details on Graham Creek.

horses and bicycles. The park is immediately upstream of the high quality stream and riparian habitat.

4.2.5 Impervious Surfaces

Impervious surfaces block the natural flow of water into the soil and instead water flows over the surface where it drains to storm drains, ditches, streams and marine waters. Impervious surfaces include rooftops and paved surfaces especially roads, parking lots and transportation networks. Imperviousness is used as measure of urban sprawl.[49] Impervious surfaces collect surface water and often that water is piped through storm drain networks before being directed into the creek system, which feeds oil, fertilizers and other particulates into streams. The water collected may also run off into grassy swales and recharge the aquifer. Impervious surfaces also prevent rainfall from getting into the ground where it can recharge groundwater and aquifers, which in turn serves as the water supplies for streams. The adverse effects of imperviousness are documented to occur when the level of impermeable surfaces within a watershed exceeds approximately 10 % (Derry and Karlson 2001). The Effective Impervious Area (EIA) is a measure of the total area connected to the drainage network where water does not infiltrate into the soil. The EIA for the Hagan Creek watershed is 11% (Bennet 2000).[50] This high rate of impervious surface can cause irreversible changes in hydrology and channel morphology, thereby causing significant loss of fish habitat, flooding and erosion (FRAP 1998).

4.3 Geology and Soils/Surficial Sediments

The Hagan Creek Watershed is underlain with sediments that are primarily Capilano Sediments that are made up of sand, gravel and silt clay. These deposits are the result of glacial retreat afterthe last Ice Age. Generally the soils in the area of Hagan Creek have high silt, clay and organic contents, though the thickness of the marine clay deposit is

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[49] Urban sprawl refers to poorly planned development that includes low-density residential suburbs, commercial centers and business parks, all separated from one another by roads and parking lots. It results in heavy reliance on roads and automobiles, and the destruction of the very features that induce many to live in rural developments. From the *BC Sprawl Report 2001.*

[50] A detailed study on the imperviousness of the watershed was conducted in 2000. For a detailed analysis see, Bennett, Katrina. 2000. Unpublished. Hagan Creek/KENNES Watershed Project - *Impervious study of the Hagan Creek Watershed, Vancouver Island, BC, GIS Analysis.*

highly variable. The clays create conditions that cause ponding of water and sediment detention within the Maber Flats area of the basin (Bennet 2000). This low permeability in the watershed causes excess water retention and seasonal flooding. The materials on the floor of the stream bed include areas of dense silt, deposits of sand and regions of gravel bars and cobbles.

The Saanichton gravels, created 18, 000 years ago during the last major glaciation (Fraser) provided the materials that formed aquifers (Dayton and Knight 1994). Significant amounts of these gravel deposits have been excavated for their economic value (Bannister et al. 1996). The two aquifers that underlay the Hagan Creek watershed are the Hagan Creek Aquifer in the north, and the Keating Aquifer in the south (Bennet 2000). The majority of the basin is underlain by igneous (diorite) bedrock. Exposed bedrock is found in the headwaters of Hagan Creek and in the early upper portions of the Graham Creek.

Several factors influence the disruption of soil structure and stability in the creek. Poor bank stability is the result of stream channelization (moving the stream from its original path of flow), compaction, erosion, loss of riparian cover, increased flow energies and flooding. The banks have been modified in many areas along the creek and bank erosion is observable in most areas.

4.4 Climate

According to the Biogeoclimactic Ecosystem Classification (BEC) system, used by the Ministry of Forests, Hagan Creek lies in a Dry Douglas Fir Zone. The climate in the watershed is a modified Mediterranean climate, characterized by moderate temperatures and pronounced wet and dry seasons. Temperatures are mild, with average winter temperatures above freezing and summer temperatures generally below 30 degrees Celsius. Average yearly temperatures range between 9 degrees and 11 degrees Celsius. The riparian zone around the creek experience a frost-free growing season of approximately 250 days per year.

The region is located in the rain shadow of the Olympic Mountains and surrounded by mountains and hills of Vancouver Island Mountains, Coastal Mountains and the Malahat Ridge. Polar maritime air and southwesterly flows dominate the area. Rainfall patterns are seasonal with wet winters caused by the Alaskan Low of the Aleutian Chain and dry summers are caused by Alaskan low moving north and the movement of the Hawaii high on a semi-permanent basis. Ninety-six percent of the rain falls as precipitation. Typically, 750 to 850 millimetres of precipitation occur per year, with about two-thirds falling between October and March due to the occurrence of frontal storms during this time. The annual mean rainfall is 850 mm (Dayton and Knight, 1994).

4.5 WATER QUALITY

The Water Management Division of MELP has established specific objectives for water quality on the basis particular variables. The variables (discussed below) include dissolved nitrates, turbidity, dissolved oxygen, and water temperature. Water quality objectives are safe conditions or levels of contaminates that protect the most sensitive water use of a specific body of water (MELP 1996). These water quality objectives are watershed specific standards determined from scientific literature and set according to the land use and water use of a watershed. Water quality in the Hagen Creek is considered poor to fair (MELP 1996).[51] This designation means that most of the uses of the creek are protected, but some are threatened or impaired (MELP 1999). Designated water uses of Hagan Creek through water licencing include: the protection of aquatic life and wildlife, drinking water, livestock watering, and primary-contact recreation (swimming) (MELP 1999, BC MELP Water Management Branch).

Water quality problems in Hagan Creek are measured using the following variables: fecal coliform, ammonia and nitrates, dissolved oxygen, suspended solids and turbidity (MELP 1999). The are many possible causes of poor water but agricultural land use is a common cause for high reading in all of the aforementioned variables. Examples of agricultural practices resulting in contamination of ground and surface water from agricultural waste and runoff include: inadequate manure storage, uncovered manure piles during the rainy

season, poor manure spreading practices, wood-waste use and discharges from silage, feedlots and milk parlours (Brown and Drever 1999). Other factors that contribute to poor water quality include gravel mining which has been implicated in elevating loads of suspended solids and fine sediments (FISS 2001). Another cause of poor water quality is storm water runoff, particularly from Keating Industrial Park. Stormwater contaminants in Graham Creek generally occur in spikes during rainfall events. Contaminants include oils, grease, metals, sediments, and unspecified hydrocarbons.

The Hagan Creek Project staff has monitored water quality since 1998. Staff measured fecal coliform, ammonia and nitrates, dissolved oxygen, suspended solids and turbidity, and water temperature on a weekly basis. The testing was done at 7 sites throughout the watershed. The following section discusses the elements used to measure water quality and readings for the Hagan Creek Watershed.

4.5.1 Fecal Coliforms

Fecal coliforms are intestinal bacteria found in humans, cattle, and other organisms. The sources of fecal coliforms in streams include sewage discharges and manure runoff. The effects of fecal coliforms are mainly problematic for humans and livestock since these microbes are associated with gastro-intestinal disorders. Humans can be exposed to the disease-causing organisms by swimming in contaminated water. Similarly, livestock can be exposed to disease by drinking contaminated water.

Bacteriological analysis of fecal coliforms in the creek's main channels are generally below 500 FC/100mls, however monitoring done at road side ditches draining into the creek have been recorded as high 40, 000 FC/100mls. Health regulation standards for swimming require readings below above 200 FC/100mls (Bennett 2000).

4.5.2 Ammonia and Nitrate

Ammonia and Nitrate are naturally occurring nitrogenous compounds. Their anthropogenic sources include sewage discharges, septic systems, and agricultural runoff.

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[51] For the details of water quality standards see MELP regulations at www.

Deleterious effects occur when the concentrations are high enough to become toxic to fish or when the input of these nutrients lowers the level of dissolved oxygen. For ammonia, toxicity varies and increases as water temperature and pH increase (Nener and Wernick 1997).

The extent of nutrient loading in Hagan and Graham Creeks is poorly understood. Similarly, the nature of pollutants that trigger elevated pH and conductivity in Graham Creek is not clear. The watershed ammonia levels vary between 0.02 and 0.3 mg/L, a range well below the MELP objective of 1.23 mg/L . This is below the MELP objective for average levels which is 0.02.

4.5.3 Suspended Sediments/Solids and Turbidity

All streams carry sediment as a natural consequence of water flowing over erodable material. Anthropogenic activities that remove riparian zones or change the patterns of runoff and hydrology within a watershed disrupt the natural regimes of sediment transport in a stream. Activities that cause such disruptions may include: agricultural practices such as soil loss from cultivated fields, and riparian removal, urban development, gravel removal, logging or mining (Nener and Wernick 1997). Effluent from gravel mining operations has been linked to raised sediments loads (Drever and Brown 1999).

Altered sediment regimes have deleterious effects on both water quality and fish habitat. The settling of fine suspended sediments can degrade fish spawning and aquatic insect habitat and impair the survival of fish eggs. High suspended solids can also reduce light penetration and primary production of aquatic flora (Nener and Wernick 1997).

Turbidity is a measure of the cloudiness caused by sediment, microscopic organisms and pollutants. The suspended particles restrict light penetration in the water, that in turn affects algae growth and oxygen production. At high enough levels, sediment can clog gills or other breathing structures of fish and benthic invertebrates. Turbidity varies naturally and normally increases during and after rainstorms or rapid snow melt.

As in many rural/urban streams, elevated turbidity levels occur during heavy flows and rain events. Winder turbitity levels in Hagan Creek have been recorded as high as 500 NTUs.

4.5.4 Dissolved Oxygen (DO)

Dissolved Oxygen refers to the amount of gaseous oxygen dissolved in an aqueous solution. Oxygen enters water by diffusion from the surrounding air, by aeration (rapid movement of water), and as a product of photosynthesis. The amount of DO in water fluctuates according to a host of factors, including physical factors like water temperature and pH, as well as biological factors such as photosynthetic rates of stream algae and flora.

Adequate DO is required for good water quality as oxygen is vital for aquatic biota, from spawning and rearing salmonids to benthic stream fauna. The lower the DO levels, the more stress that aquatic life is put under. Many land use practices adversely affect DO levels. For example, clearing of riparian cover elevates stream temperatures, which decreases the natural capacity of water to hold dissolved oxygen. Agricultural runoff and manure inputs increase biological oxygen demand in streams, thereby lowering DO levels.

Dissolved oxygen levels at Hagan Creek varies significantly in Hagan Creek. Some monitoring sites, above Centennial Park have recorded DO to be as low as 1 mg/L in summer and areas below Centennial Park that have well vegetated riparian areas have recorded DO at 8 or 9 mg/L during summer. MELP's acceptable minimum in summer is 6 mg/L and winter 11 mg/L.

Traces of lead, copper and zinc have also been found in Hagan Creek. The watershed discharges these contaminants into the Saanich Inlet.

4.5.5 Water Temperature

Water temperature is an important aspect of water quality. Changes in the range and mean of water temperature in a stream affect fish and other aquatic through a variety of mechanisms. Altered temperature regimes affect fish populations. Effects include changes in the metabolism and behaviour of fish. Other effects resulting from temperature increases decreases in the amount of dissolved oxygen, which creates anoxic conditions for fish. The preferred range of temperatures for fish is between 8-15 degrees Celsius.

Land use practices related to agriculture and urbanization that remove riparian vegetation have significant impacts on the temperature regime of streams. Removal of streamside vegetation can increase both the daily fluctuation in water temperature and the average water temperature (Drever and Brown 1999). In addition, effluent discharges from industrial activities can have measurable effects on the water temperature immediately downstream. These effects are especially significant to small streams, as the low flows of small streams have little capacity to buffer the increased irradiation of the sun or the impacts of industrial effluents.

The channelized sections of Hagan Creek with little riparian cover can experience temperatures as high as 20 degrees Celsius. The temperature has also been recorded as low as 11 degrees (summer temperature) in areas where there is well-vegetated cover.

4.6 STREAM FLOW

4.6.1 Hydrology

Stream flow is a problem in this watershed. The problem is characterized by low base flows in the summer and flooding in heavy rainfall periods, especially during winter. A hydrograph is a graphic depiction of water flow data. The mean annual hydrograph for Hagan Creek and Graham Creek, closely follows the annual precipitation cycle (Figures 2 and 3).[52] Maximum monthly discharges typically occur during November, December

[52] The mean annual hydrograph is an average of the quantity of flow recorded on day for all the recorded years.

and January. Flows decline through the spring and summer and monthly discharges reach a minimum in July, August and September.

MELP's Water Allocation Plan uses 10% of Mean Annual Discharge (MAD) as a general tool to estimate the minimum stream flow required to sustain fish and wildlife values. Values below 10% are considered insufficient to sustain fisheries values within the creek. The monitoring of water flows have been monitored by Woodwyn Farm staff since 1996. In the Hagan Creek Watershed, 10% MAD value is 19.4 liters/s. Graham Creek consistently has a daily discharge lower than 19.4/liters/s. Probable causes of low summer flows in Hagan Creek include a reduction in groundwater recharge caused by increased impervious surfaces, and licensed/non-licensed extraction for irrigation (Cabrera 1994). Other probable causes include the loss of Maber Flats wetland and the gravel pits, both of which retained water for slow release. The two probable causes mentioned above are significant management issues and are quite contentious. There is also an inadequate water supply in the summer to meet the competing demands of agriculture and fish.

Figure 2 - Graham Creek Monthly Discharge

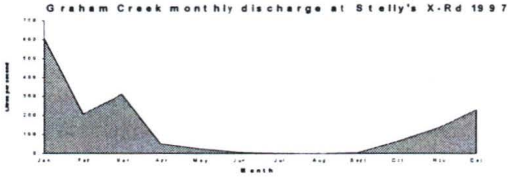
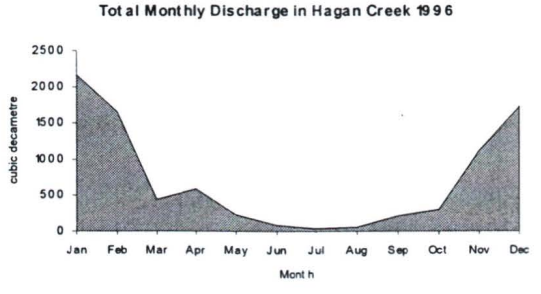


Figure 3 - Total Monthly Discharge for Hagan Creek



Source: Cabrera 1994

4.6.2 Water Extraction

Surface water in BC is owned by the Crown and permission to use surface water is regulated by the *Water Act*. One must obtain a license or approval to divert or use water. The *BC Water Act* gives all owners equal access to water on a first come, first served basis. Water licensing is transferable upon the sale of land. The priority date of a license is an important condition of the license because when one or more license is issued on the same stream, the license with the earlier priority has first right to the availability of supply. The licence with the second earliest priority has the second right, and so on. Hagan Creek supports extractive agricultural licenses.

Table 3 - Hagan Creek Watershed Licence Summary

Irrigation	**19**	**302, 851,259 l/yr**	**53.34**
Storage	**7**	**149, 140 6, 053 l/yr**	**26.27**
Domestic	**4**	**5, 808, 580 l/yr**	**1.02**
Frost Protection	**1**	**110, 000, 000 l/yr**	**19.37**
TOTALS	**33**	**567, 805, 892**	**100**

Source: BC Water Licence Data Base, 2000

Accurate records do not exist of the amount of water actually used by licencees and it is highly probable that not all licence holders make use of their allocated water and that others withdraw more that the licence-alloted volume.

Extractions are greatest during the summer months for irrigation and watering and this is the time when creek flows are lowest. These extractions that occur during the low flow period can have a detrimental impact on fish habitat and creek health.

4.7.2.2 Groundwater Extraction

The province of BC has no groundwater legislation. As a result, there are no records of groundwater extractions within the Hagan Creek Watershed. Groundwater reservoirs

recharge during the fall and winter, when precipitation is greatest and discharge during the summer when flows into the reservoirs are small. Quantifying groundwater use is important because extractions from these unconfined aquifers, or water table, may reduce stream flows. Groundwater is extracted for many uses in the watershed including residential, irrigation and industrial wells. Consequently, a significant portion of the annual discharge from this groundwater reservoir is consumed.

The Hagan Watershed is influenced by two local aquifers: the Hagan Creek Aquifer and Keating Aquifer. These aquifers provide a source of cold ground water for the creek, thus playing an important role in decreasing creek temperatures and increasing oxygen levels. However, unrestricted extraction of groundwater by numerous wells in the area has influenced aquifer levels, and both of the Hagan Watershed aquifers are shallow. Unregulated well withdrawls and decreased percolation and runoff from impervious surfaces, has resulted in limited aquifer recharge and significant drops in creek water levels (Bannister et al., 1996).

4.8 Riparian Conditions

Functional riparian zones are vital for stream health. Forested riparian areas provide shade, sources of coarse and fine woody debris, bank stabilization, soil stability, nutrient inputs and many other important ecological functions. There is no common agreement on appropriate riparian width but they are generally considered between 15-30m away from the stream. Along Hagan and Graham Creeks, the riparian corridors vary from narrow *0.5* meters to 5 meters. Land use in riparian areas includes agriculture, recreation and private home owner uses. Approximately 40% of the riparian area has very poor or no cover, with field or crops grown to with 0.5 meters of the stream bank (pers comm MacDuffee 2000). Another 40% of riparian land is marginal, with hedgerows on one side of the stream bank and degraded riparian understory (pers comm MacDuffee 2000). Only 20% of riparian land is good, with full canopy cover.

As the creek runs through Centennial Park, one side of the stream is bordered by private property and the other riparian area is part of the park. The riparian area along Centennial

Park has an extensive trail system close to the creek, and the heavy use of the trail has resulted in a high impact on the understory in many areas, exposing tree roots, compacting and eroding soils and inhibiting plant growth under trees and along the banks of the creek. The riparian conditions in the park vary. In some areas erosion is occurring at a rapid rate and the stream banks are caving in as a result of heavy water flows from several winter storm events. The riparian area on the private property side of the creek has a generally healthier understory.

4.8.1 Riparian Species Composition

The riparian conditions along the creek vary considerably. Approximately 25% of the creek system has been reconstructed into ditches with virtually no bank vegetation, complexity or cover (Maber Flats and in the Mt. Newton Valley). Some sections of riparian area is vegetated with a young to mature mix of maple and alder trees with some cedar (Central Saanich Resource Atlas 1998). Parts of the riparian area along Graham Creek, downstream from Centennial Park, have a well developed riparian zone with a mature canopy consisting of second growth mixed conifers (Douglas fir, grand fir, cedar, western hemlock) and deciduous (big leaf maple, red alder, black cottonwood). Some of the Douglas Firs are approximately 400-700 years old. Approximately 1500 metres of the riparian area has a forest understory and creek banks composed of sword fern, blackberry, Oregon grape, snowberry, Indian plum, and salal. Approximately 120 metres of the creek's riparian area has a full canopy and well-vegetated banks. In areas where the stream has been channelized (southern border of Centennial Park), the creek is experiencing bank erosion, which makes it difficult for vegetation to establish. The steep banks, lack of rooted vegetation and loose soils greatly increase the erosion potential.

4.8.2 Species Compositions (Habitat)

Hagan Creek supports a resident population of coastal cutthroat trout. The abundance of Cutthroat Trout has shown a significant decrease over the last decade (CTHEP). Electro shocking and trapping between 1997-1999 indicate the presence of trout in Hagan mainstem and the lower reaches of Graham Creek, though anecdotal reports suggest that this present population is smaller in numbers, size and range than historic levels. As recently as fifty years ago, 16" Cutthroat trout were caught in Hagan Creek as far

upstream as the Keating-West Saanich area. The anadromous fish are not able to pass up the mouth of Hagan Creek due to natural and man-made barriers upstream of Hagan Bight. There is currently approximately 1 600m of adequate to good cutthroat trout habitat in the entire Graham/Hagan Creek system. Observations suggests that habitat loss, decreased water quality conditions and low food supply are limiting factors for fish. Other species present include Three-spine sticklebacks and pumpkinseed sunfish.

An extensive bird population is found in the hedgerows and forested areas in the watershed. A total of 27 bird species and several of these species are blue-listed (vulnerable or sensitive) by the BC Wildlife Branch are present in the watershed. Blue-listed birds include the barn-owl and trumpeter swan. When Maber Flats flood during the winter in some years it provides habitat for up to 3000 ducks (Dayton and Knight 1994).[53]

Development of the watershed and associated land uses has resulted in a range of habitat problems. Specific habitat problems include a loss of vegetated riparian corridors, loss of natural stream characteristics, and disruption of natural drainage patterns and features.

4.9 History of Hagan Creek

4.9.1 Chronology

A 1859 survey map shows what is most likely the "natural" condition of the Hagan Creek watershed.[54] The area was characterized by Douglas Fir forests, rocky outcroppings and a Gary Oak meadow and arbutus trees (BC Archives). Only a small percentage of the original tree stands remain. A large wetland known as Maber Flats was located in the watershed. Two large wetlands slowed water flows through the area. Wetlands also serve as recharge areas, storing waters and slowing releasing it over the dry summer months. This function greatly moderates the water flows in the winter and spring. Wetlands are important areas of habitat and thus would have been used as habitat by resident and migratory birds, aquatic organisms and wildlife. The population of cutthroat

[53] This is an overview of habitat in the watershed and deals mostly with flora and fauna directly related to creek habitat. For a more detailed information, please consult the Dayton and Knight report.

trout was found further south of the wetland and reached sizes of up to 16" (MacDuffee 1999).

A survey of a 1920 Map shows significant changes to the creek and its habitat (Maps BC). Much of the land had been cleared for farming and the drained wetland was replaced with a ditch system. These ditches were designed to move water away from fields, roads and buildings. The ditches were built straight and deep with no obstacles such as rocks or boulders. Rocks and boulders are an important feature to streams because they tumble and mix water providing oxygen and blocking or slowing water flow. This ditch design resulted in low oxygen levels in the creek and greater erosion.

The channelized section of Hagan Creek is the same today and extends from Keating X-road to Centennial Park. Evidence of the channeling can be seen through Centennial Park where the stream bed was deepened and piled along the banks of the creek. Changes in water flows and habitat began in the late 1920s. The land use had changed considerably and much of the forest cover had been cleared to accommodate farming. The removal of forest cover and the draining of the wetland changed water flows and water storage in the watershed. Anecdotal information suggests that the creek still had a healthy trout population of varying sizes until 1940s.

A 1996 aerial photograph shows how much again, the landscape of the watershed has changed since 1920. Most notably, there is extensive impervious surfaces (building and pavement) in the watershed. Estimates suggest that 11% of the watershed is now covered with impervious surfaces (Bennett 2000). If this figure increases it could result in irreparable decline in creek health.

4.9.2 First Nations

Several First Nations have lived in this region for hundreds of years. First Nations reserves make-up 133 ha of the watershed which is 8.7% of the total land area (Dayton and Knight 1994). The South Saanich Reserve, inhabitated by the Tsarlip Nation, the

[54] To view the maps see http://www.ios.bc.ca/ios/osap/hagancreek/Then-and-Now.htm

has the most extensive area of mature dense forest in the watershed. The bottom of Hagan Creek runs from West Saanich Road between farmland and Tsartlip Reserve lands and then cascades down a ten meter waterfall into Hagan Bight. Hagan Creek drains west into the Saanich Inlet just north of the Tsarlip village.

The original name of Saanich was WSANEC, as declared by the Saanich people. Hagan Creek watershed is home to the WASNEC, or "The rising up people". Today the Tsarlip Nation has reserve territory in the watershed. The First Nations share the same customs and speak the same language - SENCOTEN (Elliot 1990).

Characteristics of the watershed valued highly within First Nations communities have been lost and degraded. Among these are privacy and solitude, access to important cultural sites, integrity of sacred grave sites, and the opportunity for sustenance and cultural use of natural resources. First Nations consulted for the Saanich Inlet study expressed that they felt their traditional culture has been lost as a result of land alienation and disappearing natural resources. Further losses to the First Nations culture are not acceptable. The culture and land of First Nations peoples are inextricably bound together. The resources of the Inlet that fed the Saanich people for thousands of years was an important part of both spiritual and cultural traditions. Their knowledge of seasonal cycles, tides and water movement was also essential for successful hunting and fishing and survival. This knowledge, along with the history of KENNES, has been passed down through generations.

Historically, the Saanich people had both permanent homes and temporary camps. Their longhouses were often near shore so that fishing and other sea food collecting could continue throughout the winter season. During the winter season the Saanich people lived on both sides of the Saanich Peninsula, as far south as Mount Douglas and Goldstream (Paul 1995). The Saanich people gathered food, fished and hunted extensively during the summer in a territory which includes the San Juan and Gulf Islands and as far north as Comox on Vancouver Island. Maber Flats (wetland area) was used for

everything from duck hunting to providing weaving materials and medicinal plants. When the wetland was drained in the late 1800s/early 1900s the Tsarlip elder David Elliot Sr. recalls his mother saying, "This place will be no more good to us" (Elliot 1990).

Some of the place names in SENCOTEN reflect the significance of the Creek to in their lives. Some examples include: KENNES meaning "whale" referring to the mouth of Hagan Creek; KEXIMINEN meaning "place of consumptive plant" for Hagan Bight and TITECEN, the spiritually significant name for Hagen Beach (Elliot 1990). This watershed is clearly a place of great importance to the Saanich people both spiritually and in the preservation of their heritage. They have witnessed the drastic changes to the Hagan Creek watershed. The Saanich people can not longer fish or collect shellfish as they traditionally had, as Saanich Inlet is contaminated. This results in heavy loss for First Nations whose traditional fishing and hunting rights are guaranteed under the Douglas Treaties. It is clear that further loss of marine species in the Inlet is not acceptable to First Nations.

4.9.3 Economic Snapshot

The economic development and settlement of the Hagan Creek watershed has transformed the ecology of the watershed. Population growth and accompanying economic pressure has caused the rapid depletion of natural resources and the decimation of fish stocks.

Agriculture is a major economic driving force in the watershed. Approximately 60 % of the watershed is in the Agricultural Land Reserve (ALR). The uses of agricultural land includes a dairy operation, three or four beef raising operations, and commercial greenhouses. Crops grown include forage (hay), potatoes, corn, strawberries, carrots and root vegetables, and a seed nursery. This accounts for a significant portion of the total agricultural land on Vancouver Island.

The industrial park (Keating Crossroad) is the location of many approximately twenty businesses (pers comm Bob Maxwell 2001). The commercial use ranges from bricks and

block sales, auto part sales, tractor repair garage, lathe manufacturing and a fitness center to a car wrecking lot, boat and outboard motor retailer, and several computer stores. Another very significant business is the Butler Brothers gravel pit. This business is an important and historically dominant economic actor in the community. This company is mining an important aquifer of the watershed. The company is interested in paving over their current pit once it is vacant (pers comm Bob Maxwell 2001). The company intends to apply to change the zoning from extractive commercial to business commercial. They have been not been invited to be a part of the Hagan Creek stewardship initiative. Another important business in the watershed is the Brentwood Lakes Golf course, located near Maber Flats.

Other interest groups with economic interests include: the Saanich Peninsula Agricultural Committee and the South Vancouver Island Grape Growers Association.

4.10 Other Institutions and actors

The residents of the watershed, are arguably the most important actors. There are approximately 50-60 riparian landowners in Central Sannich. Riparian landowners along the tributaries number approximately 20 in North Saanich and 200 in Saanich. The agricultural composition of the watershed gives it a relatively high number of farmers. There are a half dozen large farms of over one hundred acres and many smaller hobby farms.

Community groups that are active on watershed issues include the Saanich Inlet Protection Society (SIPS) who promote awareness and protection of the Inlet and the water courses that drain into the Inlet. The group is located in Brentwood Bay. The SIPS is an active partner with the Hagan Creek project and has worked on planning and execution of activities. It has supported many of Hagan Creek's grant applications, as the Hagan Creek Project does not have a charitable society number.

The Environmental Advisory Committee (EAC) for Central Saanich Municipal Council support the Hagan Creek Stewardship initiative. The EAC supported the Resource Atlas

Project. The Municipality of Central Saanich Resource Altas Project completed an inventory of watershed land use, categorized the kinds of vegetation grown, classification trade information, surfical aquifers, potential for different crops, geological information and much more. It has between 30-40 maps of Central Saanich . This was completed with a partnership between MELP and Saanich Council. One of the committee members, has worked with the Hagan Creek project on resource co-ordination, mapping and overall support and approval of the project.

Both the Central Saanich Rate payers and the Hundred Year Vision Coalition, two community associations, have contributed to the Hagan Creek Project by developing Greenway and educational materials. The Hundred Year Vision Coalition teamed up with the Hagan Creek Project on an application that raised money for signage along the stream bank, and a grant to help the Hundred Year Vision Committee publish a book on the watershed.

Academic Institutions involved in the watershed include the University of Victoria and Camosun College. Government agencies that are working in the watershed include DFO, MELP, DOE and Fisheries Renewal.

4.11 Why is Hagan Creek significant?

In many ways, Hagan Creek is typical of many urban watersheds that are experiencing growth pressure. Residents in this watershed use water for agriculture, residential use, recreation, industry, and waste disposal. The fragmented development that has occurred creates diverse demands on the area's limited resources with no integrated planning schema that incorporates hydrological and ecological considerations into land-use plans and development. This omission of ecological considerations in planning results in long term ecological, economic and social decline.

Water is a limited resource in the Hagan Creek Watershed. The demands on water for agricultural and domestic use are pushing the resource to its limit during the summer

season. The problems of inadequate supply and degraded water quality are shared by many other urban watersheds worldwide.

Establishing a long-term watershed plan is required to sustain the agricultural economy in the watershed, to preserve fish habitat, prevent the deterioration of coastal areas and finally to preserve the historical value of the Creek for the community and First Nations.

On a local level, the Hagan Creek watershed lies within the several municipal boundaries, approximately 89% is in the municipality of Central Saanich, 7% in the District of North Saanich, and 4% in the District of Saanich. Local competition between different uses, particularly among agricultural, industrial and gravel pit uses makes water an important issues to many stakeholders. Highly valued characteristics of Saanich Inlet, including aesthetic, cultural, spiritual and environmental attributes, have been degraded or diminished. The very characteristics that make Saanich Inlet such a highly valued place attract the human use and development that threaten the maintenance of its aesthetic appeal, cultural and spiritual significance, and environmental quality. An open house held in the community after the release of the Saanich Inlet Study demonstrated that residents believed that their enjoyment of the Inlet has reduced over time. They were particularly distressed over reductions in the scenic beauty of the area resulting from increased development. They noted a reduction in the peace and solitude of the area related to increased noise and use of the area and other changes perceived by participants were loss of fishing opportunities, loss of plant and animal life, and a decrease in water quality.

The 1996 Saanich Inlet study, completed by the Ministry of Environment, Lands and Parks (MELP) identifies many concerns about the ecological health of the Inlet.[55] The Inlet is a significant ecosystem that has important ecological, economic, historical qualities. The Inlet supports salmon and herring spawning areas, eelgrass, shellfish beds, and some of the greatest soft-bodied invertebrate diversity in the province. Cumulative

[55] All of the information here is based on the Saanich Inlet Study, Technical Version 1996.

impacts on the Inlet have also resulted in dramatic reductions to the abundance and quality of many marine species such as salmon, herring, lingcod and rockfish . The poor health of the Inlet has resulted in the closure of twelve of the fifteen shellfish beds due to fecal contamination, and a substantial loss in fish stocks (Saanich Inlet Study 1996). Recreational fishing efforts, as well as the catch of coho and chinook, has declined consistently since the 1980s the Chinook catch in the Inlet has dropped from 15 000-25 000 in the early 1980s to less than 200 fish in 1994. Herring did not spawn in the Inlet since 1972 but returned in 2000 (Saanich Inlet Study 1996; Pers comm with Misty MacDuffee 2000). Conclusions drawn in the report indicate that the environmental problems in the Saanich Inlet are a direct result of land uses in the surrounding watershed.

The Saanich Inlet is one of many important coastal areas that are threatened by poor water and land management in BC. Fish habitat is a particular concern in BC, particularly in areas which are experiencing rapid urban growth (FRAP 1998; Rosneau and Angelo 2001). Over the last five years, the provincial government has begun to support some integrated watershed planning initiatives. MELP, MMA A, MAFF provincial ministries have identified the need to develop integrated management schemes for water and land use plans. The province has worked in partnership with the federal government on two comprehensive watershed planning and management initiatives, the FRAP and the Georgia Basin Ecosystem Initiative (GBEI). The Hagan Creek/KENNES project is part of the trend of creating new grassroots watershed stewardship groups. There are over 60 groups in the Vancouver lower mainland and twenty on Southern Vancouver Island. This increase is stewardship groups can be linked to a growing public perception that government is neither capable, nor willing to address watershed conservation concerns (Romaine 1996).

The Hagan Creek watershed is still a predominantly rural area with a rich history. It is a residential community on the urban fringe and can serve as an model for of collaborative ecosystem-based planning. Currently most municipalities do not have the information or the capacity to implement an integrated water and land management plan. Planning on an

ecosystem basis in Hagan Creek watershed offers an opportunity for the involved municipalities to plan together and develop a regional vision for this important watershed. The Hagan Creek watershed is significant to the local community, for many reasons including water supply, habitat and recreational use. The watershed is also significant to the health of nearby coastal areas since it drains into the Saanich Inlet.

Hagan Creek/KENNES Project was chosen as a case study because it has the potential to offer valuable lessons about watershed planning and management on a local, regional, provincial scale. Many large scale watershed management initiatives such as FRAP are difficult to implement, oversee and evaluate because of the scale of the project. The complexity involved in the number of subwatersheds in these larger plans often impedes comprehensive understanding and assessment (Schueler 1996). In contrast, the Hagan Creek Watershed, 1 700 ha, makes it an excellent candidate for success, and an appealing model for other jurisdictions especially as it integrates a diversity of considerations, but at a small scale. This watershed is subject to many demands: agricultural, domestic use, recreational use and fish habitat. To fulfill this diversity of uses, both water quality and quantity needs must be assured. The following chapter will examine the jurisdictional considerations and legal framework relevant to the small scale of the Hagan Creek watershed.

CHAPTER 5: JURISDICTIONAL CONTEXT

5.1 Introduction

An ecosystem-based approach to governance creates many jurisdictional challenges. Our system of laws reflect institutional structures that separate human society from the natural ecosystems that sustain them and thus pose substantial challenges to an ecosystem approach. The relationship among ecosystem components is intricate, as is the relationship between government agencies and their jurisdiction. Assessing jurisdictional issues on a watershed basis involves the consideration of many levels of government: municipal, regional, provincial, federal and First Nations.

The discussion in Chapter Two addresses the difficulty of using an ecosystem-based approach for governance, specifically the discrepancy between the bureaucratic model and ecosystem-based management. Chapter Four outlines the details of the main study site of Hagan Creek. The objective of this chapter is to map out Hagan Creek's jurisdictional and legislative framework as it pertains to stream stewardship and watershed management. This chapter provides a review of federal, provincial and municipal legislation relevant to Hagan Creek. The review includes a summary and brief analysis of the positive and negative elements of legislation and how it applies to Hagan Creek. This chapter addresses jurisdictional considerations in three areas: water, fish and habitat, and land use. The overview provides a snapshot of where the Hagan Creek watershed sits in the legislative and jurisdictional framework. This snapshot illustrates the significant role of local government decision-making, which has a profound, direct impact on the local environment, particularly for urban streams. The chapter concludes with a perusal of the importance of local government in achieving sustainability.

5.1.1 Introduction to levels of Jurisdiction/Legislation

The cornerstone of legislative authority in Canada is the Canadian Constitution, which is the superior law in Canada. There is no specific head of power for environment in the *Constitution Act*, 1867. The laws that are relevant to this discussion are found in a variety of statutes enacted under various non-environmental heads of power under Section 91 and

92 of *Constitutional Act, 1867*. The Constitution divides authority between federal and provincial jurisdiction depending on the activity or issue in question.

Laws affecting water, fisheries and habitat and land use are passed by the federal and provincial governments. Local governments pass bylaws; they do not enact laws in the same sense as higher levels of government.[56] The powers of municipal governments and their jurisdiction are discussed in Chapter Two and will not be further discussed here. The municipalities of Central Sannich, North Saanich, Saanich and the Capital Regional District (CRD), derive their authority from the provinces through the *Local Government Act* (SBC 2000).[57]

Federal powers are set out in S. 91 and provincial powers in S. 92. Relevant heads of federal jurisdictions include: seacoast and inland fisheries, navigable waters and water resources on land owned by the federal crown. The Constitution does not directly allocate legislative authority over water to any level of government but it is associated with particular powers set out in Sections 91 and 92. Other shared federal-provincial responsibilities include inter-provincial water issues, agriculture, the environment, significant national water issues, fisheries (in B.C) and health. Overlapping constitutional jurisdiction means that managers must infer who is responsible for water management through an examination of water uses, such as fisheries (Pearce, Bertrand and McLaren 1985).

Relevant provincial powers include: property and civil rights, local and municipal institutions. Provincial jurisdiction also established through Section 109 of the *Constitution*, which gave the four original provinces property rights over, "all lands, mines, minerals and royalties" that belonged to them at the time of Confederation and

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[56] Bylaws are laws that are passed by local councils or regional boards, and are binding on the local government and property owners. Bylaws are formally passed in accordance with the procedures outlined in the *Local Government Act, SBC 2000.*

[57] This Act was formerly titled the *Municipal Act*. Bill 14 amended the *Municipal Act* in June, 2000 and renamed it the *Local Government Statutes Amendment Act.*

thereby vests the ownership of public land with the provincial government. Provincial authority to manage water resources comes from its constitutional right over the following jurisdictional heads of power: Section 92(5) Management and Sale of the Public Lands, section 92(10) Local Works and Undertakings, section 92(13) Property and Civil Rights and section 92(16), Generally all Matters of merely local or private nature.

Provinces possess many important rights as key property owners of land and water within the province. Provinces own water resources, which include both surface and groundwater and are responsible for: flow regulation; authorization of water use and development. They have the authority to legislate areas of water supply, pollution control, thermal and hydroelectric power development. Provinces have the broadest jurisdiction over environmental protection by virtue of the scope that has been accorded S. 92(13), which confers upon them the power to legislate in respect of property and civil rights. Municipalities only have those powers delegated to them by other levels of government.

5.1.2 Introduction to the Jurisdiction - Hagan Creek

Hagan Creek watershed is under the jurisdiction of the federal and provincial governments, the Capital Regional District of Victoria (CRD) and two municipalities. Eighty nine percent of the creek flows through the district of Central Saanich, seven percent through the district of North Saanich, and approximately four percent runs through the district of Saanich. Approximately 8.7 % of the Hagan Creek Watershed is on land owned by the Tsartlip Nation Band and its members. A holistic watershed plan in these overlapping jurisdictions requires cooperation.

Hagan Creek watershed is subject to the authority, ownership and management of many jurisdictions and agencies. At the federal level, the government of Canada is responsible for fisheries management, and environmental protection and enforcement through the Department of Fisheries and Oceans (DFO) and Environment Canada (DOE). The Province of BC has authority over water and land use management, fish and wildlife and agricultural practices through the Ministry of Agriculture, Food and Fisheries (MAFF);

Ministry of the Environment, Lands and Parks (MELP); and, Ministry of Municipal Affairs (MMA). Local government agencies include the Districts of Central Saanich, North Saanich and Saanich. The Tribal Councils of the Tsartlip Nation has jurisdiction over the land they own within the catchment basin or watershed area of Hagan Creek. In addition to the government, numerous private institutions and actors play important roles in any ecosystem-based planning process. Economic actors include developers, farmers, and private residents. Political actors include non-governmental organizations (NGOs) and community associations.

5.1.3 First Nations

First Nations are significant actors in any land use and water management issues in the Hagan Creek Watershed. A brief overview of considerations is discussed below.

The federal government creates Indian reserves under its constitutional responsibility for, "Indians and lands reserved for Indians" (*Constitution Act 1867,* s.30) The federal government holds title to all Indian reserve land and has a fiduciary duty to the First Nation for management of the reserve. Neither the government nor First Nations can alienate or dispose of the land except by following the extensive provisions of the *Indian Act,* which delineates how the band must surrender the reserve land (*Indian Act* RSC 1970). There is no formal legal relationship between local governments and First Nations in BC and this gap in the legal framework is significant in addressing land use issues. Many aboriginal communities in BC, are in the process of settling outstanding land claims. Aboriginal rights give aboriginal communities the right to hunt, fish, and carry on other traditional activities though they may not "own" the land. If any development activities affect traditional uses and rights, then provincial and local governments are required to consult with aboriginal communities. Water in the territories and on the reserves of First Nations, falls under federal jurisdiction.

Due to the constitutional division of power, neither local governments nor provinces have the jurisdiction/authority to carry out land use planning over reserve lands within municipal or regional district boundaries and likewise, aboriginal peoples have no formal

mechanism to participate in municipal land use decisions. First Nations can approach a local government or use the courts if there is potential infringement of aboriginal rights. Aboriginal peoples have no formal role that leads them to become involved in local government decisions, even those which take place on traditional lands. Similarly, local governments and communities are not consulted about the development of federal reserve lands, and in the future, treaty settlement lands (pers comm with Deborah Curran 1999). As a result, many First Nations are reluctant to participate in any decision-making processes, which, from their point of point of view, may jeopardize their position in treaty negotiations.

Cooperation between First Nations and local governments regarding land use and water management decision-making is particularly important given both the scope of aboriginal rights and broadening powers of local government over watercourses and fish. First Nations have special rights concerning certain water resources, and are exercising a greater range of regulatory control over water within their territories (Erikson 1996). Working together to ensure that planning goals are achieved would help facilitate consistency in land use and unify goals.

5.2. Water

The regulatory framework addresses water primarily as an economic resource, not as a complex natural ecosystem characterized by a dynamic hydrological cycle. A water ecosystem includes all water, whether flowing or standing, surface and ground, the processes, factors and natural cycles that affect it, and the organisms living in the water. Water management must balance competing users and uses. Many users vie for resource use including residents, recreationalists, agriculturists and industrialists. In order for watershed management to be effective, it must consider balanced socio-economic and biophysical factors (Dixon and Easter 1986; MELP 1993).

There are many scales that one can consider water ecosystems including the bioregion, watershed and subwatershed. A watershed is a river drainage basin, delimited by land elevation that naturally divides the landscape. Managing at a watershed or sub watershed

level tends to be an effective scale for successful ESbM (Schueler 1996; ICLEI 1999). To maintain ecological integrity, all elements of the hydrological cycle, such as groundwater recharge and stream flows, should be a part of the regulatory scheme.[58] Watersheds are dynamic ecological systems that provide a medium by which energy, elements, soil and pollutants travel (Nener et al 1996). The ecological relationship between water ecosystems and land is strong. Land use has a profound impact on water quality and quantity; thus to have comprehensive water management, the two cannot be separated.

Water on federal lands (e.g., National Parks), in the territories, and on the reserves of First Nations falls under federal jurisdiction. The federal government also has the responsibility for boundary and transboundary waters. Legislated powers over water resources are further complicated because provincial and federal governments delegate aspects of their constitutional authority over water laws to municipalities, First Nations, territorial governments, water boards, commissions and agencies (Erikson 1996). The complexity is exacerbated by the lack of integration and coordination within and between government agencies.

Water law includes a combination of common law principles and statutory regimes regulating various aspects of water resources. Common law established riparian rights that give landowners bordering a watercourse certain rights to use water that flows and percolates through their property. These landowners could protect the water quality and quantity of watercourses against interference by bringing a common law action (such as a nuisance or trespass) to remedy the source of interference (Erikson 1996). Most of these common law riparian use and diversion rights have been abolished and replaced by statutory licensing schemes. The regulatory framework governs many aspects of water resources (supply, discharge, pollution and groundwater) in a fractionalized, sectoral fashion. There are no unifying policy objectives regarding water (MELP 1993).

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[58] Groundwater reservoirs recharge during fall and winter months when precipitation is greatest, and discharge during the summer month when flows into the reservoirs are small.

Stewardship groups working at the local level find the complexity of this management system difficult to understand. Many laws directly affect community based watershed management efforts since the activities of many stewardship groups impact the water resource. Clarifying the relationship between the regulatory scheme and its impacts on streams requires a more detailed review of water-related legislation.

5.2.1 Direct Impacts on Quality and Quantity

The laws governing fresh water in the province of British Columbia are based on the assumption that water is a low-cost, abundant resource. All levels of legislation supports, in principle, the preservation of water quality and quantity. Water quality and quantity are regulated by different levels of government and by different agencies. The Crown owns all surface water in the province and the right to use surface water is obtained through a licencing or approval system, administered by MELP under *Water Act* (2;3). Water quality is regulated directly by Environment Canada under the federal *Fisheries Act* (s 36(3)), and by the BC *Health Act*.

The Hagan Creek watershed is subject to multiple demands. Many of the residents in the watershed are on a well system and not connected with municipal water system. Surface water and groundwater provide the water supply for agricultural water use. To fulfill these diverse needs, water quantity and quality needs must be ensured. Both water quality and quantity are impacted by a variety of land and water uses. In the case of Hagan Creek, demand from the stream and groundwater table is highest during the summer, when precipitation is at its lowest.

Several areas of concern regarding water quality include surface water quality, groundwater quality and coastal water quality. The many causes of degraded water quality are related to unsustainable land use and under-regulated industrial use (Shrybman 2000). Water quality is of great concern in British Columbia as we have the highest per capita incidence of waterborne disease of any province in Canada (Christensen 2001). Legislation such as the BC *Waste Management Act, BC Health Act* and BC Pollution Control Objectives for Municipal Effluents and Industrial Water Discharge Guidelines

provide some control for concentrations of substances discharged to ground and surface water sources.

Groundwater sources supply approximately 25% of total municipal water demand in Greater Vancouver and Victoria (Shrybman 2000). Groundwater extraction is not regulated and therefore, owners of high capacity wells have the legal authority to extract any quantity of well water. The pumping of these high capacity wells results in reduced flows in surface water channels near the well, yet these two water sources are not jointly managed. Combined, well drilling and surface water allocations can threaten the integrity of entire hydrological regimes. Groundwater contamination is a serious problem for some provincial groundwater sources. For example, drinking water guidelines for nitrate-nitrogen are not being met in certain aquifers because of agricultural contamination from manure and fertilizers.

The following review sets out the legislative framework into which these concerns fall.

5.2.3 Federal Legislation

Federal legislation regulating water does not have direct implications to Hagan Creek. *The Canada Water Act, (R.S.C.1985,c.C-11)* legislates water management and water quality management, with the goal of encouraging federal-provincial cooperation in the planning and implementation of projects (Pearce, Bertrand and McLaren 1985). The *Canada Oceans Act* (RSC 1997) states that marine ecosystems should be conserved for biological diversity and natural habitats. The legislation does not take a single species approach since the Act identifies the need for an ecosystem approach that recognizes the complex interactions between divergent species. The Act also incorporates a precautionary approach to coastal marine management.

The *Canadian Environmental Protection Act* (CEPA) (R.S.C 1999, C.33) is relevant to water resource management in two ways. Part VI of the act regulates ocean dumping from ships, air crafts, industrial flows or any other manmade structures. Second, Division

2 of the *Act* contains provisions for the discharge of regulated toxic substances into the environment, including releases into water (Erikson 1996).

The principles of the *Oceans Act* are relevant because they incorporate the precautionary approach to coastal marine management. Hagan Creek drains into the Saanich Inlet, which is a part of the Georgia Basin, thereby under federal jurisdiction since it has jurisdiction over oceans. The principles of the Federal Water Policy reflect appropriate values for water management but do not have concrete operational implications for Hagan Creek.

Federal Water Policy, developed in 1987 is the first of its kind in Canada. It was written, in consultation with government and the private sector, to address issues of the management of water resources and balancing water uses with the requirements of ecosystems. Overall objectives include: encouraging efficient and equitable freshwater use consistent with sustainable development principles; protecting and enhancing the quality of water resources and promoting the wise and efficient management and use of water. The policy also stresses the important role of Canadians in realizing the true value of water in their lives.

5.2.4 Provincial Legislation

5.2.4.1 Local Government Act, S.B.C 2000

The *Local Government Act* is the source of all council powers - in fact, their whole existence. The *Local Government Act's* greatest influence on water issues is through its powers over land use. As discussed, land use has a profound impact on water quality. If a municipality has environmental protection as a priority, there is no lack of tools at their disposal since the *Local Government Act* includes provisions that could be used for the protection of urban streams. The local governments, however, are under no obligation to use their authority to protect the environment.

The *Local Government Act* gives municipal council jurisdiction over aspects of water management. This jurisdiction is primarily over service and management of local water

supplies, storm water management, flood control and irrigation. The *Local Government Act* allows regional districts to create bylaws that establish water supply service to a local service area. The *Local Government Act* is discussed in greater detail in the land use section. 5.4.1.1. The *Local Government Act* is significant to this discussion because local governments are given authority to manage important water related issues and their control over storm and drain water management impacts water quality in the watershed.

5.2.4.2 *Water Act,* R.S.B.C 1996, c.483

The *Water Act* is an important tool for protecting urban streams as it is the chief provincial law controlling the use of fresh water. It has historically focused on regulating quantities of water, through a license system. It regulates the use, diversion, allocation and development of water resources in British Columbia. This *Act* enables the issuance of water licenses and defines how water rights are acquired and held. The Crown owns the water, subject to the licences or permits, approvals or given approval under the *Act*. Different procedures apply and there are different requirements under the *Water Act*, depending on whether a licence, permit or approval is required. The *Act* supersedes the common law of surface water. It abolishes riparian water use and diversion rights by implication. Under the current licensing system, water is allocated on a first come, first served basis except where water has been reserved or is subject to the existence of other rights such as the rights of First Nations (Percy 1988). The approval/license/permit system is administered by the Water Management Branch of MELP (MELP 1993).

The most important part of the *Water Act* for urban stream protection is the license allocation system. If you obtain a water license before someone else, your rights to use the water will prevail over the person who obtained a license at a later date. If two licenses are obtained on the same date, there is a priority list of uses established in the Act that governs priority. "Conservation" is listed as the ninth of ten priority uses. Although water licenses may not affect urban streams as much as other legal provisions, they are still an important legal tool that could be used more often to protect water resources, especially in areas of rapid urbanization where the water has not been allocated (Nolan 1996). There are provisions in the *Fish Protection Act* to protect streamflow for fish

habitat.[59] The Ministry can refuse to issue a licence or can attach conditions to a new water licence if the issuing licence would have a significant impact on other uses of water. For example, a "fish clause" could be specified in a water licence to protect fish and/or fish habitat (Nolan 1999).

Those activities that make changes "in and about the bed and banks of streams" but do not divert or use water (e.g., pipeline construction, dyking and bank protection) are regulated by an approval process. Any changes to stream bed or banks must be made in accordance with regulations and must exercise, "reasonable care to avoid damaging land, works, trees or other property therefore including land vegetation and natural environment within a stream." Section 7 of the *Water Act* allows the Comptroller of Water Rights or a regional water manager, or an engineer employed in the Ministry to whom the authority has been delegated, to issue an approval with necessary conditions for the short term use or diversion of water. This statute also regulates the destruction of stream and stream channel habitat (Erikson 1996).

BC is the only province in Canada without groundwater regulation. This legislation is needed to address problems such as contamination of aquifers from fertilizers and pesticides, excessive withdrawals from wells in coastal areas causing saltwater intrusion, and poor well construction practices. The Water Branch of the MELP solicited public input in 1993 on its proposals to regulate groundwater, but to date has not yet released draft legislation or regulations for further public review. Jurisdiction over groundwater is not well developed in the legal regulatory framework. Until a regulation regarding groundwater exists, nothing explicitly legislates that common law has been extinguished.[60] Since no regulation regarding groundwater exists in the *Water Act*, this

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[59] Streamflow Protection Licences sec.8 of the *Fish Protection Act* are discussed in section 5.3.2.2

[60] Common law is law that has evolved through the decision made by judges over hundreds of years, or that are made by elected government representatives or legislators. Regulations provide the precise details of when and how a law applies. Regulations are legally binding.

situation indicates that the common law rule granting a landowner proprietary rights to groundwater that percolates beneath the land in undefined channels is still in force.[61]

5.2.4.3 *Water Protection Act* , R.S.B.C., c.468

The stated purpose of this legislation is to foster the sustainable use of BC's water resource. The *Water Protection Act* (WPA) regulates the extraction of surface water, confirming the ownership of surface water in the Province except in so far as private rights have been established. Since the province owns the water in British Columbia, it has the proprietary right to ensure its protection and sustainable use. This Act also maintains existing bulk water removal rights, within clearly defined limits. A comprehensive registration system is established under the legislation to define and limit the quantity of bulk water being removed from British Columbia.

5.2.4.4 Waste Management Act, R.S.B.C. 1996 c.482

The *Waste Management Act* is the province's main anti-pollution law. This statute outlines the regulatory jurisdiction over persons who allow wastes to be introduced into the environment, including air, land and water. In practice, the *Waste Management Act* has limited applicability to non-point or widely distributed sources of pollution. Regulations under this act control the storage and location of discharges and quality of wastes discharged into the ground and groundwater. It also regulates the design and operation of treatment and disposal facilities, and the transportation of toxic and special substances.

The *Waste Management Act* prohibits emitting waste without a permit and includes a waste discharge fee. Permit requirements consider the ecological sensitivity of the environment receiving the waste, such as its ability to accommodate a given level of BOD (Biochemical Oxygen Demand). Each permittee must pay a fee based on the volume and toxicity of the material that is discharged. The theory is that the more it costs to pollute,

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[61] *Water Act*, R.S.B.C. 1996, c.483, s.3 States: The Lieutenant Governor in Council may, by regulation, fix a day on which this Act begins to apply to groundwater in a part of the British Columbia as the Lieutenant Governor designates.

the greater the incentive it is to reduce pollution. This fee, introduced by regulation in 1992, has had a positive impact to date (Nolan 1996).

The *Waste Management Act* requires regional governments to prepare liquid waste management plans to deal with sewage, storm water runoff, combined sewer overflows, industrial operations, agricultural runoff and other sources of pollution, all of which can harm urban streams and the marine environment. The delegation of authority to regional governments (Section 17 and 18) transfers a certain degree of control over water quality. The regional district is empowered pursuant to the *Waste Management Act* and the *Local Government Act*.

The Code of Agricultural Practice for Waste Management is part of the Agricultural Waste Control Regulation. The code sets out waste management guidelines for using, storing and managing agricultural waste to ensure it is handled in an environmentally sound manner. A permit for waste disposal is required for any operations that do not meet the code requirements. Local governments can also require site specific planning for agriculture land use adjacent to designated environmentally sensitive areas.

5.2.4.5 Health Act, R.S.B.C 1996

The *Health Act* provides the essential legal framework for water quality protection. It delegates significant authority to local governments through s. 37, which gives municipalities the ability to create local boards of health. The local councils can appoint medical health officers and this officer has the same power as a public health inspector. The *Health Act,* (s.42) regulates the potability of public water supplies and special minimum distances between wells and potential sources of contamination. A major responsibility of the health board is to prevent health hazards. Water quality issues would fall into this category of responsibilities.

Water Quality regulations under this *Act* include the Safe Drinking Water Regulation (s.142) and Sanitary regulations (s.42). The Safe Drinking Water Regulation requires that the be public notified of any health hazard related to water quality. The Sanitary

regulations require that the local health authority provide its district with a healthy water supply if it can be acquired at a "reasonable" cost and enables it to make "reasonable" rules for water supply and pricing (Shrybman 2000).

5.2.4.6 The Environmental Assessment Act, R.S.B.C 1996 c.119

The purpose of this Act is to assess the environmental impacts of any major project. Examples of projects that may require an assessment would be a major landfill, sewage treatment facility, or shopping mall development. The assessment must include cumulative socioeconomic effects of the proposed project. Public participation is required as part of the assessment process. The process permits alternatives to be weighed and then a board decides whether or not the project will be approved. This *Act* also applies to provincial government projects and other major projects that require a permit. The *Act* requires an impact assessment for groundwater diversion projects. It also requires water quality and quantity impact assessments for any major non-diversion project such as a new development. This legislation is reactive and tries to decrease negative impacts (Erikson 1996).

5.2.4.7 Critique

The legislation identified above has significant implications for managing water quality and adequate flows for the province, and for watersheds like Hagan Creek. The legislation is limiting in many respects, and some of those limitations and shortcomings are discussed below.

There are a number of problems with the *Water Act*. It is outdated and does not adequately address problems with the water licencing system that does adequately address in-stream conservation (M'Gonigle 2001).

Historically the *Water Act* was designed to regulate quantities of water, not quality of water and as a result there is limited ability to protect water quality against non-point sources of pollution. Other jurisdictions have laws designed to maintain minimum water quality standards. For example, the goal of the *US Clean Water Act* is to eventually make all waters under the *Act* both "swimmable" and "fishable." The provincial government

promised a complete overhaul of the Act in 1997 but has not yet acted on this promise (Nolan 1999).[62] Though the *Health Act* does cover water protection measures, it takes preventative measures for establishing a comprehensive framework that ensures safe drinking water. Such a legislative framework would make the connection between human health and ecological health in a comprehensive framework to protect water quality. Many causes of degraded water quality are environmental problems related to unsustainable land use practices, and under-regulated industrial and resource development.[63] The water quality protection measures of the *Health Act* are not applicable to many residents in the Hagan Creek watershed, as they are not a part of the municipal water supply. The residents on a well system are responsible for monitoring their own water quality.

Although the *Waste Management Act* is a powerful anti-pollution tool that has greater potential to make urban streams cleaner, it has limitations. This Act does not address activities such as urbanization and storm water runoff, which impact water quality. It is designed to control pollution originating from a single source (point source), and is not as adept at controlling non point (or widely distributed) sources of pollution. Construction, land clearing, and industrial use can all deposit unwanted substances into the water and impact stream health. The cumulative impacts of many small sources of pollution create deteriorating environmental conditions in urban streams that may be as great, or greater than, any single source. Urban runoff (storm water or non point source pollution), which is usually collected separately from wastes destined for sewage treatment plants, and can contain toxic substances, may be even more harmful than treated sewage effluent. The 1993 BC State of the Environment Report notes that BC, like other Canadian jurisdictions, currently has few regulations controlling storm water discharges and that even though this type of discharge should be controlled by the *Waste Management Act*, few permits, if any, have been issued for such discharges (Nolan 1996, Stormwater Management in BC, 1999).

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[62] For an thorough review of water quality problems across the country and in BC consult, Randy Christensen (2001)

BC is the only province in Canada without groundwater regulation. This legislation is needed to address problems such as contamination of aquifers from fertilizers and pesticides, excessive withdrawals from wells in coastal areas causing saltwater intrusion, competition between users, drawdown, and poor well construction practices. The Water Branch of the MELP solicited public input in 1993 on its proposals to regulate groundwater, but has not yet released draft legislation or regulations for further public review. Groundwater conservation and legislation is an important concern for many stewardship groups because groundwater has a significant impact on overall watershed water quality and quantity.

The shortcomings of the above legislation has implications for the health of the Hagan Creek watershed. The *Waste Management Act* is applicable to discharges that are emitted from the industrial park in the watershed. The Hagan Creek project has done significant monitoring to determine cumulative impacts of runoff and impervious surfaces but these non-point sources are not regulated under the *Waste Management Act*. Similarly, the *Water Act* issues licenses that designate rights of access to Hagan Creek. These withdrawal licenses have a direct impact on water flows in the creek. Since the costs associated with these licenses do not reflect real costs, alternative water sources (e.g. recycled water) do not appeal to those who hold the licenses (MELP 1993). The inaccurate pricing system demonstrates a need to overhaul water management policy in the province (MELP 1993).

The lack of groundwater legislation is of enormous significance to the Hagan Creek watershed as most residents are on a well withdrawal system. Well drilling and surface water allocations can threaten the integrity of entire hydrologic regimes and the human and biological regimes that depend upon them. Neufeld (1996) concludes that the effective promotion of groundwater protection might best be served through community-based decision-making, using a multi-stakeholder process.

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[63] For a detailed discussion on water quality and drinking water standard see Steven Shrybman (2000)

5.3 Fish and Habitat

The federal and provincial governments share the responsibility for managing fish in BC. The crisis of BC's salmon fishing industry in 1997 sparked a renewed debate over fisheries jurisdiction. The ongoing controversy over fisheries, traditionally a federal responsibility, culminated in a landmark agreement in 1997, when the federal government acquiesced to share control over West Coast fisheries with the provincial government. The Canada-B.C. Agreement on the Management of Pacific Salmon Fisheries Issues aims to improve co-ordinated delivery of habitat protection, restoration, enforcement, data collection and management activities between both levels of government. This administrative arrangement between federal and provincial governments means that the provincial government manages all freshwater fish and steelhead salmon.

In 1997, the BC government issued the Fish Protection strategy, and the *Fish Protection Act* is a major component of the strategy. The *Fish Protection Act* (R.S.B.C 1997) reinforces the protection of fish and fish habitat in streams and along stream banks in BC.[64] There is the provision for riparian protection regulation in the Act, which would protect habitat for wildlife and waterfowl. Jurisdiction over wildlife, like fish is shared between federal and provincial powers.

Federal agencies with jurisdiction over fish and habitat include the Department of Fisheries and Oceans (DFO), Environment Canada (DOE) including the Canada Wildlife Branch. Provincial agencies that have jurisdiction over fisheries and habitat include MELP, Ministry of Agriculture, Food and Fisheries (MAFF)and the crown corporation of Fisheries Renewal BC. These agencies are predominantly responsible for the enforcement of regulations outlined below.

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[64] This Act is discussed in detail in section 5.3.2.1.

5.3.1 Federal Legislation

5.3.1.1 Fisheries Act, R.S.C 1985, c.F.-14

Historically the *Fisheries Act* was the key legislation in fisheries management. The *Act* is administered by DFO. This *Act* is concerned with fish as resource, and thus their commercial value. The Act applies to all Canadian inland and marine waters that are frequented by fish, and thus it does not apply to all sensitive riparian and aquatic habitat (such as wetlands). Sections 35 (1) and 36 (3) both mandate habitat protection and strong penalties for noncompliance. The *Fisheries Act* provides legislative authority for the management and regulation of fisheries (salt and fresh water) including access, control of conditions of harvesting and enforcing of regulations. It divides responsibility for administering the *Act* between federal government - DFO, DOE (pollution and water quality) and MELP, a provincial agency.

The Act outlines general regulations regarding who has right to fisheries and how the fish are to be protected from obstruction or harm. The federal government is responsible for regulation and enforcement related to water pollution or works that may affect fish or fish habitat. The Act provides the basis for the DFO to assess development projects to determine whether fish habitat will be harmed and identify changes that must be made in development plans to protect fish. The *Act* creates the legal framework for the prosecution of people who damage fish habitat.

The *Fisheries Act* is one of the most influential pieces federal legislation for stream restoration groups. An important provision of the *Fisheries Act* for urban stream protection is the prohibition against altering or destruction of fish habitat (s. 35). This provision allows the DFO to authorize certain projects to go ahead even if they may damage fish habitat. In this case, DFO provides an authorization for a project to proceed, and requires habitat compensation to achieve the government's policy goal of "no net loss of fish habitat." Another important provision is the prohibition against emitting a deleterious substance into water frequented by fish (s. 36). This provision is a general anti-pollution section. Even though provincial law also contains many anti-pollution

provisions i.e. *Waste Management Act*, the federal *Fisheries Act* is used more frequently to prosecute offenses of polluting rivers or streams where the discharge is deleterious to fish.[65]

5.3.1.2 Canadian Wildlife Act, R.S.C 1985, c.W-9

The *Canadian Wildlife Act* outlines the involvement of the DOE in wildlife conservation and management of public lands for wildlife. The Act is subordinate to the provincial role in wildlife management since it requires provincial agreement or cooperation for most endeavors.

5.3.1.3 Critique

The enforcement of the provisions of s.36 of the *Fisheries Act* is limited by a lack of resources, and also by political concerns such as the federal government prosecuting municipalities for violations. Municipalities are rarely prosecuted by the federal government under this Act.[66] The *Act* does not employ a precautionary approach and, as a result, prosecutions usually occur after damage has occurred. It is rare for the Minister of Fisheries and Oceans to issue a stop work order prohibiting any damage from occurring, even though that provision is available (s. 37(2)(b)) (Nolan 1999).

5.3.2 Provincial Legislation

The provincial government manages the sports fishery within its boundaries, along with the land and water that provide fish habitat. Provincial laws and management must comply with federal fisheries laws and the *Fisheries Act* by protecting any fish habitat that the province owns. As a result the province has adopted the federal no-net-loss of fish habitat policy (Clark 1995). In addition to the legislation and policies, both provincial and federal governments have developed programs to

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[65] There were 48 convictions based on S. 35(1), 36 (1) in BC as of Oct 28, 1998 (www.wcel.org/wcelpub/1996/11666).

[66] Recently citizen's groups have taken municipalities in Nova Scotia to court for violation of federal legislation and regulations. Similarly, citizens have taken on enforcement responsibility in areas where there are not enforcement officers (Perss Comm with Annie France,Gravel of Environment Canada (Atlantic Region) March 6, 2001).

improve the conservation and management of fish and fish habitat. Many of these programs work closely with stream stewardship groups.

5.3.2.1 Fish Protection Act, R.S.B.C. 1997

The *Fish Protection Act* (FPA) divides responsibility for administering water laws between federal DFO, DOE (water quality) and provincial (MELP) authorities. The *Fish Protection Act* is a key element of the BC Fisheries Strategy to preserve fish stocks, developed in 1997 to deal with the Pacific salmon crisis. The *Act* centres on four major objectives: ensuring sufficient water for fish, protecting and restoring fish habitat, improved riparian protection and enhancement, and providing stronger local government powers in environmental planning. The overall goals of this *Act* are to protect fish by ensuring there is enough water for them, protect their habitat, and promote long term local planning that considers impacts on fish populations.

The FPA amends many sections of the *Water Act*, some areas of the *Waste Management Act*, the provincial *Fisheries Act, Local Government Act* and the *Wildlife Act*. Sections of the FPA that make important amendments to the *Water Act* include 5,6,7,8 and 10.

The FPA is administered by the Ministry of Fisheries (formed in 1998). The ministry structure includes the consolidation of staff and operating budgets from MELP and the Ministry of Agriculture, Fisheries and Food (MAFF) and the BC Fisheries Secretariat. This ministry is responsible for administering the *Fisheries Renewal Act*, *BC Fisheries Act* and the *Fish Protection Act.*

A contentious regulation of this Act that has been hotly debated since 1997 is the Streamside Protection Regulation (s12). It received harsh criticism from municipal governments as they perceived it to potentially infringe on private property rights.[67] This provision was enacted in 2000 and the policy branch of MELP worked extensively with municipalities drafting this document. In response to local government concerns, the

[67] This regulation has been on the agenda for discussion at the Annual Union of BC Municipalities conference in 1998, 1999 and 2000.

government stated that the regulation would initially apply only to the Lower Mainland, the east side of Vancouver Island and sections of the Southern Interior, as these are the regions in the province where urban development is threatening important fish habitats. The regulation does not apply to forestry, agricultural or crown lands, but does apply to residential and commercial areas.

The Stream Side Protection Regulation gives local governments the tools to protect stream side areas from impacts of urban development. Some of the riparian management objectives include the protection of root systems in riparian areas, leaf litter, logs and snags, and vegetation. Local governments have the flexibility to choose from a range of management tools such as landscaping bylaws, tree protection bylaws, development permit areas; storm water management, liquid waste management planning, and setbacks from streams, to meet management objectives. The mechanisms chosen must provide a necessary level of protection as judged by local governments.

"Sensitive streams" are identified in the FPA to be areas where the sustainability of fish is at risk, and additional protection measures will be required before water extraction licences can be issued. The onus is on the applicant to show that the water license request will not harm fish. Section 5 of the Act, codifies, for the first time, the requirement of water managers to consider the impact of water licences or approvals on fish and fish habitat or streams when they are making decisions under the authority of the *Water Act*. Thus far, experience in the field indicates that this discretionary power given to water managers has not resulted in the strong consideration of fish in water licensing allocation (Pers Comm- May 12 2000, Meredith Brown).[68]

5.3.2.2 Wildlife Act, R.S.B.C 1996, c.488

This statute offers some wildlife protection, but it is primarily used for regulation and allocation of game sports. The purpose of the legislation is twofold- to manage the habitat that sustains wildlife populations, and to regulate how those populations may be hunted or trapped. The statute mainly manages wildlife through the regulation and

issuance of licenses for hunting, fishing, trapping, angling guides and fur trading. The Act contains some restrictions on activities that may harm wildlife and there is allowance for the designation of land important for wildlife such as wildlife management areas or wildlife sanctuaries. The criteria for distinguishing threatened or endangered species are also included in the *Act.*

5.3.2.3 Critique

Both the *BC Fisheries Act* and *Wildlife Act* have limited relevance to stewardship groups. The parts of the provincial law regulating wildlife that relate to endangered species are potential tools that could be used for urban stream protection but, as it is currently administered, the *Wildlife Act* is not an effective tool. The Act is discretionary: the Minister may choose to designate a species as endangered, and may set aside land as critical habitat for that endangered species. Both steps are rarely used. Only four species have ever been legally designated as endangered and only once has critical habitat been set aside for an endangered species in the province (Nolan 1999). There are no fish officially designated in the province as endangered species. Although the *Wildlife Act* is an ineffective tool for protection of endangered species, MELP does have programs related to protection of freshwater fish, whether or not they are endangered. Recent initiatives will expand this type of protection for endangered fish (Nolan 1999).

This legislation impacts fish populations as the acts function primarily as regulatory tools, but they have limited direct impact on stewardship activities. Provincial wildlife managers in BC do not have regulatory controls or decision-making power over most wildlife habitat. The managers can suggest restrictions on activities that can harm wildlife and allow for the designation of land important for wildlife through wildlife management areas, critical wildlife areas and wildlife sanctuaries.

The *FPA* is an important piece of legislation for stream stewardship groups. The *FPA* does bring together a number of both federal and provincial agencies to deal with the issue of fish and habitat protection. This *Act* does have the potential to be a useful tool

[68] Meredith Brown worked with the Steelhead Society as a Hydrology Specialist, Eng, MRM.

that groups could use to lobby their local governments. It provides a legal conduit for all organizations who are concerned with fish and habitat.

A review of the legislation done by West Coast Environmental Law states that:

> though the FPA is a good step forward to filling some gaps in the current array of tools available for fish habitat protection, it could be considerably strengthened by removing the discretionary language which is found in so many section in the Bill; broadening the appeal rights under the Water Act, removing conflict with federal powers to protect fish habitat and strengthening the riparian protection provisions of the Bill, an area of fish habitat clearly under provincial jurisdiction, which has been left unregulated for too long (Nolan 1999).

The FPA does introduce a change towards treating water more as a public, rather than a private commodity. The Streamside Protection Regulation (s.12) highlights this shift. Some members of the public have requested that government compensate them if the regulations result in restrictions on their land use. *Local Government Act* s. 914 sets out conditions under which local governments do not have to pay compensation to land owners.[69] Under this regulation, local governments are required to protect stream side areas according to management objectives such as mandatory setbacks. The stream side directives could include development free areas and specific management approaches for vegetation, soil and impervious surfaces. The stream side protection measures under the FPA, in the majority of cases, will not result in claims for compensation (Nolan 1999). Under the *Local Government Act* and the *Fish Protection Act* local governments do have the ability to protect fish habitat, specifically in sections related to runoff control, landscaping to protect the environment and development permit controls (*Local Government Statutes Amendment Act,* 1997). Though the stream side protection regulation does demonstrate a shift in the provincial government's willingness to develop explicit riparian protection measures, there are gaps. A key recommendation made by WCEL is that provincial oversight of municipal stream side protection measures is necessary for improved riparian habitat protection. Provincial oversight could include uniform riparian

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[69] For a complete treatment of this issue see, Linda Nowlan (1999) section on Riparian Protection and Compensation - Fish Protection Act.

setbacks in s.12 and the certification by a Registered Professional Biologist and provincial approval for all s. 12 (Nolan 1999).

The lack of success with S.5 of the *Water Act* could be improved by the work of community stream stewardship groups. The lack of success can be attributed to a lack of information regarding actual stream flows since many streams do not have accurate and up-to-date flow records that document actual withdrawls and correlate those withdrawls with stream low flows and minimum flow rates for fish (pers comm with Meredith Brown 2000). Stream stewardship groups are collecting this information and they can pressure water managers to ensure that thorough monitoring is done before licences are issued in their watershed.

5.4 Land Use

The legal protection for urban streams has both a water and land component. It is increasingly imperative to address land use in water management because as water drains off the land, it carries with it the effects of human activities throughout the watershed. To protect streams the law must address both the water quality in terms of what enters the water and what is taken out of the water (including the water itself) as well as the physical space or land around the water in the form of culverts, pavement, or the banks of a stream (Nolan 1999).

Local governments have most direct authority over land use and local land use powers are found in more than 70 British Columbia Statutes. In response to the complexity and inter-jurisdictional nature of land use legislation, significant resources have been invested by senior government agencies to create guidelines for local governments in order to protect aquatic habitat and general ecosystem health. As part of the FRAP- Urban Initiative series, DFO has published approximately 6 documents that address local government relationship to land use, water and habitat. MELP has also published a Stewardship Series. The research provided in these documents canvass the many issues associated with land use legislation and ecosystem conservation. The local government response to the federal and provincial research has been slow and cautious. Some

progressive municipalities have embraced the guidelines provided by senior levels of government, but the majority struggle with the recommended changes.[70] Local government jurisdiction over water laws is granted through provincial enabling legislation and they have responsibilities that impact water under numerous provincial statutes.

5.4.1 Provincial Legislation

5.4.1.1 *Local Government Act*, S.B.C 2000

The *Local Government Act* gives local governments authority to deal with many local issues including elections, taxation, public works and utilities, and land use planning. The *Local Government Act* (LGA) provides both broad and specific tools that can address environmental issues. The municipality has significant control over land use in their jurisdiction through Official Community Plans (OPCs), zoning and development permit processes, within the framework of federal and provincial regulations. These provisions are permissive, thereby making them subject to the discretion of local government.

Jurisdiction granted to municipalities include: sewers and storm drain systems; drainage, works, dikes, flood plain management, irrigation and land reclamation. Aspects of these powers are subject to the *Water Act.* Municipal government has the power to: protect stream banks from erosion; to control surface water that originates from another municipal jurisdiction; to use drains or ditches to collect water from any highway and divert it into a waterway or watercourse. Pollution prevention bylaws are enabled through s. 725.1, and s.903 regulates or prohibits land uses which generate non point source pollution. Zoning and bylaw powers may also impact what activities may or may not be conducted near watercourses.

Several of the most relevant powers for land use planning in *Local Government Act*, that are pertinent to watershed management are briefly discussed below.

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[70] The municipality of North Vancouver, Burnaby and Whistler have incorporated DFO recommendations

5.4.1.1.1 Official Community Plans

The *Local Government Act* enables local governments to develop community plans. An official community plan (OCP) bylaw describes broad community goals and objectives, stated policies, and designated areas for development or protection and outlines servicing strategies, for a period of five years. It may also identify areas requiring special management and specify guidelines in these areas, as well as specify the circumstances and areas requiring development approval information. Municipal councils, regional district boards (for unincorporated areas), and local trust communities (for the Islands Trust Area) enact OCPs. Any bylaws enacted within the jurisdiction must be consistent with the government's OCP. In the event of an inconsistency, the local government can quite easily amend the OCP. A public hearing must be held, to give all residents an opportunity to have their concerns heard or present a written submission. If an OCP has goals, objectives and policies that reflect strong environmental priorities, then zoning requirements will also be environmentally proactive.

An OCP can be used to identify and set out policies for environmentally sensitive areas (ESAs). ESAs are areas of land sensitive to development because of environmental values. They may be important for fish habitat, wildlife habitat, flood plain, slope stability, unique vegetation, scenery and recreation. Once designated, these areas require design approvals.

Design approvals are required from local and senior governments before development can proceed in or adjacent to ESAs. Development permits are designated under an OCP for special purposes, including the protection of the natural environment, the preservation of natural water courses, work standards requiring responsible development near ESAs, storm water management and environmental monitoring during development. All permit conditions in ESAs must be connected to the protection of the natural environment. In 1997, amendments to the *Local Government Act* expanded the definition of natural

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and guidelines for protecting habitat and water resources.

environments to include areas important to the protection of ecosystems and biodiversity (DFO 1994, Nolan 1999).

5.4.1.1.2 Zoning Powers

Zoning bylaws set out permissive land uses and densities for development. Each zone may have specific requirements for parcel size and siting, and controls location, type and extent of land and building use. Rezoning can not occur without a public hearing. Once the public has been consulted, council decides whether to approve the amendment to the particular zoning bylaw.

Zoning bylaws are the means by which an OCP can be implemented and thus can shape the type of development which takes place within the municipality. Bylaws can have an important impact on stream stewardship since they provide a means to describe setback requirements for development near an ESA or watercourse. Bylaw control of land use and density can prevent polluting uses near fish habitat (Webb 1996; DFO 1993, 1994). Bylaws may also trigger the dedication of ESAs during densification by rezoning or subdivision.[71] In general the zoning process requires that the proponent of the development draw up a plan, often in consultation with municipal staff, which is then submitted for approval. The public process is triggered if the plan calls for a change in zoning (designation of permitted uses of the land) or an amendment to the OCP. The *Local Government Act* spells out how the public process must be done and provides legal remedies when the process is not followed.

Municipalities have successfully used environmental protection bylaws for urban stream protection. For example, the *Land Development Guidelines for the Protection of Aquatic Habitat* were used as the basis of an environmental protection bylaw in North Vancouver. These guidelines are applicable to all fish species that may be affected by developments in or adjacent to their waters. The goal of the Guidelines is to "ensure that the quantity and quality of fish habitat are preserved and maintained at the productive level that existed prior to land development activities" (DFO 1994). The municipality's use of such

a bylaw then requires that land development projects are subject to the Land Development Guideline objectives including: leave strip protection and provision; erosion and sediment control and site development practice; storm water management; in-stream work controls; fish passage and culverts maintenance and prevention of deleterious substance discharges (Nolan 1999).[72] Before a developer is given a permit from the municipality allowing development to proceed, he or she must agree to comply with the bylaw. The intention of this procedure is to educate developers about the importance of urban stream protection at an early stage of the development activity. If the bylaw is breached, the permit can be revoked, and the developer can be found guilty of an offense.

Other basic environmental protection bylaws include bylaws for tree protection, soil removal and watercourse conservation. Water course conservation bylaws give municipalities the ability to set requirements for: enforcing an open streams policy; improving water quality particularly in water courses by adding control of other deleterious substances to the control of sediment exercised in the soil removal and deposition bylaw; and incorporating water quantity performance standards for storm water management to regulate the flow discharge from land developments into water courses.

5.4.1.2 Growth Strategies Amendment Act, SBC 1995, c.9,

The *Growth Strategies Amendment Act* amends the *Local Government Act,* RSBC 1979, c.290. The GSAA is an empowering tool for the re-establishment of regional planning in the province. This 1995 amendment to the *Local Government Act*, Part 28.1, empowers Cabinet to designate areas that must adopt a regional growth strategy (RGS). This statute revisits the disputed area of municipal autonomy since it requires a regional vision be developed that meets the objective of: addressing issues of environmental protection, pollution control, suburban sprawl, intergovernmental coordination and economic

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[71] There are potential tax savings available for downzoning ESAs.

[72] For technical information refer to the *Land Development Guidelines for the Protection of Aquatic Habitat*. DFO-MELP 1993 and 1994.

development. Once a strategy is established, OCPs must be congruent with the strategy and correspondingly, all bylaws must be consistent with the OCP.

The draft Regional Growth Strategy - *A Proposed Growth Strategy for BC's Capital Region* - was presented to the CRD Regional Planning Committee (RPC) on Wednesday, Feb 21, 2001. On February 28, the Board approved the release of the draft for publication and formal referral to member councils, participating agencies, First Nation councils, and neighbouring jurisdictions for discussion, review and comment. Comments will be received until the end of July, and a staff report will go back to RPC and the Board in the 3rd and 4th weeks of September, perhaps with First and Second reading of the Bylaw at that time. The earliest a Public Hearing can be held is in October 2001.[73]

The CRD had developed a Blue/Green Strategy as part of their RGS. The Blue/Green areas are areas considered to be, "Natural and semi-natural areas, both land and water, that are of ecological, scenic, renewable resource, outdoor recreation and/or greenway value. These areas are considered to have high ecological and/or social value as green/blue spaces. Green/blue space areas could include developed, partly developed or undeveloped public and private spaces"(CRD 1998.). The Strategy outlines a Regional Green/Blue Spaces System that is considered to be a major part of the regional infrastructure that is essential for creating a livable and healthy region (i.e., sewers, water supply, transportation, solid waste disposal, and green/blue spaces).

The purpose of the strategy is to protect and enhance the natural environment against unregulated development. This is a core value that underpins the adopted Official Community Plans of the CRD. The Blue/Green strategy has important implications for the protection of streams and habitat in the CRD. However, the RGS and the Blue/Green Strategy are not binding in themselves on the municipality. The non-binding character makes it particularly important for citizens to exert political pressure on each local to address non-compliance. Securing the Regional Green/Blue Spaces System will be an

[73] To see a map of the plan see http://www.crd.bc.ca/regplan/RGS/Reports/rgs_map4.jpg

incremental, cooperative process requiring many years to complete. Citizens, landowners, all levels of government, institutions, public utilities, and non-profit organizations can all contribute to protecting and maintaining regional green/blue spaces.

5.4.1.3 Land Titles Act, R.S.B.C. 1996

The *Land Titles Act* is the primary statute controlling land disposition in the province. This has significant ramifications for urban stream stewardship. Section 82 of this Act states that, where land is subject to flooding, subdivision shall not occur without the consent of the Minister of the Environment. The Minister of the Environment may specify conditions of consent that may be registered against the land title under the provisions of Section 8 of the *Land Title Act*. The Act also contains subdivision design conditions.

An important provision in the *Land Title Act* created under s.215 are "conservation covenants." A conservation covenant is a voluntary, written agreement between a landowner and an individual or conservation organization in which the owner of the land promises to protect the land in specified ways.[74] This type of covenant is an agreement between a private landowner and the Crown or Crown corporation or agency, municipality or regional district or a local trust committee under the *Islands Trust Act*. Municipal governments have used s. 215 covenants to specifically protect fish habitat on privately owned land. Many covenants of this type have been signed between a landowner and MELP where the landowner agrees not to alter the riparian portion of his or her property covered by the covenant. The potential for using this mechanism to protect riparian areas along Hagan Creek is very significant.

Section 219 makes a provision for riparian property tax relief for landowners to use conservation covenants to protect fish habitat. The conservation covenant is intended to last forever, and binds future owners of the land, not just the current landowner. The

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[74] This Act was recently amended to allow conservation organizations to be the holders of conservation covenants. The conservation organization holds the covenant and can enforce it, if necessary, against the owner.

covenant can cover all or just a portion of the landowner's property. There are, however, high levels of noncompliance reported with covenants and encroachment onto sensitive areas (Inglis et al 1995) .

5.4.1.3 Land Reserve Commission Act , R.S.B.C 1996, c.10

The *Act* provides the legislative framework for the preservation of agricultural land in the province. Land under this designation is reserved for farming and agricultural purposes, and thereby puts limits on development. The 4.7 million hectares of land in the reserve includes primarily private land. Since Agricultural Land Reserve (ALR) land is under provincial jurisdiction, local governments do not designate land use in these areas. There is minimal governmental involvement in the area of agricultural activities relating to water (DFO et al.1980). In the Hagan Creek watershed approximately 60 % of this watershed is ALR land. As discussed, agricultural lands adjacent to streams create specific concerns for both water quality and quantity.

5.4.1.5 Critique

Clearly, there are numerous tools available to local governments for environmentally sound watershed management and protection. The challenge is, "to create a set of coordinated bylaws, to ensure that they integrate with provincial or federal regulations, and which together create a simple, effective and reinforcing environmental protection program" (DFO 1996). The flexibility of these tools, however, may result in neighboring municipalities having different levels of environmental regulations (Webb 1996; Nolan 1999; Nener et al 1997). This reality means that one municipality's rigor in environmental policy may be abated by a jurisdiction upstream or downstream because they have not taken the same measures to protect a shared watercourse. This problem is a very real issue in the Hagan Creek watershed, where three municipalities are involved with no mandated need for policy consistency. This lack of coordinating standards compromises habitat protection and water quality measures. As the above discussion demonstrates, legislation is available to protect urban streams.

The *Local Amendment Act* is an extremely significant piece of legislation for the protection of water, fish and habitat. The many legal tools available to local governments

give community stream stewardship groups material to use when lobbying for habitat and water protection. OCPs are particularly important for determining the vision that the municipality has for its watershed. Therefore, it is important for stewardship groups to participate in the OCP process. The land covenant provision in the *Land Title Act* is an important legal tool available to stewardship groups. An attempt was made in 1999 in the Hagan Creek watershed to protect John Dean Park using this legislation.

5.7 Conclusions

Land use decision-making happens at a very local level. Many land use decisions are heavily influenced by economic interests, namely developers and often, these developers are not local. Promoting long term, sustainable land use practices requires the political will of citizens and local governments. This overview of relevant jurisdictional issues demonstrates the complexity that local governments face. This situation illustrates the difficulty the current governance model has in responding to contemporary ecosystem pressures exerted by our growing urban areas.

As discussed in Chapter Two, ecosystem-based governance presents many challenges to conventional governance. Land use, water and habitat protection are regulated by all three levels of government and First Nations in some cases. Although local governments do not directly regulate fisheries management, areas under local government jurisdiction contain important fish-bearing streams. These streams are vulnerable to the impacts of urban development and the design of local government bylaws have an impact on land use development practices. Land use has a direct impact on riparian vegetation, watercourses, wetlands and other environmentally sensitive areas.

Although the province has delegated some authority to local government to deal with these issues, it has become apparent that new tools are required to improve environmental management at the local level. As this review has discussed, the existing tools are not adequate. Examples include the lack of groundwater legislation and weak water quality regulatory infrastructure, and the use of discretionary language in legislation. Requiring environmental conditions on development permits and zoning amendments strengthens

local governments' ability to protect fish and fish habitat by allowing them to use such environmental protection measures. In order for such measures to be successful, they must be accompanied by political will.

Many municipalities question whether they should be responsible for protecting the environment. Traditionally environmental protection is seen as the responsibility of more senior levels of government. Addressing this concern requires a strengthening the relationship between federal and provincial levels of government with local governments.

Another related concern, which has gotten more publicity since the Walkerton incident, is the issue of "downloading." Municipalities perceive that they are frequently given additional responsibilities, such as those for environmental protection, but are not given additional financial and other resources to perform these additional responsibilities. For example, the many provisions available to local governments through the *Health Act* are undermined by the fact that public health officials do not have the resources to be proactive and are unfamiliar with land use planning processes (Shrybman 2000). Again, this system of governance fails to facilitate governance that protects the health and overall well being of local residents.

Last year ICLEI launched, "The Water Campaign 2000". The mandate of this campaign is to engage local government to improve the local water environment by identifying the impacts of their corporate (local government) activities and how these activities can be mitigated. The program requires that local governments commit to reevaluating their approach to local water resource management and sets the stage for more community involvement. The process focuses on improving communication between water-related departments of local government. The program builds on the notion that many of the stresses that the municipal corporation puts on local freshwater supplies can be cost-effectively managed by modifying current operations and practices and by taking a long-term, multidisciplinary approach to freshwater management.

The role of the public in the process is essential. It has been mentioned several times that political will is critical to the creation of long term ecosystem health. Citizens across the world are taking the stewardship of ecosystems in their communities into their own hands, literally and figuratively. They are working to rehabilitate streams, and organizing to discuss how they can better steward their local environment.

In order to determine what is important for good community-based stream stewardship, it was necessary to investigate what other community groups were doing, and what they felt were important factors for their success. The next chapter will look to other jurisdictions of community based stream stewardship groups.

Chapter 6: Other Jurisdictional Examples of Community-based Stream Stewardship Initiatives

6.0 Introduction

This chapter examines four community-based stream stewardship initiatives that have been chosen to develop a better understanding of the characteristics of successful stream stewardship groups.

The stream stewardship groups profiled include:

1. Baker Creek Enhancement Society - Quesnel, BC
2. Langley Environmental Partners (Salmon River)- Langley, BC
3. Laurel Creek Citizen's Committee/Laurel Creek Watershed Study Roundtable - Waterloo, ON
4. Salmon Arm Watershed Project - Salmon Arm, BC

Part I of this chapter provides a brief description in table format, of each of the stewardship groups profiled in this chapter. Part II provides the analysis of the evaluation conducted of the four group profiles. The objective of Part II was to determine lessons learned, or keys to "success" in the community stream stewardship groups examined in this thesis. To determine these lessons, the groups were evaluated on the basis of the evaluation components identified in Chapter 3 (section 3.3.2).

PART I

The first part of this chapter (6.1) sets out a series of four tables that provide a brief profile of each stewardship group, their activities and history, and the physiographic characteristics of the watersheds where the groups worked. The summaries provided in this table were developed from both materials supplied by the groups and personal interviews. The purpose of these tables is to provide basic baseline information about the groups. The tables may serve as a reference for the analysis that follows in Part II of this chapter.

6.1.1 Baker Creek Enhancement Society Profile

Table 4 - Baker Creek Enhancement Society Summary

	BAKER CREEK ENHANCEMENT SOCIETY PROFILE (BCES)
Location	City of Quesnel, BC is 640 km north of Vancouver with a population of 8 000.
Physiographic Features	Baker Creek is 40km long and a 4 km portion runs through the city. The watershed is 200 square hectares. The watershed is located within the District of Quesnel. Land use in the watershed is characterized by forestry, urban development. The creek supports salmon populations
Year Formed	1994
Rationale for Formation	The urban portion of the creek caught the attention of concerned citizens as it was visibly in need of rehabilitation. Car bodies were used in the past as rip-rap and there was a lot of garbage in the creek. Baker Creek Enhancement Society (BCES) was formed in 1994. The Society was born out of concern by members of the Quesnel Environmental Society who felt that the health of Baker Creek needed to be addressed. The Quesnel Environmental Society felt that since it was such a significant part of their city landscape, it must be revitalized and the BCES Steering Committee was created. The BCES was also started at a time when the political climate in the community was highly polarized due to the Commission on Resources and the Environment (CORE) proceedings that had recently been held in Quesnel.[75] The community divided into "brown" and "green" supporters. One of the objectives of the steering committee was to try and create a positive project for the community.
Watershed Problems	Problems identified in the watershed included houses threatened by bank erosion, habitat destruction and water quality.
Group Mandate and Purpose	The Baker Creek Enhancement Society (BCES) is a community-based stewardship group. The mandate of the group is to ensure sustainable management of an individual watershed, to promote public awareness and stewardship of the Baker Creek Watershed, enhance aquatic and riparian habitat, develop community partnerships, develop strategies to maintain the work completed and to serve as a pilot for future stream stewardship projects.
Organizational Structure	Organizational structure of BCES is composed of a Steering Committee (8 members) and Board of Directors (10 members). There are ten committees in the society including: Special Events, Urban Development, Finance, Modules, Public Relations & Membership, and First Nations. Each of the committees has two to three members and a specific mandate. There are two project co-ordinators who share one half-time position. The project has also hired a group of youth through E-Teams, a MELP initiative. Two Environmental Youth Core groups have worked on the creek under the direction of a Youth Project Manager.
Type	Inclusive, consensus-based.
Membership	Membership of BCES includes the Rotary Club, Quesnel Naturalists Society, a city planner, city liaison person, First Nations, media representative, Youth Entrepreneur Project, and other interested community members. Approximate membership: 30
Funding	Funding partners include Department of Fisheries and Oceans, BC Ministry of the Environment, Lands and Parks, Human Resources and Development Canada through its Youth Services Canada Program, Environment Canada, the City of Quesnel, Forestry Renewal BC, and the Fraser Basin Management Board. Donations were received, in kind and financial, from over 50 community service and businesses.
Activities	The biological remediation and rehabilitation for the urban portion of Baker Creek includes a study of the riparian zone that identifies twenty sites for rehabilitation work. Rehabilitation activities incorporate bank stabilization, debris clearing, stream side planting and enhancement. Stabilization techniques include tree and native plantings and putting straw bales along stream banks. Community involvement in the project has been extensive. The public has been included in both planning and field work. The group has also done monitoring of fish populations and water quality. This group has held a number of events to build awareness in their community about the stewardship of the Baker Creek Watershed. BCES has organized Earth Day events, stream-side walks, wrote articles for local media, worked with elementary students on DFO fish rearing program, held membership drives, built partnerships with major players including those in upper reaches of the watershed such as DFO, logging companies, and Ministry of Forests. The group has also collected data on in-

[75] In the early 1990s, the Commission on Resources and Environment (CORE) worked with stakeholders to develop regional land use plans in three areas of the province: Cariboo, Kootney-Boundary and Vancouver, Island. Similar to land and resource management plans, these regional plans seek to create a vision for use and management of public provincial lands and resources. These plans span large geographic regions of the province and generally affect several large communities and several smaller ones. Their development required involvement of people representing a wide range of interests and values.

	BAKER CREEK ENHANCEMENT SOCIETY PROFILE (BCES)
	stream health, wildlife and fish.
Successes	The BCES has been successful at mobilizing a small resource-based community; they have garnered the support of over thirty-three partners in the community. The groups provides strong public information and education, co-operative action and habitat improvement. The BCES also was successful in obtaining extensive funding from Forestry Renewal British Columbia (FRBC). BCES was chosen as a demonstration project of the FRAP in 1995.[76]

6.1.2 The Langley Environmental Partnership Society (LEPS) Profile

Table 5 - The Langley Environmental Partnership Society (LEPS) Summary

	THE LANGLEY ENVIRONMENTAL PARTERSHIP SOCIETY (LEPS) PROFILE
Location	The Township of Langley is located in Fraser Valley of south-western BC, approximately 30 km east of Vancouver, and has a population of approximately 90 000.[77] The Township of Langley is an area of 303 square kilometres in the lower Fraser Valley
Physiographic Features	The Fraser Lowland consists of about 500 square kilometres of forested land, 1 550 square kilometres of crop and pasture land, 420 square kilometres of wetland, and 600 square kilometres of urban land (Healey 1997). The Salmon River drains approximately 8, 000 hectares into the Fraser River. The river is 114.29 km long.[78] Land use in the watershed consists of agricultural lands (three quarters of Langley - 23, 784 hectares are in the Agricultural Land Reserve), park space and urban development. The Salmon River, partially located in Langley, is considered to be one of the last salmon supporting streams in the Greater Vancouver Regional District (GVRD).
Year Formed	1993
Rationale for Formation	LEPS was created to respond to public concern for the environmental degradation in the Township of Langley. As part of the Lower Fraser River Basin, Langley is under significant development pressure. The public and water resource managers felt that there was a need for greater protection of aquatic resources, with a strong emphasis on watershed management and conservation. The founder of LEPS was the Environmental Manager for the Township of Langley.
Watershed Problems	Encroaching development and agricultural practices, water quality and a decreasing salmon population.
Group Mandate and Purpose	LEPS is a large comprehensive partnership that includes several levels of government, educational institutions, and community environmental enhancement organizations. The purpose of the Society is to: promote environmental protection and restoration activities in the Township of Langley; provide technical support to other community groups conducting environmental work in the township; provide education and work experience for post-secondary and secondary students in fields related to environmental protection; and promote and foster community co-operation in the Langley area through environmental based partnership among government, teaching institutions, community associations and businesses.
Organizational Structure	The organization of LEPS consists of a Board of Directors, paid staff and volunteer members. The Board of Directors is composed of six to twelve volunteer members, with representation from several interests including federal, provincial and local governments, post secondary students, youth associations, business and/community service organizations, environmental organizations and educators. This group serves as the main governing body for LEPS. The staff consists of full time and temporary paid employees (employed through youth employment grants for several months at a time). Since 1993, the core paid staff has been approximately five. Between 100-200 volunteer members have worked with LEPS. LEPS' staff has worked with over 2, 000 community volunteers on a variety of different "action" projects.
Type	LEPS is an umbrella organization for a number community groups. Salmon River Water Round Table (SRWRT) is a multi-stakeholder roundtable.
Membership	LEPS membership includes: Langley Field Naturalists, Nicomekl Enhancement Society, the Bertrand Creek Enhancement

[76] The criteria for the FRAP demonstration projects included being a watershed based group; had broad community representation,; worked towards ensuring sustainable water resources; undertook projects that were readily accessible to the general public; and had a reasonable chance of success (Romaine 1996).

[77] Township of Langley Environmentally Sensitive Areas Study, 1999.

[78] Township of Langley Environmentally Sensitive Areas Study, 1999.

	THE LANGLEY ENVIRONMENTAL PARTERSHIP SOCIETY (LEPS) PROFILE
	Society, the Yorkson Watershed Stewardship Committee, the Little Campbell River Watershed Stewardship Committee and the Salmon River Enhancement Society and Langley Field Naturalists Society. Other members of LEPS include the Township of Langley, School District #35 and Kwantlen College. LEPs has a volunteer base of over 2 000.
Funding	Funding partners include, Department of Fisheries and Oceans, BC Ministry of the Environment, Lands and Parks, Human Resources and Development Canada through its Youth Services Canada Program, Environment Canada, Township of Langley, Forestry Renewal BC, and the FRAP.
Activities	The main focus of LEPS is environmental reconstruction and rehabilitation work in and around streams. This includes enhancements to fisheries resources, stream surveying and mapping, stream side planting, erosion control and public education. LEPS has done work in the area of solid waste management and ground water quality research and septic care. LEPS has also provided career training in many areas including: watershed stewardship, stream habitat restoration projects, fencing, public information seminars, storm drain marking, signage, mass communications, and ground water research.
Successes	The LEPS has been successful at creating a unique partnership with the Township of Langley. The relationship has undergone many changes since 1993 as a result of many factors, including an election that elected a new mayor and a change in the staffing of the Township's Environmental Manager. LEPS has remained "in house" at the Township of Langley and has worked closely with many government agencies and schools. LEPS has a strong educational focus. They have completed work on over 100 km of streams in the township. They have also done a lot of habitat improvement in both riparian areas and in-stream construction. They have been successful at accessing funding. They have not been successful at achieving a strong constituency. The organization did not encourage broad-based community support and the organization's planning process was dominated by the program coordinator, rather than a group effort.
Notes	LEPS was selected as one of six demonstration watersheds by Fraser River Action Plan (FRAP) watershed demonstration program that ran between 1993-1997. Criteria to be eligible for the program included: community-based watershed groups who had broad community representation; worked toward ensuring sustainable water resources; undertook projects that were easily accessible to the general public; had a reasonable chance of success (Romaine 1996).

6.1.3 Laurel Creek Watershed Profile

Table 6 - Laurel Creek Watershed Summary

	LAUREL CREEK PROFILE
Location	Laurel Creek is located in Regional Municipality of Waterloo in south western Ontario.
Physiographic Features	Laurel Creek Watershed is 77 kilometres square drained by the creek and its tributaries. Laurel Creek is the main stem of this watercourse and runs 20 kilometres long from the headwaters to the Grand River. The creek runs through numerous townships and the city of Waterloo, Ontario (population 80, 000). The watershed contains a broad mix of land uses and environmental conditions. Land use includes urban development, agriculture, parks and wood lots. The Laurel Creek watercourse has mixed conditions from concrete channels to natural streams within wooded areas and constructed reservoirs.
Year Formed	1990
Rationale for Formation	Two important groups are the Laurel Creek Citizen's Committee and the Laurel Creek Watershed Study Roundtable (LCWSR). In 1990, the City of Waterloo organized a volunteer clean-up of Laurel Creek. Several work days were held and volunteers came out to work in the creek, cleaning up debris. Out of this effort, the Laurel Creek Citizens' Committee (LCCC) was born. Several residents took on a leadership role and co-ordinated the efforts, and the City staff stepped back and let community members take the lead. The citizens' group has operated with the support and technical help of the City of Waterloo and the Grand River Conservation Authority (GRCA).[79] 2) A second group formed in 1990, out of public concern for Laurel Creek when a developer wanted to construct a subdivision in an environmentally sensitive area in the watershed. The community and the city officials worried about development destroying important natural features and the potential negative impacts on the creek including erosion, flooding, increased siltation and groundwater contamination. A Laurel Creek watershed study was commissioned to deal with these concerns. The Laurel Creek Watershed Study Roundtable (LCWSR) developed out of this study, and existed from 1991-1993. The purpose of this roundtable was to decide what the content and priorities of the study would be, how funding would be allocated, and what municipal priorities about this development should be.
Watershed Problems	The key concerns were the potential impact of development on the flood risk that existed in the developed portions of the watershed. There was also concern over degraded water quality, flows and fisheries resources.
Group Mandate and Purpose	1)The group's mandate is to protect, rehabilitate and enhance Laurel Creek and its tributaries, raise public awareness and work with the City of Waterloo Council as a community resource. 2) The study group was initiated by the GRCA, in co-operation with the City of Waterloo, City of Kitchener, Regional Municipality of Waterloo and the Townships of Wilmot, Wellesley and Woolwich in consultation with the Ministry of Natural Resources (MNR). These partners completed a full study of the area around Laurel Creek to find out: where development could occur; what constraints would have to be built into new developments; what environmental resources would have to be protected and; what the impacts of changing land use would be. Since the proposed development in the Laurel Creek Watershed created significant public outcry, a steering committee was struck to ensure that public representation would be an integral part of the study, and to include all different interests to oversee the study.
Organizational Structure	1) The core group members, informally referred to as the executive, established the work plans for the group. The executive did so with the guidance of the GRCA as the conservation authority w as involved in issues that involve whole watershed. The LCCC also contributed to the work related to the conservation of Silver Lake, which is a small lake in the middle of the City of Waterloo. Work planning meetings are open but are generally poorly attended. The City of Waterloo and GRCA staff members lend expertise and direction to the committee, and regularly volunteer time and energy. 2) The study group included a consultant team, an administrative team, and staff from the Regional government and the Grand River Conservation Authority. The public was drawn from interest groups, development groups, business associations and environmental groups. The Laurel Creek Citizen's Committee had representation at this roundtable. Interested participants were asked to apply and send resumes

[79] Conservation Authorities are local environmental agencies based on the watersheds of Ontario. There are 38 Conservation Authorities in Ontario. Their purpose is to incorporate watershed-based resource management planning, and flood control measures into municipal and provincial strategic plans. The Conservation Authorities Act was originally passed in 1946. The current statute R.S.O. 1990 c. C27 can be accessed at: http://192.75.156.68/DBLaws/Statutes/English/90c27_e.htm#TOC.

	LAUREL CREEK PROFILE
Type	1)Inclusive 2) selected membership with several workshops that solicited broad community participation.
Membership	1) The LCCC is composed of a core group of about 5 members (an executive committee), and membership has fluctuated from ten to fifty members. In 1997, there were 25- 30 active members who regularly came out to work day events. The membership is open to any community members. 2) Approximately 20 people were part of this steering committee roundtable. The study was partially funded by the Grand River Conservation Authority.
Funding	City of Waterloo, GRCA, MNR
Activities	1)This group focuses on stream rehabilitation. The group has four to six, clean-up work days per year between May and September. The LCCC focuses on hands-on physical work in and around the creek bed, removing branches and logs from the stream that obstruct flow, constructing log deflector structures to improve stream channel design and reducing erosion, native tree and shrub planting, stream assessments and many public education events. The group participates in some joint planning projects in the watershed, but they are primarily a rehabilitation work group, not a planning group. The core group members, informally referred to as the executive, organize the group's work. They do so with the guidance of the GRCA as it is more involved directly with the whole watershed. The LCCC also contributes to work on, and sits on a roundtable for Silver Lake, a small lake in the middle of the City of Waterloo. Work planning meetings are open, but are generally poorly attended. 2) Unlike the LCCC, the LCWSR was a planning group. The study was conducted by consultants, but the roundtable determined what needed to be included and how. The roundtable also spearheaded "issue" workshops at several crucial stages of the study, (i.e. to find out what the public thought about retaining artificial lakes on the creek, and about what the public thought was worth spending money on, essentially to choose a preferred plan). These workshops were open to the public and letters were sent to every group they could find - social, recreational, neighbourhood, activity, any group in the whole area. The LCWSR consulted regularly with the community at large and municipal council to deal with issues and planning. Many contentious issues had to be resolved. The end product, the Laurel Creek Watershed Study, was adopted by the City of Waterloo Council as a basis for development regulations of their official community plan. It gave the city a clear idea of what the public wanted, what they would support in relation to development and the way in which land was being used.
Successes	1) The rehabilitation work of LCCC resulted in the reappearance of trout spawning in parts of Laurel Creek and its tributaries. 2) The work of LCWSR was successful in making significant changes to land use planning in the City of Waterloo. The results were directly implemented into municipal land use planning and development guidelines. The recommendations from this public process became part of the official city plan directing and limiting future development.
Notes	To view a copy of the completed report of the study see http://www.bordeaux.uwaterloo/lcws/docs/chl.html

6.1.4 The Salmon River Watershed Profile

Table 7 - The Salmon River Watershed Summary

	THE SALMON RIVER WATERSHED PROJECT PROFILE
Location	The Salmon River Watershed is located in south-central British Columbia.[80] The river runs a 110 kilometres north and east from its headwaters in the Highlands west of Vernon to the south-east corner of Shuswap Lake at Salmon Arm.[81]
Physiographic Features	The watershed is mountainous and covered in pine, fir and spruce forests. The south-western portion is characterized by open grasslands. There are approximately 6 000 residents in this watershed who live in a narrow valley bottom from Westwold through Falkland and on to Salmon Arm. The predominant land use in this valley is agriculture (hay and pasture) with a number of rural residents. As the river approaches Salmon Arm, its gradient lessens, the valley broadens and the fertile fields support dairy farms as well as forage and field crops.
Year Formed	1993
Rationale for Formation	The Salmon River Watershed Project grew out of local concern for the health of watershed since it had undergone substantial environmental degradation. The rural and agricultural nature of the valley had become threatened as residential and other forms of development in the North Okanagan-Shuswap area had rapidly accelerated. Collectively, these factors contributed to a significant decrease in the salmon population of Salmon River. Historically, this river produced one of the largest sockeye salmon runs in the Fraser Basin. Both water quality and quantity problems had prevented the rebuilding of the sockeye salmon population in the watershed. In 1990, the municipal council in Salmon Arm created an environmental sub-committee. The winter of 1990-91 was very wet and a number of residents started to lose property due to erosion of the banks of the river. Those residents went to the environmental sub-committee to see if there was anything the District could do. The District invited other levels of government and agencies to sit down and talk to the farmers and landowners who were losing their land. At the same time, a group of First Nations were addressing issues of concern related to the salmon stocks in the Salmon River. Five First Nations bands of the Okanagan and Shuswap have land in the watershed. The Upper Nicola Band land is close to the river's headwaters. The Okanagan and Spallumuheen Band are located adjacent to one another downstream from Falkland where the river crosses Highway 97C. The Adam's Lake and the Neskonlith Bands straddle the river at the mouth of Shuswap Lake (Argent and Christiansen 1995). The First Nations and the informal group that had developed started to work together on some co-operative field work. A key figure in the development of the Roundtable was Dorothy Argent, who was a municipal Councillor at the time. A group of stakeholders began to meet informally and discuss issues and concerns about the health of the Salmon River.
Watershed Problems	The activities contributing to the environmental degradation of the stream included; most significantly, the use of cattle manure as fertilizer to grazing areas increasing the nutrient load of the watershed and over-grazing of vegetation on stream banks by livestock increasing stream temperature and decreasing salmon habitat complexity. Clear-cut logging resulted in early warming of the snow-caps through loss of shade, increased early spring run-off and diminished late summer flows. High spring run-off and reduced stream bank vegetation combined to accelerate bank erosion with significant loss of farm fields and siltation of salmon spawning beds.
Group Mandate and Purpose	In May 1993 concerned citizens gathered to attend a workshop to determine if there was a common vision about how to improve the health of Salmon River. This gathering marked the inception of the Salmon River Watershed Project (SRWP). During the workshop a mission statement was developed. The statement declared that the Salmon River Watershed Project would be a "catalyst" to achieve and maintain a healthy Salmon River Watershed through co-ordinated management of all resources, respect for all concerned and co-operative, positive actions." A roundtable committee was formed with the purpose of creating a stewardship plan for the watershed. The roundtable is a partnership among the grassroots public both native and non-native, businesses, various levels of government including native, federal, provincial and local, as well as others having a stake in the watershed.
Organizational Structure	The process design of this roundtable included using a consensus-based planning model based on sustainable living, an ecosystem approach with ecosystem objectives, and the creation of a plan that would be useful to land owners, agencies and businesses through which the plan would be implemented.
Type	Inclusive, Round Table
Membership	30+
Funding	Funding partners include: Department of Fisheries and Oceans, BC Ministry of the Environment, Lands and Parks, Human Resources and Development Canada through its Youth Services Canada Program, Environment Canada, the District of Salmon Arm City, Forestry Renewal BC, and the FRAP.

[80] This watershed is different from the Salmon River in Langley, cited in the LEPS case study.

[81] See Map 3.4

	THE SALMON RIVER WATERSHED PROJECT PROFILE
Activities	This project very consciously engaged in a two pronged approach - planning and action. The planning component ensured that participants developed an understanding of the watershed as a whole, and planned for the stewardship aspect of the initiative. The strong nature of the action component ensures that community members who would rather work in the stream as opposed to be at the table, have the opportunity to stay involved in the restoration's effort The action group works on stream bank restoration, water quality and quantity monitoring, surveying the watershed to find out how much water is in it, building nesting boxes, in-stream restoration, riparian rehabilitation and monitoring.
Successes	As of 1997, approximately ten per cent of the stream has been restored. SRWRT had been successful at creating a broad-based consensus planning stream stewardship group. The organization consciously developed the process and practice using an ecosystem approach. The group has achieved a high profile in the community and throughout the province for their planning process.
Notes	The SRWR was a demonstration project for (FRAP).

PART II

Part II contains two main sections, the first, Section 6.2 discusses the process components that were evaluated, which include: *process design, decision-making, terms of reference, representation and resources.* The evaluation components that describe the characteristics of the groups are closely related, and influence each other to characterize the groups. The process design, or governing principles of the group, will influence decision-making, the terms of reference and the breadth representation in the group. The terms of reference usually establish, in writing, what the process design will be, and what kind of decision-making processes the group will use. Representation, or the breadth of participation in the stewardship group, is often influenced by the process design of stewardship group. The acronyms in brackets throughout the text mean that the statement is based on the experience of that group or groups (ie. BCES, LEPS, LCW, SRWRT).

The second section of Part II, (6.3) analyses the characteristics of the groups in light of *outcome criteria*. The five outcome criteria are *education, attitude change, empowerment, institutional infrastructure, and substantive impacts*. The intention here was not to find "accurate measures" but rather to probe participants for indicators of what their work has accomplished, and to determine if participants felt their work had an impact on their local community. The objective of this analysis is to identify specific outcomes that resulted from the group and its activities. The concluding lessons learned are derived from the analysis of both the characteristics of the group and the relationship between those characteristics and the outcomes that resulted from group activity and design.

Institutional infrastructure refers to institutional changes such as local planning bylaws or administrative arrangements that support ecosystem objectives, while substantive impacts refers to altering the pattern of ecosystem damaging development and a positive change in stream health indicators (See Table 1).

6.2 Process Component Evaluation

The evaluation undertaken in this thesis attempts to identify common characteristics that make community-based stream stewardship groups successful and achieve established goals. The areas of inquiry include the characteristics that improve community participation in stream stewardship groups, and characteristics of "success". The discussion characterizes successful community based stewardship groups using the evaluation framework as the parameter for the discussion.

The following section discusses the findings derived from interviews with stream stewardship participants from Langley, Quesnel, Salmon Arm and Kitchner-Waterloo. The evaluation components are reviewed individually, starting with an explanation of the component, followed by a discussion of the findings derived from an analysis of the interview data.

6.2.1 Process Design

Process design refers to the scheme that prescribes the series of actions or operations followed by an organization, to achieve goals or outcomes. Process design is similar to the concept of governance because it creates the conditions for an organization's governing principles and regulations. In the context of stream stewardship groups, process design is a determining characteristic of the organization, and has an impact on other features such as representation, decision making or terms of reference. Group characteristics that are the product of process design of a stewardship group include whether or not the group has both a planning and action components in their activities, the size of the group, the decision-making model the group uses, and the scope of the project. Process design is not an absolute, and can change over time.

The following types of process design illustrate how a group's process can vary. The process design can range from exclusive, hierarchical, top-down, expert-driven, closed, and arbitrary or it can be bottom-up, inclusive, multi-stakeholder, open, consensus-based and fair. These characteristics have an impact on the overall organization and how it functions. The characteristic of "fairness" will be used as an example to explain the relationship between process design and outcomes. Fairness is associated with impartiality, justice, consistency and equitable conduct and conditions for all those who participate. Fairness requires that the information provided to all stakeholders is accurate and understandable. Transparency requires a free flow of information and thus promotes accountability within an organization. An organization that uses an arbitrary (little consistency, unclear roles and responsibilities) versus a fair process will not share the same operational conditions, and logically, not result in the same outcomes.

Responsibility for process design and management varied from case to case. The groups had either an executive group/board of directors and/or a steering committee or director that was responsible for process design and management. The larger the scope and size of the project, the more formal the process. In LEPS, a top-heavy organization, the director was initially responsible for the group mandate and process design. Later this role was taken over by the group's Board of Directors. At the Salmon River Watershed Round Table in Salmon Arm, many stakeholders were brought to the table at the outset to talk about the problems with the watershed. The process used in Salmon Arm evolved with very broad participation in all aspects of the project .

The initiators of a stewardship group have the important responsibility of deciding the timing of broadening community involvement in the group. This timing can affect the community's perception of the group because if a broader scope of participation is initiated long after the group has started, there may be some mistrust between the initiators of the group and other stakeholders who are invited later in the process (*LCW, SRWRT)*. Trust takes a long time to develop, particularly in areas where there has been a

hostile political environment. If there is a broad base of participation at the outset then the group begins to build a stronger presence in the community, more people participate in deciding goals and objectives for the group and thereby building ownership among a broader community from the outset. This was the approach taken is Salmon Arm and Baker Creek. Wide scale community participation was encouraged from the very beginning of the projects and thus the projects were perceived to be inclusive and open to broad participation.

Process design is influenced by, and influences, leadership within a group. Having dedicated individuals who make things happen is as important as having formal policies and projects (Yaffee 1996). A local leader was noted by many interviewees to be an important factor for project success. In most cases, there was usually one to several "champions" that either started or kept a stewardship group alive. Those individuals have a great influence on how the group develops. In some cases, the leaders were able to cultivate an open, inclusive process; in another case, a strong leader controlled much of the process. Successful groups and process design had the ability to foster and develop local leadership and champions. Good leaders can establish and reinforce credibility (SRWRT, BCES).

Interviewees identified communication style (written and oral, during meetings) and their approach to the community affected levels of participation, particularly in areas where there was an urban rural split. The community's comfort level with the language and the process used (multi-stakeholder, open, consensus-based) needed to be considered. Many of the actors in Salmon Arm were rural agriculturalists, and their educational levels varied significantly. Participants have different needs and the process that is chosen must respond to the needs of the community members.

The size and scope of a project affects the accessibility of participants, as does the division between "action" and "planning" components in the process. Some people only

want to be involved in action such as stream clean-ups, tree planting or fence building. For this type of person, there is a danger feeling cynical about the project if their impression is that the group is "all talk, no action". Similarly, rural farmers may not be comfortable at a large roundtable setting and to accommodate this, the overall planning process could be supplemented with occasional small scale "kitchen table". The accessibility of the process affects the continuity of people's interest and commitment to the project. In Salmon Arm, some landowners attended several meetings but did not return and participate in the group because they did not understand the process and why the group operated as it did.

In all of the cases in this evaluation, an action and planning component was part of their group, but the split between the two aspects varied. Interviewees stated that their organizations strove to be inclusive but the way the group achieved inclusivity was contingent on group governance. LEPS was clearly less inclusive and several interviewees stated that the group had poor transparency. The LEPS was led by a co-ordinator who believed that it was more important to accomplish concrete things and therefore he, as an individual, went ahead and did things without including the entire group, or community in that work. LEPS was referred to as a "one man show" even three years after it was established, which reflects poor community capacity development. This characteristic affects the transparency of the organization, the openness of decision-making, and the representativeness in the group.

Successful stream stewardship groups need goals that are embraced by leaders at all levels of government, the community and business. An inclusive process ensures diverse participants are brought into the process early, have a generous opportunity to participate, and are afforded a productive long-term. The overall design of the process has significant impact on group governance. The design also has an impact on the perception of participants, public and agencies, about the group. The process design sets the stage for

how the group will function, and there is a relationship between the process and all of the factors which are discussed in the subsequent sections (Tetra Tech Inc. 2001).

6.2.2 Decision-making

The process design influences the type of decision making methods employed by a given stewardship group, as decision making is a subsidiary to the overall process. Two aspects of decision making need to be considered—internal and external decision-making. The internal decision making process refers to the way that decision making transpires within the organization. External decision making refers to the breadth of a stewardship's decision making beyond the immediate activities of the organization.

There are many types of decision making methods that can be used by a stewardship group. Some methods are: consensus-based, shared decision making, voting and multi-stakeholder methods. Many stream stewardship groups use a multi-stakeholder approach. A stakeholder is an individual or an organization who has a direct or indirect interest in an issue. The rationale for a multi-stakeholder approach is to achieve broad-based support for a plan or policy. Consensus based-decision making is an ideal model, and requires that all stakeholders at the negotiating table be in agreement about an outcome or decision. A multi-stakeholder approach can avert confrontational situations when trying to resolving conflicting interests or points of view. A multi-stakeholder process allows sharing between all involved parties rather than just one proponent representing a government agency or private industry. Each person sitting at the table is there for a common purpose but with different interests, and the decision-making process needs to ensure that every interest is satisfied with the decision. Using this type of model often results in creative and innovative problem solving.[82] Consensus decision-making promotes a win/win result thereby decreasing the potential for conflict in decision-making. The "acceptance of any solution is enhanced when those who must abide by it are included in designing the solution" (Delbecq 1974 in Gray 1985:919). The omission

[82] See Reagan and Rohrbaugh. 1990, For a model of four perspectives on effective decision processes - consensual, political, empirical and rational perspectives. These competing perspectives need to be taken

of relevant stakeholders invites political difficulties during subsequent implementation; therefore, the selection of stakeholders must be done with considerable care. All stakeholders must know that they have an equal say in decisions. Including opponents is as important as the form of participation itself - if they don't participate, then they retain their status as opponents (Rosener 1981:595). Successful multi-stakeholder processes require that participants are well informed and that data, documents, and educational material are accessible to all participants. Each participant brings different expertise and experience to the table.

The interview data about decision-making revealed the presence of re-occurring issues: dealing with conflict; transparency; time; frustration; and participants unfamiliarity with consensus decision making. Since the issues that the stewardship groups undertake are often contentious, dealing with conflict was an issue of concern for all interviewees. Many mentioned the importance of having good facilitators for dealing with conflict. The groups dealt with conflict in different ways and conflict arose from different causes. In one case, a lack of transparency caused conflict because people sitting at the round table did not feel that all of the information was being made available and that there was back-door dealing going on, and this resulted in a lack of trust among participants (LEPS). Working with a broad constituency helps to decrease possibilities for conflict because if you have representation from most interests, then they are working with the group to find a solution, rather than working against the group.

Another common issue among the groups was that participants often do not have the skills, such as the ability to negotiate, needed to work using a consensus format. In many of the agricultural watersheds, consensus decision-making is not a common mechanism for decision-making and people have to be introduced to the idea. In Salmon Arm, it took months for some people to go to meetings and sometimes they would stop attending because the decision-making process was too frustrating for them because of

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into consideration in a multi-stakeholder forum.

the language used and the time required. A consensus-based model is time-consuming and interviewees agreed that consensus decision-making was slow and frustrating. At the same time, participants also agreed that time was needed to engage in consensus decision-making and time was needed to develop trust, which is important for consensus-based processes.

External decision making refers to the breadth of a stewardship's decision making beyond the immediate activities of the organization. For example, if the group participated in decision-making bodies or processes that impact the watershed, such as land use or water allocation planning and policy, that would be external decision-making. Does the group serve in an advisory capacity to government or the NGO sector? Some of the groups made recommendations to local governments about land use planning though the group does not have any jurisdiction or final decision-making authority. Many groups members talked about the challenges of pursuing advocacy. A significant barrier to stewardship groups endeavouring to play a more important advocacy role is the strong connection that groups often have with local government. Some groups expressed discomfort lobbying their local government that provide the groups with resources, or some degree of support (such as information, maps etc.). Another barrier is that since the jurisdictional issues are so complex, many members do not understand all of the issues and where to access decision-makers. This factor was closely related to the type of leadership and process that the group had. If the group had a strong leader who was controlling of the process, there was a lower understanding of the "big picture" among participants. In cases where there was strong local leadership and a very inclusive process, understanding about decision-making processes and policy was stronger.

Another important aspect of external decision-making is how the stewardship groups interface with appropriate decision-making processes run by government. The capacity of a group to understand the issues affects their relationship with government. There is a continuum for participatory decision making discussed in Chapter 2 (IAP2 2000). At the

lowest level of participation, participants receive information about the initiative and may provide advice about issues direction or potential solutions. At the higher, consultative level, participants define the agenda for decision-making, develop and recommend solutions and review final decisions. At the highest level of authority, stakeholders participate jointly as nominally equal partners in substantive, collective decision making. If the government is to give more authority to communities, then the communities must have the capacity to take on that responsibility. The Salmon Arm group invested a lot of time in increasing participants skill level and lost some participants as a result.

> *The bottom line is that different level of government need to determine that they want public participation, it has to be one of the principles. Right now, it's that, I guess that you know, it's called public consultation; public consultation to me is not public participation. And also too, consultation at what level? Bottom level.. and top level?* (SRWRT)

The specifications of the decision-making process are important and must be established at the beginning of the process and all parties must be in agreement. To ensure that this process is successful, it is important to have a skilled leader or facilitator to recognise when closure or agreement is reached. It is often the case that decisions are reached before a chair closes discussion and this can result in unnecessary ongoing discussion and participant boredom and frustration.

Though there are many challenges to a multi-stakeholder, consensus-based process, all groups supported this method of decision-making. Time was consistently noted as the greatest challenge to this decision-making model. Time required for consensus decision-making was identified as a limitation to an inclusive, multi-stakeholder decision-making model. However, many participants expressed that if a group did not go through this time consuming decision-making the group would encounter barriers later in the process as a result of skipping the "work and time" of a consensus model. A consensus decision-making model promotes principles associated with good governance such as transparency, accountability, fairness, and equity. An inclusive, holistic approach to

watershed planning can result in a comprehensive ecosystem-based planning initiative rather than a plan that addresses single issues from single perspectives (DOE 1996:25).

6.2.3 Representation

A multi-stakeholder process brings together many different people who represent different interests and therefore representation is influenced by both process design and decision-making model used by a stewardship group. Representation refers to the breadth of participation in the stewardship group. An important consideration of representation is the range of interests involved in the organization. Addressing representation requires examining who determines the breadth of involvement and the inclusiveness of the outreach process.

A stakeholder is a group or individual who has the responsibility for implementing the decision, is affected by the decision and has the ability to impede or assist in the implementing the decision (MacPherson and Tonning 2000; Horton 1996). Stakeholder initiatives are pluralist or representative processes involving designated agents from multiple competing interests. Stakeholders can be governmental - city, county, regional, provincial or federal government agencies. Stakeholders can be the public - individual residents and landowners, schools; commercial and industrial establishments; agricultural, mining, and forestry operations; utilities; environmental, consumer or community groups. The rationale for using a stakeholder process is discussed in the previous section. Broad involvement is critical for a watershed approach, as in many cases, the solutions to water resource problems depend on the voluntary actions of many people . The literature and best management practices (BMP) show that it is critical that all actors who have an interest in the watershed be involved in the decision making, planning and action processes associated with stewardship advisory groups (Macpherson and Tonning 2000).

The range of interests involved in the process presents an interesting point for discussion. It is not practical to meet with hundreds of people in a particular process, but the

challenge put to those responsible for process design, is to identify stakeholders from key sectors. It is critical for stewardship groups to ensure that the identification and selection of stakeholders in carried out in a fair, transparent and equitable manner. Determining who is a legitimate stakeholders can be a challenge and shared perceptions of legitimacy to work together effectively. Perceptions of legitimacy will be shaped by historical relations and by the existing power distribution among stakeholders. Those actors with a right to participate are those who will be affected by the actions of other stakeholders. Stakeholders resources and skills (or lack of expertise) can affect whether or not they are perceived as legitimate and justify their involvement in collaborative efforts (Gray 1985: 923). The exclusion of legitimate stakeholders during problem setting will constrain subsequent implementation of solutions (Gray 1985).

Achieving balanced representation requires an inclusive organizational structure. Inclusive representation has both direct and indirect implications for stewardship groups. Sharing the responsibility of decision-making and ensuring that most concerns are factored into decision-making. Many parties working together co-operatively can result in direct and indirect outcomes such as partnership building to combine financial resources or establishing watershed-based frameworks for planning and activities. Indirect outcomes include building social capital and skills (Putnam 2000).

Most of the stewardship groups that participated in this evaluation strove to include anyone in the community who was interested. All groups did work with the education sector- elementary and high schools, and two of the projects had active partners with colleges or universities. Membership lists for the groups show that groups had a wide range of stakeholders involved. Members included government representatives such as DFO, Ministry of Forests, MELP, and local governments. Other members include: Community Futures, community groups such as Kiwanis, Lions, Rotary, residents, environmental societies, field naturalist societies and forestry companies.

There appears to be a relationship between initial breadth of involvement by stakeholders and the outreach methods used. The method of public outreach used varied and resulted in different outcomes. Methods used included through networks, phone calls, letter mail outs, media and word of mouth. Participants said that done through The best form of solicitation that direct landowner contact, going door-to-door and letting people know what was going on was the most effective way to increase membership and support. At Baker Creek, stewardship organizers knocked on over 250 doors of the 8000 people in the town. The majority of surveys that were returned came from households where the BCES volunteers had face-to-face contact with the residents. As a result of this effort, a meeting at the upper watershed had 50 of 200 residents of the area attend the meeting. Those community members who were not aware of the stewardship initiative expressed their disappointment about the lack of outreach to the community.

SRWRT was initiated by several interested members of the community and they brought their concerns about the watershed directly to the wider public and anyone who might have an interest was directly targeted to participate in the group (ie. agriculturalists, First Nations, landowners). When the group took on a formal structure the initiators did additional broad solicitation for membership. The Salmon Arm group had very wide public representation in both action and planning aspects of the project. The BCES solicited a wide variety of stakeholders, even stakeholders who were considered controversial. BCES included all stakeholders at the outset of the project and together, all stakeholders helped the project to develop. As a result BCES and SRWRT had a very open process and broad constituency. The BCES and Kitchner-Waterloo group were both quite small groups and had informal processes. BCES had representation of Boy Scouts, forestry companies, ranchers, the Lions Club and local government all sitting at the same table.

Both the Salmon Arm group and BCES have large memberships lists but have a small active membership. The LCWSR was the one and half year planning process that LCCC

was involved with, and it used a roundtable format. To participate in the process, the organizers asked interested parties to apply and send resumes. This approach was taken to build a team of participants who broadly represented all interests. These representatives chosen were responsible to their constituents and at several critical stages, broad- based public workshops were held, that allowed for broader participation. To solicit broad based participation, letters were sent to every group, social, recreational, neighbourhood, in the area. Newsletters and several open houses kept the community informed.

LEPS did not solicit broad-based citizen participation. The group started as one person's initiative and was housed within the Township of Langley's municipal hall. The fact the one person spearheaded the initiative had a significant impact on representation. LEPS had been widely criticized for its lack of a constituency. The lacking representation also has an impact on building community capacity. The more the public is involved, the greater the development of community capacity and assets. Ongoing outreach was primarily done through field work and the media. The director chose issues that were not contentious to the public and used stream mapping and water quality testing initiatives as a way to reach the public. They would let people know they would be in the area doing stream mapping, ask permission to be on private property and answer the public's questions. The director believed that this gave them a good platform for communication and he used data collection exercises as a way to give something back to the pubic - information about their own land, and the status of salmon in the streams.

Having broad representation is important when working on a watershed basis, since the issues are complex and long-term land and water use planning and implementation requires collaborative efforts. Having over or under representation of any particular stakeholder has implications on how the group is perceived by the wider community and stakeholders themselves. Depending upon the process and how representation is "managed," it can cultivate scepticism and distrust of the process and the stewardship group. An inclusive process that encourages broad representation will develop stronger

local ownership, which is an important consideration for group longevity; it will also promote trust and transparency among stakeholders. All of these qualities helps to maintain a strong volunteer base and strong local support and local support is critical to developing a sense of ownership. Wide-based representation also engages more citizens and provides them with a forum to further develop a sense of civic responsibility.

6.2.4 Terms of Reference

All of the previous criteria - process design, decision making, and representation - are documented in a group's terms of reference. Terms of reference generally take the form of a document that clearly describes how an organization will function and govern itself. Terms of reference define organizational structure and process characteristics. Characteristics such as: mandate and purpose; roles and responsibilities; operating rules and decision-making methods; goals, project scope and membership. A mission or vision statement may also be included in the terms of reference. This statement can provide a group with clarity of purpose and a common goal for the group. Having clearly stated goals and objectives can result in effective and efficient programs since it ensures that participants in the stakeholder process are aware of the goals, mandate and purpose of the stewardship group (Rosener 1981). If a group decides these details at the beginning it can save significant time and avoid trouble later in process.

Determining the terms of reference is an important opportunity for stakeholders to articulate the values that guide their individual pursuits and to begin to identify and appreciate a sense of common purpose for a collaborative processes. This was the forum where discussions about values came up for many groups as they established terms of reference. The groups had to decide the values that would underlie the operation of their organizations. Values such as the importance of inclusiveness, environmental values, equity or fairness.

Establishing common goals is a consensus building process. Once the group understands each participant's needs, goals and the benefits of co-operation, they can create better

solutions and incorporate everyone's needs. After establishing goals, a group needs to plan strategies for achieving those goals (Pinkerton 1993). If the work that the group will undertake is clearly identified through goals and strategies, it optimizes benefits and can minimize costs to both citizens and government because chances of achieving those goals is greater.

The interviewees expressed that the terms of reference helped the groups define their goals, roles and responsibility and it established a time line for achieving short and long-term goals (LEPS, SRWRT, BCES). All of the groups expressed that terms of reference were an important part of building cohesiveness and establishing well-defined goals and vision for the organization. Many groups used an outside facilitator to draft the terms of reference. Another issue associated with the terms of reference, was the consideration of how having a clear mandate and terms of reference may assist in achieving greater community buy-in. Drafting the terms of reference was also an important trust building process for stakeholders within the groups since it was an initial consensus process for the group to accomplish.

6.2.5 Political Support

Political support refers to the strength and assistance the stewardship groups garnered from the community and government. A stewardship group's ability to gain support is largely a product of two major factors: the history of the community and the internal organization of the stewardship group. Historical relations have an impact on people's attitudes. For example, the Community Resource and Environment (CORE) process had recently been held in Quesnel before BCES was formed, and tensions in the town were high about land use planning. The CORE left a legacy of distrust among government, First Nations and environmentalists. This type of history in the community made it more difficult to introduce new ideas, and the climate for multi-stakeholder process was not favourable.

The second factor is internal organization, itself a product of the characteristics discussed thus far. Community support is demonstrated through broad-based participation and an awareness of stewardship efforts. A stewardship group with strong community support has the capacity to mobilize the community into action or to support the group with resources. Political support is demonstrated by a group's ability to access appropriate decision-makers, community leaders media and resources. A stewardship group with strong community support has active volunteer participation in general meetings and working committees. The stewardship group needs to be able to accurately reflect community interest in order to build trust and support in the community.

Virtually all stewardship groups are sustained by volunteers and they are the foundation of stream stewardship groups. Interviewees emphasized the importance of supporting volunteers. Most stream stewardship groups have a few staff, usually none of them permanent. Volunteers need to feel like they are an important part of the process and that translates into keeping them informed and a part of group decision-making. An important factor for gaining community support is a strong support system for volunteers, strong outreach and use of the media to get the message out to the community (BCES, SRWRT). Establishing and maintaining a strong volunteer base requires groups to provide an infrastructure for volunteers:

> *To gain wide-spread community support, you need to be there for volunteers. There needs to be an infrastructure in place so that you can make sure that anybody who wants to volunteer can, whether it be a 2-hour volunteer or a 2-week volunteer. To have things organized so that anybody can do something...they need to feel satisfied at the end of it .. and they need to know how it fits into the big picture. They need to know why they're doing it. They need to have a vision.. and if they do see a vision or a piece of it, so they can relate to why they're doing this thing and how it's going to help the big picture - those people will come back, they'll be back. People like to do good things, if you give them the chance, they will. You need to have the infrastructure and facility there so they can, and then they will (LEPS).*

Broad-based community support is reflected through a diversity of community interests - citizens, business, schools, participating in stewardship efforts. People have different

motivations. A fisherman may support stewardship efforts because he fished in the stream as a child, while industry buys in because it wants to be perceived as a green operation that is environmentally sensitive (LEPS).

The diversity of representation on a board of directors or steering committee can also be an indicator of community support. The groups with most inclusive process had the strongest community support. If the community believed that its interests were being represented in the organization, interviewees stated that community support was stronger. The accessibility of the process also had an impact on community participation. Variables related to accessibility include factors such as community awareness of the group and the comfort level community to direct participation. Groups that regularly invited community participation had a greater number of volunteers. Barriers to accessibility may include cultural diversity or language barriers. The project in Salmon Arm had to address the issue of literacy and a critique of the Salmon Arm project was that it used a high literacy approach that was not accessible to all watershed residents because in the more rural areas, the literacy rates were lower.

Strong public support can increase a groups political clout. Another aspect of political support is government support for a stewardship group. Government support exists if necessary government agencies partner with the stewardship group to provide resources (funding and information) and feedback. It is significant for groups to have endorsement from agencies, even if they do not get funds from government. For example, the Fraser Basin Management Council demonstration projects did not get funding, but it gave the groups leverage when trying to secure funding from DFO, FRAP and the federal Green Plan.

The history of intra-governmental and inter-agency dynamics affects the political support of stewardship groups. Since stewardship groups have to work with many levels of government, the groups have to contend with distrust within departments, among

departments and levels of government. Stream restoration requires dealing with many jurisdictional issues relating to water, land and fisheries management, all of which are contentious issues among local, provincial and federal governments. There are occasions when a stewardship group has to work very hard to get co-operation and to get all levels of government to sit down together to resolve problems (BCES, SRWRT, LCW).

All of the stewardship groups discussed in this evaluation have an important relationship with their local government. The LEPS is physically located within the Township of Langley municipal hall. LEPS, LCW, SRWRT were all born out of a connection with local government. In two cases, the person who spearheaded the stewardship initiative was a political representative or bureaucrat in local government. Many interviewees expressed that the character of the council, (i.e. "green" versus "pro-development), had a significant impact on the stewardship efforts.

There are some people (in council) that are going to apply copious rules (by-laws) and technicalities to delay you because they have friends that are developers that want to use the land adjacent to where you are cleaning up and they want to culvert it and you want to repair it (LEPS).

Gaining the support of community and government is essential for successful stream stewardship groups. The support from government is critical for many reasons, both for the acquisition of resources, and the ability to work co-operatively with local government bureaucrats (planners) and Council members. Broad-based community support is crucial for the longevity of any stewardship efforts. The work of a stewardship group will have little impact if they can not reach the broader community to help them understand the many factors that affect stream health, habitat and water management issues in their community. To achieve long-term success a stream stewardship group need the support of both government and the community.

6.2.6 Resources

An inextricable relationship exits between political support and accessing resources. Resources sought by stream stewardship groups include: funding; expertise and technical support and; relevant and accurate data. The ability of stewardship groups to access

resources affects their ability to realize internal organizational stability, group aims and objectives. The instability of resources is a difficult issue for many stewardship groups, and is a common problem for many NGOs. Stewardship groups tend to seek resources from government and community sources.

Stream stewardship groups need tools to build their capacity. Tools such educational materials, information or modules, which can help groups achieve greater community involvement and stewardship goals. These tools help to build the capacity of all people involved in the projects. The government is an important source of these tools. The problem for many groups is accessing these resources.

The complexity of jurisdictions that stream stewardship groups must deal with further challenge resource acquisition because groups may not know where to seek information and resources. Similarly, the criteria and requirements for government funding vary considerable from department to department, making it very time consuming for groups trying to acquire funding. The groups are also subject to funding programs and political timelines that are not compatible with long-term planning for ecosystem health. Several groups were able to capitalize on funding programs with a limited timeline such as FRAP (1993-1998) or Forest Renewal BC. The participants expressed their frustration with the lack of long-term and seed funding that result from a political system that has changing mandates and priorities.

Government is a vital source of information, technical expertise and funding. Important government agencies for stream stewardship groups are DFO, MELP, FRAP, DOE, and MoFF. Interviewees indicated, in every case, that finding sympathetic contacts within government departments had a significant impact on the groups' access to resources. These agency people were key for providing advice, support, information and feedback to the groups. For the Salmon Arm group, the government representatives were a part of the process but they did not dictate the process. The government representatives worked hard

to deliver public resources to the right places at the right time and helped thus helped the stewardship group with its process (SRWRT).

Getting local government support is critical for most stewardship groups. LEPS staff called it, "selling the benefit of the group to Council." LEPS staff contended that the municipality knew that for every dollar they put in, the community got a minimum of seven or eight dollars back in terms of the benefit of the work. There is volunteer time, in-kind services and support, moneys from contracting and grants. All of the groups stated that they had an important relationship with their local government, though it was not always amicable.

Another source for resources are local community organizations and businesses (BCES). Interviewees cited that many businesses gave the groups discounts on materials and services. When groups did get resources, it was very important to give appropriate recognition to the donor, whether it was a business or individual who supported the group. Interviewees emphasized how important it was to thank bureaucrats, the businesses and community for providing support and resources.

In summary, resources are required for planning, administrative tasks and project work. Resources can be obtained from the capacities of the membership within the organization, or externally from the government and private sector. The ability of a stewardship group to acquire and develop resources has important implications for the longevity of the organization, and the quality of the work they do. Research done on the voluntary sector and public interest organizations show that having adequate funding is key for initiating any successful public engagement initiative. Volunteer time excessively consumed with funding concerns strains an organization and compromises their ability to fulfil the organizational mandate.

6.3 Outcome Criteria

The objective of this section of the analysis is to examine specific outcomes that resulted from the stewardship groups and their activities. This section looks at what the groups were able to accomplish and the analysis focuses on determining lessons learned or keys to "success" in the community stream stewardship groups examined in this thesis.

6.3.1 Education

Many facets of education are addressed by stream stewardship groups. Through different aspects of stewardship activities, the groups share knowledge, develop skills and training with their own membership, the community and government. The groups educate the public about numerous issues - ranging from how to take water quality tests to the impacts of land use on local water resources, to how to work as part of a multi-stakeholder, consensus based group. All groups in this study have a mandated educational component to their project, usually focusing on issues that affect the stream and/or watershed.[83] These activities build community capacity and social capital. This dissemination of skills and knowledge influence factors such as attitude change within stewardship groups and can spill over to the broader community.

The groups surveyed revealed that participants educated the local community about many issues and clarified misconceptions. Misconceptions mentioned included residents thinking stream restoration would mean an increase in their taxes, and a farmer having difficulty understanding why driving his bulldozer through the river contributed to erosion. The groups stewardship groups worked with and gave talks to service organizations, community groups, schools and the general public (LCWSR, BCES, SRWRT). This outreach to the community informed people about the issues and clarified misunderstandings. Educational efforts resulted in better attendance at major meetings and a greater number of volunteer participation in field work.

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[83] Some groups such as LEPS, did undertake diverse activities to include composting and recycling projects.

Schools are important partners for most stewardship groups. LEPS was a major supplier of environmental education in Langley. LEPS has trained hundreds of high school students through their training programs and internships. The group works with many schools and worked with teachers to develop curriculum that incorporates stewardship activities. A staff member of the Salmon Arm project noted the importance of this work for empowering and developing ownership among participants, skills-building and helping students develop a connectedness to place.

> *We'd involved school groups, we'd go, for example, plant trees. Then they would be going back to water* ***their*** *trees. They would come back to me and say, "hey there's something wrong with* ***my*** *tree." That's great! They took ownership...They started out with a field action by planting their trees and watering them. There were monitoring their site with their eyeballs, by looking at what was going on. They saw a problem and took another field action to protect their trees and it just kept going. Kids are the best messengers to send home with a new message. Kids bring home news and it is much more acceptable, and they tell their parents what to do a whole lot more than what we like to* (SRWRT).

Media also plays an important role in educating the public and building awareness. All groups mentioned that newspaper, television, and radio all had a great impact on spreading the word about their work. It was important for people in the community to know that somebody "cared" about the creek.

Stewardship groups fill a niche, one that creates a forum for citizens to actively participate in planning, decision-making and working in the streams in their community. Participants expressed many different types of learning that happens as a result of participation in stewardship efforts. The learning included personal learning, such as working on a consensus basis, understanding watershed issues and developing better communication skills to educating others. A greater understanding of ecosystem functioning by the broader community is important for stewardship groups to have a long-term and comprehensive impact. Stream stewardship groups are one of the most important vehicles for raising community awareness about water, stream health, and land

development issues. Building awareness increases the public understanding of the issues, and is one of the few ways to changing people's attitudes and behaviour.

6.3.2 Attitude Change

Attitude change refers to alterations in thinking or behaviour of stewardship group participants, community members, and relevant governmental authorities regarding watershed health or environmental concerns in general. Participants interviewed expressed that they had witnessed changes in attitude among different stakeholders in the community. The types of people who underwent attitude changes included children and youth, local government officials, skeptical participants and the community at large. The work done by the groups discussed in this thesis educated thousands of people in British Columbia and Ontario and made people aware of stream health in their community.

Interviewees mentioned the significant change in children and youth who participated in the stewardship initiatives. Several groups have used youth E-Teams, a MELP funded program. Under this program many youth worked with DFO directly doing habitat analysis and fish counts for stewardship groups. Many youth became extreme stewards and they were physically changing the creek and they really grew to care about stream health (BCES, SRWRT and LEPS).

The attitude of local government staff and officials towards stewardship project and activities is significant to stewardship groups. Stewardship groups need the co-operation of local government in many different areas - permits, by-law enforcement, data, funding. One interviewee expressed that "the environment" can be a scary term to both senior administration and local council. In some cases, groups had to tread lightly, to convince local government that it was not a scary term and that the stewardship groups were not a threat. Many groups expressed that local government was unwilling to relinquish power to community groups. Developing credibility and trust with local government brought reluctant councils on-side. A selling point that LEPS used was to convince the township that they could even make money doing environmental work. Many interviewees said that

their stewardship efforts moved municipal councils far beyond what they would have anticipated. The groups interviewed are working on community planning reviews and discussing other relevant policy issues with local government.

The importance of attitude change in community members was cited most often by participants. Every group encountered skeptics in the community and in every case, there were some pivotal stakeholders who were "won over." Once community members saw changes happening they became more interested and wanted to participate. For instance, at the beginning of the Salmon Arm Project, many ranchers and farmers were hesitant to get involved since they thought the project was only about fisheries management. The round table sent a man who was both a rancher and logger to a workshop on stream stewardship and then he went up and down the valley and started selling the idea of stewardship, restoration, and the importance of volunteer work. It was a very effective means for convincing farmers and ranchers to become involved. Conversely, LEPS, invited the broader pubic to be involved building some demonstration sites, to give the public something tangible to see. LEPS did not pursue community involvement on an ongoing basis. This type of approach does result in some attitude changes but inviting people to come out and work on a specific project for a few days does not engage the public in any ongoing, comprehensive way. LEPS' top down approach meant that the director decided what should be done, garnered support to get resources and then invited volunteers to come out and work on the project. This approach proved to be not as effective as the approach taken in Salmon Arm, where farmers were continually invited to the roundtable to be a part of the entire process.

Interview data revealed that the changes in attitude among community members was generally proportional to the number of people involved in the project. Outreach is an important factor for broader attitude change in the community. The more effort a group puts into reaching a wide constituency, the greater the breadth of attitude change in the community. All interviewees mentioned that they had been successful in dispelling many

misconceptions. Several interviewees said that stewardship groups need to give the community the benefit of the doubt and invite them to participate and support community volunteers when they are ready. Many groups experienced slow changes in attitude, but with patience and consistency, the stewardship members were able to involve people who had no interest in the project at the beginning. Interviewees did express that government representatives did change their attitudes towards working with other governments representatives and the community through their participation in stewardship efforts. Demonstrated successes and positive experience are the factors that often won people over from skeptic to steward.

6.3.3 Empowerment

Empowerment involves helping people help themselves, and fostering self-determination. The concept of stakeholder empowerment includes some of the following aspects according to Papineu and Keily (1996):

> (1) a perception of self-efficacy and control; (2) acquisition of resources, knowledge and skills: accessing or developing political, social or economic resources, information and skills need to accomplish personal and collective goals; (3) participation in concerted actions: the empowerment process involves individuals taking collective action to effect change, adapting social structures including organizations and programs to improve the quality of life (pp.81).

Most participants interviewed felt they fit the above description, but not consistently. Participants felt empowered when they were given a chance to offer their opinion, participate and contribute. Interviewees did state that they did feel empowered by "being heard" and feeling like there was a place for them to voice their opinion and have it considered and either acted upon or recorded in some way. Shared decision making empowers people since it is a process that reflects the wishes of diverse participants and has an impact on the wider community. The barriers such as resources acquisition, lack of political support and poor access to decision-makers affected the participant's feelings of empowerment.

Empowerment was not a conscious component of all the cases evaluated. The Salmon Arm project and the Laurel Creek initiative were both very process oriented. As a result, these projects considered empowerment quite carefully. The groups that focused on hands-on work expressed that many of the volunteers felt empowered through their sense of accomplishment, by seeing the results of their work. The Laurel Creek and Baker Creek group did very little advocacy work as part of their stewardship efforts. The limited advocacy efforts they have done was ad hoc rather than strategic. The funding infrastructure for stewardship groups did not empower groups since most of the funding is short term and thus securing funding is consistently a struggle. In any long-term process, seeing the "fruits of your efforts" often takes time and thus this is likely a limitation for those who are involved in efforts that require a longer timeline before seeing tangible outcomes, such as bylaws, OCPs or changes in legislation or increases in biological diversity.

6.3.4 Institutional Infrastructures

Institutional infrastructures refers to the creation of appropriate institutional changes or infrastructure, such as planning by-laws, or administrative arrangements, that have been put in place to allow substantive outcomes to be achieved. Typically, developing planning by-laws or regulations that favour the work of stewardship happens in two ways. The municipal government may be sympathetic to environmental causes in general or to the goals of the group, and the group can influence decision-making in a non-confrontational manner. Changes in infrastructure can also result from advocacy, and some degree of lobbying. This is a challenging issue for many groups because they may get support in the form of resources from local government, but this support does not necessarily translate into support to change land use planning, official community plans or other structures of local governance.

The Salmon Arm and Langley projects did some advocacy work on groundwater legislation but this has not resulted in any provincial legislative changes. In fact, the Langley group suggested to the provincial government that citizens who are part of a

watershed, participate in a dialogue about developing groundwater legislation. The suggestion was not well received by the provincial government. Most groups did collaborate with local government in land use planning and official community plans. The Salmon Arm group had a tree retention by-law passed. The Laurel Creek group had recommendations that were integrated directly into their Official Community Plan. Langley group participants stated that the OCP reflected more environmental considerations as a result of LEPS work.

Some of the fieldwork and base line data collected by the stewardship groups has been used by municipal planners. In this way, information is changing policy. Participants felt empowered when they felt their contributions made a difference and they were give an opportunity to offer their opinions. The stewardship groups felt they had the greatest impact at a local level. For example the results of the Laurel Creek consultation was implemented in the community plan by the municipality of Waterloo.

Participants stated that by-laws and regulations were more likely to hinder a stewardship group or stop then, rather than assist the group.

> *I would imagine it's a 9:1 ratio. For every one (regulation) that is going to assist you, nine will slow you down. If I go in to clean up the stream, it takes six months to get approvals and costs me $120 for a license, and that's to pull out a shopping cart, car tire, wallboard, undelivered flyers, out of the creek. And that's because the rules that are meant to stop the destruction of streams, are not independent from the rules that are used for cleaning up and repairing the stream* (LEPS).

Administrative arrangements, such as inter-agency or multiple agency co-operation have changed informally in an ad hoc manner. At the time this initial research was done there was not a mandate for agencies to work together on watershed issues, although programs such as the Georgia Basin Ecosystem Initiative, led by Environment Canada, do advocate such co-operative, ecosystem-based work. All of the groups that were a part of this study,

were invited by local government to participate in relevant meetings, forums or workshops.

Since stream stewardship groups do not have any authority within local structures, the institutional infrastructure changes they can influence are limited. Most of the groups interacted to some degree with both elected officials and staff of local government. The participants felt that they provided information and baseline data that was important to local government decision-making. Stewardship groups have broad community support was an important influencing factor for local government i.e. If the group had a high profile in the community, the local government needed to pay attention to this constituency.

6.3.5 Substantive Impacts

Substantive impacts refers to achieving measurable success in: a) altering the pattern of environmentally damaging development; b) stream health indicators showing a positive change; c) local planning decisions incorporate ecosystem considerations.

Time is the most limiting factor to measuring successes of the cases examined in this thesis. First, the timeline for the projects that were evaluated ranged from 3-6 years. This is a relatively short time frame to measure substantive impacts. Groups participated in OCP development but this is not a binding document and until bylaws and legislation are created, it is difficult to access the impact of stewardship activities. Similarly, it is difficult to measure impacts of restoration work over a short time-frame (6 or less years) but, common reports made by groups include: seeing the return of salmon and many invertebrates to streams (where they had been absent for an extended period of time), seeing trees grow in riparian areas that were previously barren, and returning colder water temperatures in areas where riparian restoration has been successful i.e. a tree-lined arches. The groups have collectively planted tens of thousands of trees, collected base-line data and important mapping information. Many water monitoring programs are too

recent to access. In these many ways, stewardship groups are demonstrating incremental successes.

6.4 Summary

Table 8 - Case Study Evaluation Summary

STEWARDSHIP GROUP		*BCES*	*LEPS*	*LCCC/LCWSR*	*SRWP*
PROCESS CRITERIA					
	Process Design	open, many stakeholders	closed	open	open and multi-stakeholder
	Decision-Making	consensus	top-down	consensus	consensus
	Representation		limited		broad
	Terms of Reference	developed with many stakeholders	developed with stakeholder input	yes	developed with stakeholders
	Political Support	good community and government support	poor community support, good from local government	yes	strong community and many levels of government
	Resources	government and private sector	government	government	government and private sector
OUTCOME CRITERIA					
	Education	some emphasis	strong emphasis	little emphasis	strong emphasis
	Attitude Change	yes	yes	yes	significant changes
	Empowerment	yes	marginal	yes	yes
	Institutional Infrastructure	worked with local and regional government	Some. Contributed to OCP development	Yes. Directed municipal resource allocation for watershed study.	Yes. Worked closely with local government and provincial and federal government agencies.
	Substantive Impacts	decreases in bank erosion, better water quality	significant in-stream and riparian work, increase salmon populations	yes	yes

6.5 Findings

Many people that participated in the interviews, others who I came into contact with, requested a basic list of considerations in the design of stream stewardship groups. These many requests identified a need for some kind of check list for groups so I developed the following list. The list is the product of interview information and literature reviews on public participation processes. The incorporation of these components in community-based stream stewardship groups has proven important to the success of stewardship initiatives. These factors were identified to be the "keys to success" in the interviewees stream stewardship and relate to both process and outcome criteria identified in the evaluation in this thesis.

The factors are ranked in order of importance (based on the frequency of their occurrence in interviews and interviewee emphasis).

6.5.1 Factors Identified to be Critical for Success

- **Time is required to identify and recruit stakeholders, achieve consensus and have an impact on ecosystems and institutions**
- **Trust among stakeholders is important for co-operative efforts**
- **Local leadership is critical for group longevity**
- **Empowerment does not happen organically**
- **Local ownership must be cultivated and supported**
- **Consensus decision-making takes time but has long-term benefits**
- **Agency champions are critical for resources and infrastructure changes**
- **Community and government support is necessary to meet short- and long-term goals**
- **The breadth of participation is a product of accessibility to the stewardship initiative**
- **Well-defined goals and vision help groups to focus and be more effective in their efforts to achieve goals**

- **Accountability and transparency help to build trust among all stakeholders**
- **Resources, both financial and in-kind, are imperative for achieving group goals**
- **Field action and planning need to be balanced**
- **Volunteer support requires will, good planning and a commitment to capacity building**
- **Community capacity development is an important part of stewardship efforts**

6.5.2 Conclusions

This chapter has answered some of the key questions identified in chapter one of this thesis, namely, what are important and contributing characteristics to successful stream stewardship groups. By interviewing stewardship volunteers, government representatives, and stewardship co-ordinators this chapter records their comments and identifies those important considerations for the design of a stewardship group. The following chapter will take the same evaluation structure and apply them to the Hagan Creek/KENNES Project.

CHAPTER SEVEN: THE HAGAN CREEK STORY

This chapter provides an analysis of the Hagan Creek/ KENNES Watershed Project (HCKWP) from personal insight, the perspective of project participants, and documentation about the case.[84] The purpose of this chapter is to meet the second objective in the evaluative process identified in the methodology: to evaluate the Hagan Creek/KENNES Watershed Project's approach to watershed stewardship and governance, using both the evaluative framework discussed in Chapter 3 and incorporating the outcomes from the evaluation documented in Chapter 6.

The process and outcome evaluation conducted in Chapters 6 resulted in a characterization of successful stream stewardship groups. The first two characteristics that were cited as important for successful groups were time and trust, time to establish trust from the community. In order to gain the trust of the community, it is important to have local leadership within the stewardship group. The process should be one that empowers participants and helps develop their commitment to the project. An important part of making participants feel like they are a part of the process is through the use of consensus decision making, transparent, accessible process, and well defined goals and vision. Local ownership can be cultivated through an empowering process where people are involved and understand the problems and possible solutions. For stewardship groups to prosper and succeed, it is critical that they have adequate resources and agency champions who work with the groups to help them secure resources. Political support is also important for the acquisition of resources and achieving substantive outcomes, and translating goals into policy. Many groups identified that it was important to couple field action with planning in order to diversify community participation and ensure that participants understood the importance of both the planning and action aspects of the project. Since the groups are volunteer driven, it is important for the stewardship groups to support volunteers and actively facilitate their participation. Supporting volunteers, a wide breadth of community representation and an accessible process are all-important

[84] Eight Steering committee members were interviewed as a group, with the project coordinator present. Additionally, two steering committee members were interviewed one-on-one. The project coordinator was

characteristics of stewardship groups, which ultimately build and develop community capacity.

7.0 The Study

The investigation took place between June 1997- 1999. Documents about Hagan Creek were collected from the project's inception until 1999. The project is ongoing and has evolved significantly since 1999. Events that occurred after 1999 are not considered by this thesis.

The impetus for this thesis was the Hagan Creek/KENNES Watershed Project. The HCWP required a model for the development of its stewardship component. Recommendations that resulted from the investigations of this thesis were to be incorporated into the Hagan Creek initiative.[85] The outcomes culled from the evaluation in Chapter 6 are applied in this chapter to the analysis of the case of Hagan Creek.

7.1 Summary Information

The two tables below summarize the HCWP between 1997-1999. Table 9 provides basic background information and explains the organizational structure of the group. Table 10 is a chronology of the events of the first two years of the project and will help the reader understand the developments of the first two years. This information will also contextualize the analysis that follows.

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interviewed and two student staff members were interviewed. One volunteer was also interviewed.

[85] The original intent of this research project was to integrate the results directly into the Hagan Creek project. Due to differing opinions and changing objectives for the Hagan Creek project, the results were not integrated into the development of a stewardship component of the project, although I believe this research has informed the process in some capacity.

Table 9 - Profile of Hagan Creek/KENNES

	Hagan Creek/KENNES Watershed Project
Location	Saanich, BC is 30 km north of Victoria with a population of 16, 000.
Physiographic Features	The watershed is 1, 750 hectares. The dominant land use is agriculture.
Year Formed	1997
Rationale for Formation	The HCKWP was initiated by three organizations who are called partners: Institute of Ocean Science (IOS), the EcoResearch Chair of Environmental Law and Policy at the University of Victoria and Woodwynn Farm.
Watershed Problems	Availability of water for all users, water quality and habitat loss.
Group Mandate and Purpose	Mission Statement: "To protect and enhance the Hagan Creek stream system in order to maintain sufficient water quality and quantity, to achieve the best possible balance between ecological and agricultural needs of the watershed, and to maintain these watershed functions for future generations." 6 Key Goals include: **1) Public Education and Stewardship** - build resident support for the protection of Hagan Creek's habitat, water quality and quantity **Objective:** increase public awareness and understanding of Hagan Creek and the factors that influence its health. Encourage and promote residents to take steps to protect HC's water quality, quantity and habitat values. **2) Stream restoration** - improve in-stream health and habitat through physical enhancement activities **Objective:** undertake and restoration projects that will physically enhance water quality **3) Water Resource Management** - develop a local, sustainable approach to water use and management that ensures ecological integrity and sufficient water for agriculture **Objective:** develop a watershed model that can simulate the effects of various approaches (wetlands, etc.) on water flows and aquatic conditions. **4) Planning and Policy** - ensure legislated protection for the function and features of the Hagan Creek watershed. **Objective:** develop a watershed plan for Hagan Creek that becomes part of the OCP, by-laws and other planning documents. **5) Project Administration** - Enhance and enable the activities of the Hagan Creek Project. Components include: funding/finances, project co-ordination, administration and develop partnerships **6) Monitoring and Assessment**- enable/enhance decision-making that is based on pertinent information **Objective:** improve understanding of creek conditions and factors influencing the health of Hagan Creek.
Organizational Structure	The organizational structure of the project consists of Hagan Creek Partners (EcoResearch Chair of Environmental Law and Policy at the University of Victoria, the IOS, and Woodwynn Farm). There is also a Steering committee that was formed in 1998 with 8 members. The number of staff has varied although there have been between one ½ time employee to 2 paid staff and five summer students. The steering committee had weekly planning meetings at Woodwynn Farm between 1998-1999.
Type	Watershed Group
Membership	Volunteer membership approximately 25. Volunteers have been recruited through open

	Hagan Creek/KENNES Watershed Project
	houses, community events and, one letter mail out to residents. The primary role of volunteers has been to work on the project, but they do not attend Steering Committee meetings.
Funding	Funding partners include: Government sources: DFO- IOS, MELP, Environment Canada, Human Resources and Development Canada through its Youth Services Canada Program, BC Hydro, Fisheries Renewal BC, Provincial Capital Commission Educational institutions: EcoResearch Chair of Environmental Law and Policy and Camosun College. Some funds from private donations, in kind and financial from X community service and businesses and the local Canada Trust Bank's Green Fund.
Activities	Between 1997-1998 the project engaged in general water quality monitoring, specific monitoring began 1998 and continues presently. Protection and restoration efforts include stream inventory work, riparian plantings, fence and riffle building. Education activities included working with two local schools during 1998, doing presentations to the community, having articles in local newspapers, and hosting public events.
Successes	The group has completed in stream and creek-side restoration work, collected a important baseline data on the watershed, and established public support and Municipal Council enforcement.

Table 10 - Chronology of Evolution of the HCKWP from 1997-1999

DATE	EVENT
1997	Hagan Creek/KENNES Project initiated by project partners.
1997	Tsartlip Band supports in principle, no active participation.
1997-1999	General Monitoring Initiated
August 1997	First letter from Municipal Council
October 1997	Mail out to watershed residents
December 1997	First Open House
1998	First Riffle constructed in Hagan Creek in Centennial Park
April 1998	Second Open House
May 1998	Steering Committee formed and first meeting held
fall of 1998	Municipal Approval to work in Centennial - riffle built
1999	Specific monitoring began
January 1998	Well Monitoring program began - 30 wells monitored for ground water monitoring
over 10 months 1998-1999	Work on Official Community Plan (OCP)
1998	David Bogg, City Councillor, forwards a motion that "relocation of any natural drainage or stream has to go before council (including municipality employees)." Planning committee and Environmental Advisory Committee

	(EAC) review applications.
1998-1999	Intermittent work with 2 local schools: Stelly's and Bayside Secondary
May 29, 1999	Third Open House
1999	Built 5 riffles in Centennial Park portion of Hagan Creek - significant riparian planting, stream complexing, some fence building

7.2 Evaluation Components Applied to Hagan Creek

7.3 Process Evaluation

Chapter 6 provides a description of the evaluation components, and thus, they will not be repeated here.[86]

7.3.1 Process Design

The process design creates the conditions for how an organization regulates itself, and its governing principles. The survey of other stream stewardship groups and literature show that having an inclusive and open process design can get complicated, but wide representation is important for progress and change. Other groups and literature maintain that for people become involved, they need to be explicitly invited again and again, and groups must continually go back to the community.

This section will characterize the process design of the Hagan Creek Project. The responsibility for process design and management was led by the project co-ordinator who characterized the process as "very organic."

The co-ordinator was accountable to the project partners and the steering committee. The role of the partners varied; they provided technical, logistical, advisory and in-kind resources to the project. The role of the partners was not clear to all project participants as the partners had a "ghost" with only one participating actively in the process. However, partners did influence decisions.

[86] See Chapter 3 for an outline of criteria.

The role of the Steering Committee was to direct the activities of the project with direction from the project co-ordinator. The project did include action and planning components. The operational processes of the group were arbitrary and there was little consistency in the way that that the group operated. The arbitrary and organic nature of the project had ramifications on the clarity of people's roles and responsibilities within the group. These characteristics also gave the project a lot of flexibility and let them take opportunities as they arose.

"There is no formal process because the HCC hasn't formalized anything.... There are issues brought to the Steering Committee and they are usually for prioritization..." - Steering Committee member (1) .

"The partners were in the background and they never had a visible, active role, and had their own agendas. ... There was a vagary about what the role of members were. There was a real oddity about who was running the project" - Steering Committee member (10).

We've been saying, okay, what are we? We are not a board of directors. We don't run it. You know, [....] runs it to some extent; the partners help her run it to some extent. And yet we sit in our meetings and happily make decisions about things (3).

The nature of the process was "open" though the general public was not actively solicited to participate in the planning process. The group considered involving a diversity of stakeholders to be more significant to long-term objectives versus a short term priority. The Hagan Creek Project chose a "hands off" approach to controversy and instead, tried to win people over by showcasing the project. This approach worked well for the group. The group identifies themselves to be inclusive and they did not actively pursue additional membership. Volunteers were invited to participate in workdays but few were invited to planning meetings and the policy issues related to the work being done were not clear to volunteers. The co-ordinator stated, "*It is open, organic really, open to people who want to get involved. If they want to bring something to it and people pick their roles accordingly.*" Another steering committee member stated, "*I wouldn't use the term "open." I would say the project is evolving, and because of that, you start needing to have some friends around it.*"

From May 1997-May 1998 the project was staffed by the project co-ordinator and 2 people donated by IOS and Woodwynn Farm. The project existed for a year with this staffing level before the volunteer base and steering committee was developed.

It was hard to determine who was deciding things, and how the group was representative of the community. We suggested more of a panel of people who have time and want to get involved and have those people directly coordinate instead of always being top down. Lets plan it. Establish some goals. There was reluctance, and well, people have different ways of doing things. It is hard to explain" - Steering Committee member (10).

The process design and organizational structure impacts the ability of an organization to share power and control. Distributing power and control can be a very difficult exercise, but as best management practices, case studies and literature attest, it is an important step in letting local people direct a project.

Clear process design that supports the principles of good governance requires that paid and unpaid staff have an idea of how the organization functions, their role, the broader spectrum of interests, relevant issues and governance. Volunteers and staff at the Hagan Creek project were not clear about roles and responsibilities, the groups' organizational structure nor the broader issues of watershed management. Cultivating more clarity in this respect could have helped to avoid confusion among steering committee members and increased the likelihood of volunteers to become involved in the planning and policy issues.

7.3.2 Decision-Making

Process design will influence the decision-making procedures of a group. The decision-making component of this evaluation examines the decision-making methods employed by the stewardship group.

From the interviews conducted, comments reveal that a small number of people were involved in decision-making, usually only between eight and ten, with information flowing from the top down. At times interviewees felt that the co-ordinator filtered what

was brought to the table, and shared information on a "need to know" basis. This influenced perceptions regarding transparency and legitimacy of the project and its aim to be community-based. As discussed in Chapter 6, without a good decision-making process it is difficult for a group to meet its goals and objectives.

Some interviewees felt that the project co-ordinator made many independent and discretionary decisions. When issues were brought to the steering committee, the decision-making process used was informal consensus. The HCKWP is not a multi-stakeholder group and does not have established procedures for dealing with conflict within the organization. The project has no decision-making authority beyond the organization, though they did work in an advisory capacity to local government during the OCP process.

Several issues mentioned by project participants that affect decision-making processes in this group were transparency and time. Since there was not clarity about roles and responsibilities, group members were unclear about decisions that were being made and how information was flowing. The group also talked about how sometimes time and opportunities did not make consulting them the most expedient way to get things done.

"*The group dynamics are very fluid, people's roles shift very easily, depending on their node of expertise. In my experience, I am more structured and some projects move very slowly because there is not a dedicated pathway, and things don't move along*" - Steering Committee member (1).

"... we feel we want to participate in the decision-making. So, we were finding a lot of things coming up at one meeting, we'd make a decision on it; never hear about it again because six more things came up. And we're starting to get concerned, you know. Are these things even being done after we've left them? So we've started to try and define what it is.. the tasks that we're doing and then... working on a work plan so that we'll be able to say, okay, these are the things that we're doing and here's some time frames for them and these have been accomplished now. ..if we are making decisions we want to know that they're real and ...," - Steering Committee member (1 & 4).

While steering committee members trusted in their co-ordinator, they wanted to be active, take responsibility and be more involved in decision-making.

"Most of use have spent time working in different volunteer organizations, and you know how one person can end up running everything, and you know, they can get a little bit lost and it's hard to keep your own perspective. If we're saying we want to participate in the decision-making, we should also take on some of the responsibility" - Steering Committee member (5).

"Three months ago we didn't even know if we had a budget. And it was not something we didn't asked about... We wanted to take more... not take control but be more informed because some of us also have some ideas how to get some of these things done" - Steering Committee member (6).

This situation demonstrates the way leadership style affects overall process and decision-making. Much like the co-ordinator of LEPS, the Hagan Creek co-ordinator was charismatic and got tasks accomplished in the most efficient manner to meet the goals of the project. This characteristic helps a group to continue momentum and capitalize on opportunity but it does result in limiting the capacity of other group members. Strong leadership is an important feature of stewardship group and it is difficult to balance inclusiveness, consensus and efficiency.

The group dealt with minor conflict within the group and worked hard to avoid conflict with external actors. It appears that the group had a fear of aggravating particular interests in the community and they dealt with opponents on a one-on one basis as conflict arose. An example of external conflict arose when the horse riders constituency voiced opposition to the work of the Hagan Creek project. The horse rider was concerned about access to the creek and the problem was solved by putting in a locked gate and giving the horse rider a key. The situation demonstrates the group's sensitive to the community

"The group is really hesitant about conflict, and take a conciliatory approach to those opposed to them and frame conflict as an opportunity. The coping strategy is seems to try and accommodate people who challenge the project and try to understand where they are coming from and shift the approach so that the person's concerns are addressed. [ ] tries to understand what the other person wants, what committee wants and then tried to make the situation work...The group is really sensitive to causing conflict. Very anti-causing conflict.....Don't want to be perceived as watchdogs. Conflict is seen as opportunities to work with people rather than start a media campaign." - Steering Committee member (1).

The non-confrontational approach has resulted in some conversions on individual basis. The co-ordinator cited several residents who showed some opposition. *"There are [... and ....] and then [...and ...], the horse people. Now they are buddies and they have asked us for our help.*

Hagan Creek group has not developed a formal decision-making process and differs from many of the cases surveyed in Chapter 6 because the HCKWP is not a multi-stakeholder group. The homogeneity of the group, the process design and leadership style has resulted in a decision-making style that is *ad hoc.* This can be good because it gives the group flexibility. However, the participants of the steering committee are not always kept informed or nor are they clear about operations and decisions.

7.3.3 Representation

Representation refers to the breadth of representation in the stewardship group. The steering committee membership of the HCKWP has ranged from seven to nine participants. The number of volunteers involved in project activities between 1997-1999 was estimated to be approximately 25. For the first year there was not a steering committee so the project co-ordinator and the partners directed the development of the project. Community participation (aside from partners, who are residents) in the project began in 1998. Once the steering committee was developed, the interests represented included farmers, Saanich Inlet Protection Society (SIPS) and, landowners. Overall the breadth of participation in the HCKWP was limited. Broad community support provides a source of political support for groups as it increases group legitimacy, builds social capital and helps to build government support.

Outreach activities to solicit membership or broaden representation were not a priority for the group. In the months that the researcher communicated with the project co-ordinator about additional community involvement, little action was taken to address this issue. The priority goals appeared to be data collection and the reasons for the slow approach to broader community involvement was not made clear. In 1997, six months after the project had started and significant external pressure to do outreach, 3000 letters went out

to watershed residents, telling them about the project and inviting them to participate. The co-ordinator received twenty-five responses. Mail out survey response rates are typically not high and this likely explains the low return rate, though the letters served to introduce the project to the community and therefore served as an outreach tool. The survey cases indicated that the best way to acquire support is to make personal contact. The respondents' questionnaires were put into a database, however respondents were not engaged in the project, nor was a community group struck. At the second Open House in 1998, a questionnaire and sign up sheet asking for steering committee members was posted and the names from this event were then added to the list of interested survey respondents.

The breadth of representation on a stewardship committee reflects the level of actual community engagement, local ownership and prospects for longevity. Though many community members only want to be involved in work projects, the group would benefit from additional membership on the steering committee.

The project partners hired the project co-ordinator and initiated the project. From the interviews conducted, it appears that the project co-ordinator, under the guidance of the project partners, controlled broader public involvement in the project and thus determined who could be involved. Despite efforts from one of the partners and a stewardship advisor, there was some reluctance to recruit new members to reflect a broader representation of the community
. The researcher was told that the community was not ready to be involved but there were not any explicit explanations given about why they were not ready. Ultimately, a staff member from Woodwynn Farm initiated the development of the steering committee.

"We started the first meeting with people who had time, some expertise, prior connection to someone around that table, or had come to the open house. We weren't extremely selective. We spent about a half day calling people and inviting them and asking if they knew anyone else who might be interested. At the first meeting, we stated that we have a coordinator, and the role of the steering committee would be to direct the coordinator as to what we want done, we needed to form a committee that does what we think needs to

be done for the watershed because to date it seemed unclear that the coordinator was willing to share the decision-making... We wanted more people to participate, to throw ideas at ... let's hash it out with people who are concerned for different reasons" - Steering Committee member (10).

"The outreach approach was unique, it was *mainly project-based, no stewardship program and yet it has worked because there is no one around to follow-up though there was funding for it. ...Most outreach is project-based, ad hoc, like someone is out walking his dog and then asked to help with riffle or riparian planting, and rescue, fence building etc. People became involved in work days, through different local contacts, friends, there is a tremendous amount of talk that goes on (has worked very well for them) people are supportive when they walk by. Some have been recruited from local events, getting people out to festivals, open houses, streams and Inlets celebration"* - Steering Committee member (1).

To date, there has been little effort to broaden the representation of the steering committee. The group did not solicit government representatives to join the steering committee. For example, the co-ordinator acknowledged that there is a need to develop some business and more agriculture representation at the table. The groups' approach to developing the steering committee was to recruit community members who the group member(s) thought should be on committee and the approach was quite informal. The criterion for joining was anyone who wanted "to have constructive input toward the stated objectives of the Hagan Creek Project."

Numerous youth have worked on the HCKWP but they have not participated in the Steering Committee and did not have a clear idea of what the watershed issues were. This was an opportunity where youth could have learned about the complexity of watershed management issues. Instead, they focused on technical and in-stream work and the links between their work and policy issues were never made clear. Some of them were not explicitly interested in the bigger picture, but it would have helped them understand how their work fit into the broader issues. Expanding representation and fostering inclusiveness requires that participants are invited to become active in all areas of the project. If these opportunities were offered to all who worked on the project, it would have been more inclusiveness.

When the steering committee was asked if they thought they were representative of the community one member responded: *"I'm not convinced that we are a representation of the community at all. We're co-opted, we're interested people. We've got our own little constituencies behind us here, that's what we're representing. I think we are here to a great extent, just as individuals with an interest, mainly a common interest"* - Steering Committee member (7).

Evidence shows that the people who are not involved but have an interest in the outcomes, are potential "blockers" of progress and meeting the long-term goals of the project (IAP2 2000). If these other interests are not involved in the project or not invited, then those parties can impede the progress of the group. There are several interest groups in the watershed who were not supportive of the project and were not invited to participate in project planning or activities. These included interest groups within the agricultural community who thought that the project was all about fish. Another important stakeholder is the gravel excavation company, Butler Brothers, who were never approached. They, along with many others in the industrial sector of the watershed, were not invited to participate in the project. If these other groups had been invited to participate then the project would have increased their accessibility and community inclusiveness with the broader representation. Many of these stakeholders are difficult to recruit but as Chapter 6 discusses, often if you can involve someone from a particular interest group, that person can become your messenger.

"I want to get things done rather that slow things down. I just want to be able to go out and get it done. If there was someone that I wanted on the committee then I would pursue them. That was what I did to get someone from SIPS, I kept calling Fran and finally she came to an open house and I invited her to be on the steering committee" - Project Coordinator.

When asked if there was general participation from the community a steering committee member responded "*No, not really. Not participation, there is awareness but not participation.*" (8)

There was a general sense among the group that there was not anything to involve the broader public in, that the role of the greater community was limited to participating on work days. The barriers to broader participation as identified by committee members and the co-ordinator were a lack of money, experience, equipment and time. Volunteer support requires a lot of time and energy and it is a challenge for many stewardship groups. These sentiments are reflected in the following quotes.

"Now we could have thirty people involved in surveying instead of just four or five but we have got to plan for that. And you know, are we ready to train them? Do we have equipment for them? And where's the priority?" - Steering Committee member (7).

"*It's a volunteer organization. And it is a time commitment, and the more people you have, the more time you spend on the telephone or you can be out there doing the water monitoring and that's the real constraint to the number of people you're dealing with, I think. That's certainly always my constraint anyway"*- Co-ordinator.

"From my experience, most people are not too keen on spending time in meetings. They are much more task oriented and you tell them to do something and they'll be there doing it. And that has not happened on a large scale yet. Because we are not ready yet. [And what will make you ready?] A plan, with a budget and resources, say okay now, you know, yes we want to do a mass planting in certain places. Fine. We need to sort some bodies out for that" - Steering Committee member (8).

"We spend a lot of time working on the infrastructure, working out our mission statement, working out all these things that are invisible in terms of people on the ground, in terms of people actually doing things and now we're getting poised to have the support internally to be able to actually reach out and start organizing things because before we didn't have that" - Steering Committee member (2).

The group approached people in the community when they needed to get approval from landowners, or when there would be impacts on their activities if approval was not sought.

"There seems to be a nebulous idea of "the public" in the group, and they relate certain people or communities in relation to specific objectives, and if they can we get the community members on-side for something specific. There was an incident about putting up some signs, a landowner was upset and so now when they put up signs, the steering

committee member talks to the landowners to make sure it is OK. The group also had to get permits from the municipality and it seemed like they would rather work with the municipality because it is more straight forward than dealing with homeowners and/or community members. They are better with institutions than the public" - Steering Committee member (1).

As established in the literature and cases evaluated in Chapter 6, broad involvement is important for a watershed approach as in many cases the solutions to water resource problems depend on the voluntary actions of many people (Macpherson and Tonning 2000). The evaluation in Chapter 6 also revealed that the way that a stewardship group starts has a direct relationship with the breadth of representation. LEPS and LCCC, which were municipality-initiated organisations, had narrow breadth of representation and constituency. Similarly, the HCKWP was not a spontaneous grassroots community initiative, it was conceived and developed by three individuals who were residents of the watershed but all were linked to prominent institutions (farmer, DFO, University of Victoria).

Similarly, the lessons learned from other stewardship initiatives show that successful watershed programs:

> Ensure that diverse participants are brought into the process early, have a generous opportunity to participate and are afforded a productive long-term role. The public should be involved in the process of developing a program from the start and its role should be maintained throughout the decision-making process. This is a key element to project success. It is difficult to include all interests and a diversity of viewpoints, but this is necessary for a program to be credible and to become an accepted and adopted way of behaving and thinking about the resource (Golden and Rogers 1996).

The breadth of community representation on the steering committee was narrow and the steering committee was developed one year after the project began. This approach resulted in lower community ownership to the project and to watershed management issues. If this group lost the co-ordinator it would be difficult for the project to continue because there is little ownership of, or general knowledge base among, all participants.

Sharing responsibility also diminishes the workload of staff as they can share some of the work with volunteers.

Since the Hagan Creek group chose not bring create a multi-stakeholder forum, with various actors and they did not create a forum for agency representatives to sit down together, or get municipal staff from other departments to sit together. This was a missed opportunity as the surveyed groups highlighted the importance of this multi-stakeholder quality to process design and governance. Admittedly, this type of forum can consume a lot of an organization's time though there are certainly long term benefits. A second missed opportunity that results from less community involvement is the degree of capacity building that can be achieved since the breadth of representation has an impact on building community capacity and assets. The more the public is involved, the greater the development of community capacity and social capital.

As the interview results demonstrate, the committee members and project co-ordinator did not feel that broadening the scope of community involvement in planning activities was a priority. At the project outset, the primary objective was data collection. The group was of the opinion that there was not a significant role for broader participation in planning activities and that the role for broader participation was in actual physical in-stream work. Trepidation about "politics" among community members may also have been a reason for the group's reluctance to do broader outreach.

The outreach component of the project was weak. There is a significant difference between saying that the group is open to broadening representation and in actively pursuing and recruiting broader representation. Recruitment is time consuming but unless actively done, it does not happen organically. The best form of solicitation cited by participants in the evaluation documented in Chapter 6 was going door to door, to let people know about the project, inform them and invite them to participate.

7.3.4 Terms of Reference

The terms of reference usually describe how a group will function, operate and govern itself. The HCKWP does not have terms of reference. The group has a mission statement and objectives (see Table 9) that were developed by the steering committee, which formed a year after the project started. The group used their objectives to measure what they did against the mission statement. The process design and decision-making systems are fairly arbitrary and there were no specific terms of reference to guide the work of the project. This lack of clarity about scope and plans impacted representation because it is hard to recruit people if what they want to accomplish and how they are going to get there is unclear. There were no clear terms of reference that outlined roles and responsibilities within the organization. Partners acted as a technical committee but their role was not clear to participants. The group does not have clear and measurable process documented for achieving goals, milestones or evaluation.

"If it was clearer it would be easier to explain and it would be logical and people would understand and know what to do. There are all of these needs, there are so many things that need to be done in the watershed. We need to figure out where you go first, then we could figure out how. I know all the issues but I don't know how to prioritize the problems and the process. I hoped that the steering committee would, but it is ad hoc." - Steering Committee member (2).

At one point a member of the steering committee did request that specific terms of reference and a longer term work plan be drafted. According to others, the member was somewhat abrasive and the project co-ordinator did not respond to the request. After a few months of requesting, the frustrated member left the committee. Frustration from the lack of clarity about the project was also expressed by a number of other participants in the project.

7.3.5 Political Support

Political support refers to the support that the project receives from the community and government. The strength of community support is partially reflected in group

membership and the commitment of a large range of individual community members and community groups. This support means that the local community is not only aware of, but also active in, the project and that the group has demonstrated its ability to reflect community interests. Strong community support also includes local control, and involvement in decisions affecting the watershed, and access to a large pool of volunteers. Strong political support from government is demonstrated by a perception of group legitimacy, ongoing dialogue and co-operation between the group and local decision-makers.

The HCKWP does have community support and there is some awareness in the community of the group's activities. As section 7.3.3 on representation discusses, there is little diversity of community interests on the steering committee and in ongoing group activities. However, the group has been effective at raising awareness among the community, and most community residents who come in contact with the project were supportive of the work that was being done. Although they do not have a large number of active supporters, the general attitude in the community is positive. The group's non-confrontational approach has allowed the HCKWP to achieve many successes. They used the media to advertise their projects successes and were able to secure resources to continue their work. The project was involved with two local schools during the 1997 and this interaction was positive for the group's profile in the community. In 1999 the project began to develop partnerships with other local community organizations including the 100 Year Vision Committee, Saanich Inlet Protection Society and the Central Saanich Ratepayers Association. The groups worked together on a joint project. This partnership demonstrated an important step in expanding community support and the joint initiative was endorsed by the Municipal Council resulting in the HCKWP winning a Provincial Capital Commission Award for developing partnerships to address stream health.

"Community support was developed from being around the creek, and public feedback was good, and businesses were supporting activities too. The community perceived the group as a legitimate interest. They have worked hard to be seen as a science-based group and they frame everything in terms of scientific language - salmon-stream rehabilitation, oxygen-concentration increase, reduce erosion, that's how they talked about it, and salmon habitat, they have stuck with that. They have kept their talk about

the creek in those legitimate terms. They don't express values in their "talk". They have also aligned themselves with the dominant legitimate institutions: DFO-IOS, provincial agencies like MELP, local schools, the municipality and the corporate sector - BC Hydro and Centra GAS. Political support is strong from council and gets stronger because the group is delivering on their projects. Their work is showing positive results such as after building the riffle, there was an increase in trout" – Steering Committee member (1).

The group had the support of senior levels of government to varying degrees. The government agency representatives did not participate directly on the project, but they provided the group with positive feedback, funding, resources and, technical advice. These agencies included DFO, MELP and, DOE.

The group does have the support of the District of Central Saanich. The group has had little interaction with CRD. On the group's relationship with CRD, the co-ordinator stated:

"it has been a bad relationship, with no real support. I pursued it a bit. The barrier was partly personalities and Hagan wasn't a big priority in CRD, not a big profile, not a squeaky wheel. There is a certain element of individual personalities that play into government support. For example Tom Rutherford of DFO is always helpful and available and he goes way beyond what he needs to for us."

"There was support and awareness from the local government, networking between local government and the group, SIPS, liasoning with other interest groups such as the Sierra Club because the coordinator has ties with them. Those connections happen on another level, not at the community level, not with those who live in the watershed" - Steering Committee member (2).

" Support is not at the grassroots but rather at the municipal, agricultural committees.." - Steering Committee member (1).

A group with strong community support is able to use their access to decision-makers to undertake advocacy functions, train other community groups, and organize, co-ordinate and disseminate information and community development activities. The group did not pursue advocacy because it was not the group's immediate goal and they did not want to push something without knowing how far Council would go without strong community

support.

The HCKWP had a degree of political support from community and government. A challenge to pursuing a greater advocacy role is the group's lack of broad community active support. The group had not pursued a strong relationship with a broad constituency in the community, nor had they pursued a strong ongoing relationship with local government. The group sought approvals and permits from local government but there had not been planning or on-going collaboration with municipal staff. The project was supported in principal but there was little ongoing participation by community members or government representatives. The strong support of the initiating partners, including institutions such as DFO- IOS and the University of Victoria, contributed to the perceived legitimacy of the HCKWP. Additional partnerships with other community organizations, coupled with stronger outreach to community residents would likely bolster political support significantly.

7.3.6 Resources:

There is a strong correlation between political support and the ability to access resources. The resource component of the evaluation examines the general resources that a group has for planning, administration and projects. As a general rule these resources include funding, materials, information, community group's strength, knowledge of the members and commitment.

The organizations that have provided resources to the HCKWP are listed in Table 16. Federal and provincial government were the main sources of funding for the Hagan Creek Project. Like many stewardship groups, this strong dependence on short-term government funding programs results in funding instability. The funding base has not been diversified to stabilize the project and funding sources. This is a common problem among community-based and non-profit organizations. The overall project budget has ranged from $75, 000 in 1997 and 1998 and $85, 000 in 1999.[87]

[87] Figures given by the project coordinator as approximations.

The leveraging of the project partners was considerable since they consist of significant institutions, a federal agency and a university. The partners played an important role in resource acquisition, provisioning and leveraging. There is a discrepancy between what Woodwynn Farm estimated their contributions in water quantity monitoring and staff time to be and what the co-ordinator estimated the contributions to be. The representative from Woodwynn estimated contributions to be approximately $120, 000 by 1998, the coordinator estimated contributions at about $15, 000 in 1997, $10, 000 in 1998 and $5, 000 in 1999. Between 1997-1999 the Eco Research Chair contributed $28, 000. The IOS provided many in-kind contributions including technical advice, office supplies, equipment, office space and financial support estimated to be approximately $20, 000/year. DFO support has also been strong, and they have provided continual support in-kind and staff time. In fact, the group received significant support from DFO considering that Hagan Creek is not a salmon bearing stream. The project co-ordinator commented on the accountability she feels to DFO for their ongoing support and commitment.

"As a representative of DFO, personally I feel a huge responsibility to DFO, that is who makes this situation a reality. I do things that go beyond the scope of the creek because it is more important in terms of peninsula -wide efforts. Solutions need to happen on a peninsula scale; the Steering committee sees it only on a Hagan Creek basis" - Co-ordinator.

The group did receive private sector funding from Canada Trust Company through its Green fund, private donations and local businesses. They received discounts on supplies for riffle and fence building materials from several local businesses. Additional sources of funding included subsidies for co-op students who provided inexpensive and flexible labour. The HCKWP had as many as five students, and their salaries were paid by grants from HRDC and BC Hydro. The provincial crown corporation of Fisheries Renewal BC also funded the project, and the group acquired some local funding from their partnership with the Central Saanich Ratepayers Association.

Project partners did provide the group access to a lot of data and expertise (in-kind support), but they were limited by funding dollars available. An area where the group needed additional funding was for monitoring equipment and staff. The activities that the group engaged in are project based and one participant expressed concern about the link between projects and funding,

"Since the structure of the group's activities is project based, they require funding for all activities and thus they are continually searching for funding. It means that every major thing that the group has done, is dependent on one grant or another. There has been nothing that wasn't specifically related to one grant. The big open house was a $5000 grant, the fence building was part of a grant, the riffle building was part of a grant, and stream surveying was grant money. Activity is tightly tied to grant money. Everything except for [the coordinator] because she will keep going even if there isn't money to pay her, but not with the same time commitment" – Steering Committee member (1).

Project-based funding is a very common challenge for stream stewardship groups, and NGOs generally.

Other elements of resources to evaluate include: group access to relevant and accurate data, contacts, experts and other sources of information. The HCKWP focused information acquisition and the group worked hard to collect and monitor water quality and flows in the watershed. The group also began a groundwater-monitoring program and launched an impervious surface study. The group collected, and continues to collect, important baseline data that is useful to many other agencies, most particularly the municipality of Central Saanich and surrounding peninsula jurisdictions.

The HCKWP has been fortunate to have the support of its partners. The support of IOS, University of Victoria and Woodwynn Farm helped the group's resource base considerably. IOS and Woodwynn Farm particularly provided valuable on the ground sources of information and expertise. The ERC provided significant support launching the initiative, searching for a co-ordinator and securing initial agency grants. Some government agencies provided the group with expertise, including MELP's Groundwater Branch who helped with the well monitoring program. MELP installed the monitoring

stations for the project. The group has done some work with municipal departments and has collaborated with the Parks Department during their work in Centennial Park, and they have had some interaction with the Planning Department. The Project has worked indirectly with the Environmental Advisory Group of the Municipal Council on the development of the Central Saanich Resource Atlas, which completed comprehensive GIS mapping of the municipality.

7.4 Outcome Criteria

7.4.1 Education

The elements of education evaluated in the HCKWP include the ability for the group to share knowledge, develop skills and training with the group's membership, the community and government. The project did not have a formalized education plan or strategy but they did engage in educational activities. The HCKWP also developed the skills of project participants. Steering committee members learned to do water quality testing and two steering committee members took the Stream Keepers training program and another member took the Shore Keepers Program.[88]

In 1997 the HCKWP worked with two local schools on and off, doing invertebrates surveys and talking about the health of the creek. This work was a great success with students, teachers and school principals. The students brought their projects to the 1997 Open House, and several students did their science projects on Hagan Creek. The project also provided an opportunity for several co-op students to gain valuable hands on experience.

The group educated the community at large with displays and presentations at many venues including the local Peninsula Market. In 1999 the steering committee members stated that once the stewardship program was up and running, there would be more

[88] Stream keeper training teaches people to assess, monitor and protect their streams. It uses a scientifically sound methodology. It is administered by the Pacific Streamkeepers Association.

opportunities for one-on-one and group education. The Project launched a web site in 1998 though it has been difficult to keep up to date because of time and resources. The project also produced some educational materials on watershed management. Much of the educational component of the project is ad hoc and the volunteers seize opportunities when they can. The group cited that a major educational opportunity for them was when they were out in the stream and passers-by asked about their work.

"Even people part of a work team will learn something, many people do not even know that there is a creek there. At that level, there is some learning going on. It gets broadened every time that we have another work gang. The people are talking creek" – Steering Committee member (1).

The well monitoring program launch in 1998 had a strong educational component. Many of the landowners who volunteered for the monitoring program had an interest in learning. *"Most had a personal interest, some were interested because having a good well could raise their property value, some wanted to learn about everything"* - staff. The well monitoring project volunteers had monthly contact with a staff member (2).

In 1999 the HCKWP, through a partnership with other organizations, conducted a public education project to promote greenway values in the watershed. The group held several educational events such as the large Open House in May of 1999. This event was held to introduce residents to the HCKWP, the concept of stewardship was well received by community members. This event bolstered community awareness about the initiative and stream health. The group also received media coverage in local papers.

The Hagan Creek initiative also increased the awareness of local government to issues about the health of the stream. For example, one steering committee member discussed their educational efforts directed at municipal employees to, *"persuade them not to take logs out of the stream in Centennial Park. Because they used to clear up all that garbage out of the creek." (8)* These educational efforts have impacted the way work is done by municipal employees. The group's activities in the watershed also heightened Council's overall awareness of watershed health issues.

An evaluation measure of education is the ability of the group to share and transfer knowledge. This requires assessing whether the work of the HCKWP used the scientific, technical and local knowledge they collected and integrated it with social and economic concerns to form a holistic information base about the watershed. A point of inquiry is whether or not the group keep in touch with the personal values and knowledge of the watershed residents and in turn share this information with the municipality and other government agencies. The project did pursue local knowledge from residents in the watershed and some of the results were compiled into reports or papers, on a project basis. The well monitoring program did give direct feedback to participants and this was facilitated by ongoing contact between staff and community participants. When doing the research for this thesis, there was not a comprehensive assemblage of data collected to create a clear picture of the watershed. Similarly, there has been little research on the economic profile and social profile of the watershed. Organizing the data to create a clear, holistic picture of the watershed could assist the group in recruiting membership and strengthening their relationship with government representatives and staff.

The project has increased awareness in the community though they did not have a strategic emphasis on social learning and education in the project. Assessing the impacts of educational efforts is difficult since the project did not have specific educational programs or milestones. The project's approach appeared to be opportunity driven and the group capitalized on opportunities when they arose. Since the membership of the group was relatively small, the multiplier effect of their educational efforts was smaller than if the group used the same informal approach but had bigger membership. To date, much of the support garnered by the group has been based on project work versus the transfer of information to decision-makers and other community members.

7.4.2 Attitude Change

Educational efforts often result in attitude changes and behaviour modification. This element of the evaluation probed whether interviewees observed attitude changes in project participants, community members, and relevant governmental authorities. The

steering committee members are like-minded individuals and thus, they noted there had been little attitude change among them. Since the participants had a smaller role in decision-making, and it was a homogeneous group, there was no noted learning about group dynamics, organizational development skill building or conflict resolution. The participants felt their presence in Centennial Park was significant to attitude change in community members. Their presence gave sceptics in the community an opportunity to see what the group was doing and they also attracted people who did not know about the group or the Creek, who were very supportive once they understood what was being done.

The group's relationship with the local government has improved since the beginning of the project. The local government endorsed the project in principal at the outset but as a steering committee member stated, "the group has done a good job of getting the municipality to support the project an their support strengthens with each passing year."

7.4.3 Empowerment

The term empowerment refers to helping people help themselves. Like some of the other cases evaluated, empowerment was not an explicit objective of the Hagan Creek Project. The interviewees expressed that, through hands-on work, many of the volunteers felt empowered by their sense of accomplishment, by seeing the results of their work. The group was able to use its resources to achieve many desired outcomes. The people who participated on the steering committee had a regular forum where they discussed their concerns, and gave them the opportunity to acquire some skills and knowledge. The group's efforts resulted in small and practical changes, but those changes were not 'substantial'. Significant change in attitude requires time, and the HCKWP is still in its infancy. Since the HCKWP had an educational component, it provided information to community members and this does give people the opportunity to make more informed decisions. This learning process also serves to develop social capital in the community.

The funding infrastructure for stewardship groups does not empower groups, as most of the funding is short term, and thus securing funding is consistently a struggle. This is not

likely to change as government agencies do not provide seed or operational funding or grants. As recent program cuts at the provincial level, such as Fisheries Renewal BC, indicate, there will likely be even less funding available to community groups. To combat this problem groups need to seek foundational and other private sources for funding. In any long-term process, seeing the "fruits of your efforts" often takes time, and thus this is likely a limitation for those who are involved in efforts that require a longer timeline before seeing tangible outcomes in the policy realm, be it bylaws, OCPs or legislation. In the case of Hagan Creek, the group did participate in the OCP process. To date no by-laws supporting stewardship have been passed.

7.4.4 Institutional Infrastructure

Institutional Infrastructures refer to the creation of appropriate tools such as planning bylaws, or administrative arrangements that have been put in place to allow substantive outcomes to be achieved.

The HCKWP made a concerted effort to use a non-confrontational approach to working with local government. They focused on building the confidence and trust of local government at arms length. The group garnered support from the local government, but the co-ordinator expressed that she was unsure how deep that support was. Since she is unsure of the degree of support, she felt she had to be careful about how she approached the local government with her concerns. For example, she said that, there,

"is a serious problem with water flows in this watershed and it is getting more serious. There has been a significant decrease in flows since monitoring began in 1994 and local government is definitely looking for answers. We are waiting to have an impervious surface study completed before going to the municipality with that concern."

The group participated in the 1998 OCP review process. The project co-ordinator said the there were many conflicting objectives within the OCP, which made the group feel like there is a long way to go in changing the institutional framework of watershed management. *"The OCP is a piece of legislation that we have tried to use as a tool to get stronger action around stream and watershed management."* The co-ordinator thought

that bylaws and incentives such as tax breaks would be welcome tools to help the group meet their objectives of re-establishing a healthy watershed. The group cited the importance of the ALR in preserving the watershed.

"..the Agricultural Land Reserve (ALR) legislation, which underpins the practicality of what we are doing, because if this was like Saanich Municipality, it would have been concreted over before we could get anything done. We'd have 50% impervious surface by now instead of 12 %" – Steering Committee member (6).

An encouraging policy discussion occurred when David Bogg, a member of the Environmental Advisory Committee (EAC) of the District of Central Saanich introduced a motion in 1998 regarding the relocation of any natural drainage or stream. This motion proposed that any relocation activity had to apply to be reviewed by the Planning and EAC Committee of Council, including any work conducted by municipal departments. Although the motion was not passed it was an important step in acknowledging the important work of the Hagan Creek Project. There is a direct relationship between the introduction of this motion and the awareness built by the Hagan Creek Project.

The group participants expressed that both groundwater legislation and the *Streamside Protection Act* (SBC 2000) would go a long way to help them meet their objectives. To date there is no groundwater legislation in BC, although the *Streamside Protection Act* was enacted in 2000.

The group felt that the presence of community stewardship groups did make a difference on a local level. The group felt they had collected information and baseline data that was important to local government decision-making, though the group did not share this information with local government on an ongoing basis. Nor did the group have an established, ongoing relationship with local government employees in relevant departments such as planning and engineering. Chapter 6 revealed that when stewardship groups had broad community support, it was easier for them to influence local government i.e. if the group had a high profile in the community, the local government needed to pay attention to this constituency. The group has certainly seen some

institutional infrastructure changes such as more consideration for Hagan Creek in the OCP, the introduction of the *Stream side Protection Act (*SBC 2000) and the Saanich Council's motion regarding regulations for water diversions.

7.4.5 Substantive Impacts

Substantive impacts refers to whether or not a stewardship group has contributed to achieving measurable success in: a) altering the pattern of environmental damaging development; b) stream health indicators are showing a positive change; or c) planning decisions for future are changed

To date there has been little threat from development pressure in the watershed since two-thirds of the watershed is zoned ALR. The OCP was used as a tool to ensure that the vision for future development and zoning would reflect the agricultural and rural character of the watershed.

The stream health indicators for water quality are showing a positive improvements. The group's in-stream work has resulted in 1 km of improved riparian area, and 600m of the stream has shown water quality improvements. There have also been increased trout populations in certain areas of the creek. Water flows continue to decrease each year and monitoring is ongoing.

Time is the most limiting factor to measuring successes of the HCKWP. The evaluation period for this project was only the first two years, and this is a short time frame to measure substantive impacts. The HCKWP's participation and input into the OCPs was a substantive outcome but until time passes and actual bylaws and legislation that result can be assessed, it is difficult to assess the impact of the OCP at this time. Similarly, it is difficult to measure impacts of restoration work, over a short time period, but thus far the Hagan Creek project has seen higher trout populations; trees and plants growing in riparian areas that were previously barren; the return of many invertebrates to streams and, colder water temperatures in areas where riparian restoration has been successful i.e. a tree-lined arches. The group has collectively planted thousands of trees and plants and, bolstered the supply of base-line data about the stream. The water monitoring programs

was too recent to assess though the group has certainly achieved incremental successes in improving water quality.

Since the group has not focused on broadening its constituency, it will be difficult for it to garner substantial support from local government, which is important to achieving additional substantive outcomes.

7.5 Summary

Table 11 - Case Study Evaluation Summary of the Hagan Creek/KENNES Project

EVALUATION COMPONENTS	INDICATORS	HAGAN CREEK/KENNES PROJECT
PROCESS COMPONENTS		
Process Design	Nature of the process action and planning components to project Clear program goals and objectives Participants agree to goals and objectives Clear understanding by participants of partners expertise and priorities	Arbitrary Yes stated goals developed, but no measurable milestones or evaluative process identified Yes Roles and responsibilities unclear
Decision-Making	Open and clear Everyone has access to the same information Accountability and transparency	most information mostly limited to co-ordinator with steering committee having some information arbitrary nature of process design impedes transparency and resulted in confusion about accountability
Representation	Hagan Creek has representation from the community Hagan Creek actions reflect community values Balanced representation No barriers to participation Community outreach	Limited somewhat No Yes Limited
Terms of Reference	Well defined goals and vision for project Includes strategy and vision for achieving goals	Yes No
Political Support	Community support - citizens participate in Hagan Creek Project activities Hagan Creek has a positive profile in the community Government support - officials support the project government provides time, resources and funding	Yes though limited to approximately 50 Yes Yes Yes approximately 30. At times

EVALUATION COMPONENTS	INDICATORS	HAGAN CREEK/KENNES PROJECT
	Access to volunteers	support for volunteer poor.
Resources	Access to government information Access to expertise, technical advice and data Stable resources and funding	Yes Yes No
OUTCOME CRITERIA		
Education	Strategic education programs Community education plans	Worked with local schools in 1997 No, ad hoc educational activities
Attitude Change	Attitude change in membership Attitude change in community Attitude change in government	No Yes Yes
Empowerment	Local leadership Group develops community capacity	Very little very limited
Structures	Bylaws and policies have been passed to support objectives	Yes (OCP)
Substantive Impacts	Undertake advocacy function Access to decision-makers Improved water quality	limited activities Yes Yes (600m of stream)

7.6 Strengths and Weaknesses of the Hagan Creek Project

The characteristics identified in Table 11 were used, along with the original evaluation framework described in Chapter 3, to access the Hagan Creek Project. The following section provides an overview of the strengths and weaknesses of the Hagan Creek/Kennes Watershed Project.

7.6.1 What Worked

Overall, the HCKWP achieved many successes during the first two years of the project and has received recognition for the work undertaken. The evaluation revealed several characteristics that contributed to the success of the Hagan Creek/KENNES Watershed Project. The group had strong project partners (IOS, University of Victoria, IOS), who supported the work of the project. This strong support was an asset for leveraging other resources. Specifically, the IOS provided in-kind resources that were critical for the project to succeed. Similarly, the ERC put in significant time to lobby and secure funding for the initial start of the project. The group achieved some very tangible outcomes including the completion of several work projects in the Centennial Park section of the

stream (see Figure 2). These activities included replanting riparian areas, fence- building along a stream side walking trail, several years of water quality and flow data collection, and some public education. The group has raised awareness and the profile of Hagan Creek and watershed health issues in the community. The group also made some inroads with the local Council and has documented Council support for the initiative. The group played an active role in the OCP process and was perceived to be a legitimate stakeholder. Finally, the group developed a successful water quality, flow and well monitoring program.

7.6.2 What did not work and Recommendations

Though the HCKWP has been successful at several hands-on stewardship projects, interviewees from the HCKWP and the case studies from Chapter 6 reveal there are several important characteristics missing from the Hagan Creek initiative. The subsequent section outlines the weaknesses and follows with recommendations for the group since the work of the group is ongoing and there are opportunities for enhancement.

1. The process evaluation revealed that a key weakness of the project was the unclear process design. The "organic" and informal nature of the project design resulted in unclear roles and responsibilities of all those involved. The role of the partners in decision-making and project direction was unclear to the participants. Since the process design has an impact on other characteristics such as decision-making, representation and, on the outcomes of the project, it is an important characteristic of any stewardship group.

   Recommendation: The group could establish a course of action that is flexible and could help those involved understand the process of the group.. Clarifying where the goals fit into the overall plan and how the group plans to achieve those goals (work plans). The use of a more formal structure and procedures would make the process more accessible to current and new members of the steering committee.

2. The decision-making process, a product of the process design, was also problematic

since it was not open and clear or transparent to all participants. The informal nature of the decision-making process resulted in a lack of clarity and transparency of the project. Ultimately, the coordinator had control of decisions, information and the group operated in a top-down manner. The coordinator was the only person with "complete" knowledge of the whole project and this arrangement was not conducive to sharing power or giving people the opportunity to become involved in decision-making with all available information. Watershed management issues are complex and to broaden understanding of the issues it is important that time is invested in all involved parties so that they have a clear understanding of the issues and how to address the problems. The connection between work done in the stream and advocacy to change relevant policy or legislation is very important for developing ecosystem-based management practices for watersheds. The connection between in-stream work and advocacy is best achieved when people have a clear understanding of the issues, problems and possible solutions.

Recommendation: The coordinator could ensure that information is shared more freely with group members. Decision-making should be more transparent to steering committee members so that they can play a greater role in decision-making. Formalizing the decision-making process may facilitate greater transparency and decrease the amount of discretionary decision-making made by the coordinator. The work of the steering committee needs to be an integral part of all project work so that the connection between planning, decision-making and field work are closely linked in members minds. Giving the steering members more information and input into decision-making would also empower them because it increases their feelings about their contribution and engagement in the project and community.

3. Another implication of the HCKWP process design was weak local ownership and leadership. There is not a local champion that leads the project, it was someone who was selected from outside the community. The group has made insufficient effort to cultivate local leadership. There is significant commitment from those involved but something that the group could assess is what will happen to the group if the current

coordinator left. Since the coordinator possesses the majority of responsibility, she also possesses much of the institutional memory because she manages the organization. An organization that is run by one person has questionable longevity. Local ownership will only be cultivated if the group works to develop a wider constituency, with some of the more difficult players such as other agriculturalists and industrialists.

Recommendation: The HCKWP could make a concerted effort to cultivate and support local leaders in the community to champion the goals of the group. This would bolster the legitimacy of the group for the broader community. The group would also benefit from more ongoing volunteer participation, not just participation on field work days.

4. The process design was not multi-stakeholder and thus many groups that have an interest in the issues that the group deals with are not a part of the project. Several important stakeholders are missing from the steering committee including First Nations, the local agricultural groups, government agencies (MAF, MELP, CRD, DFO), local businesses, local developers and local industry. The group would benefit from additional membership on the Steering Committee. This will also bolster political support.

   Recommendation: Broaden the constituency of the Steering Committee and make it more representative of different community interests.

5. The educational component of the project has been insufficient and focused on the short-term gain. Engaging people on an ongoing basis is one of the most effective ways to educate people and get buy-in. Education often has an impact on individual's attitudes and can empower them to feel like they can make a difference. There are very few people who were engaged on any ongoing basis in the project. The group has increased awareness about Hagan Creek, fish populations, as well as water and land use issues, but the group would benefit from more consistent outreach. The HCKWP has emphasized data collection but the data has not been used to create an overall

picture of the watershed as this would be useful for both educational and advocacy activities.

Recommendation: Make community outreach an ongoing and fundamental part of the project. Consider outreach and education with the same degree of importance as monitoring and assessment.

6. Monitoring, assessment and studies of the watershed have been the focus of the Hagan Creek Project. This is common among many stewardship groups. In order to make fundamental change and influence policy and decision makers, the group could adopt a stronger advocacy function. Substantive changes, including having an impact on institutional infrastructure, are difficult to achieve and in order to influence policy, advocates need to understand relevant water management and governance issues.

   Recommendation: The coordinator may need to invest more time with the group addressing strategic issues associated with advocacy, rather than focusing the whole group solely on in-stream or riparian work projects.

Table 12 - Summary of Recommendations to HCKWP

HCKWP Weaknesses	Recommendations
Lack of clarity in process design, not transparent	Formalizing process design including elements such as protocols, roles and responsibilities, milestones
Decision-making is arbitrary and top down, not transparent	Ensure decision-making process is open and transparent, with information flowing freely through the organization
Organizational memory is held by one person	Ensure that more people are involved in managerial tasks, train other members to various jobs, support champions. Share information.
Narrow representation on steering committee. Many stakeholders are not involved in the project.	Broaden membership and include other important stakeholders to increase community and political support.
Lack of regularly active volunteers	Support volunteers on a regular basis, invite them to meetings, train them about policy issues. Empower volunteers.
HCKWP does not have comprehensive resources about the watershed.	Organize data that has been collated and collect information (eg. economic activities in watershed, mapping on land use basis) available about the watershed to foster a better understanding of the watershed overall.
Outreach and Education are not ongoing	Create strategic plans for outreach and education. Ensure outreach is ongoing.
There is general community awareness but not support	Engage more people in project activities and planning.

CHAPTER EIGHT: CONCLUSIONS

> For politics is first, foremost and always, about people. To rob them of the power to make their own decisions about their own affairs, their own goals and their own resources is not only an affront to the basic ethos of democracy but it is also to make a mockery of the very concept of progress and to rob them of any prospect of the life abundant (Papworth 1988: 223).

8.1 General Conclusions

This thesis considered the issue of urban degradation from a unique perspective. It examined how ecosystem-based management and community-based stream stewardship groups can respond to the complex problem of urban ecological degradation and its impacts on water. The discussion explores the idea that public participation in stream stewardship groups is making incremental changes in governance and, that these changes integrate principles of ecosystem-based management.

8.2 Research Findings

The empirical work in this thesis focused on evaluating what characterized "successful" stream stewardship groups. The results from the survey cases reveal the important ways that community stream stewardship groups engage communities and bridge the gaps between ecosystem-based management and urban governance. Stream stewardship contributes to ecosystem-based management in several important ways.

Unlike government agencies, stewardship groups often collect data on a watershed basis, thereby creating an integrated source of information about an ecosystem. Stewardship groups are also an important source of information on local ecosystem carry capacity and variations in the ecosystem. In the case of Hagan Creek, the stewardship group has collected base line data on stream flows, water quality and conducted habitat surveys. This data would not exist if it were not for the project. This availability of this data provides a basis for more informed decision-making, providing a tool for integrated land use and water planning, thereby supporting the principles of ESbM.

Stewardship groups often serve as a catalyst to local government cooperation among departments. If a stewardship group approaches a problem from a watershed basis, they often have to bring together engineers, planners and policy people to deal with the issue. Creating this "space" for an integrated dialogue among local decision-makers is needed for ecosystem-based governance. Similarly as the results demonstrate, stewardship groups can break down misconceptions, increase understanding of ecosystem issues and affect community values about ecosystem integrity. The stewardship groups also cultivate multi-stakeholder forums that bring together multiple levels of government as the survey cases illustrate. All of these activities contribute to changing social values and educating both the public and government officials about local ecosystem conditions. This unique role, filled by community-based stream stewardship groups, is critical for implementing the principles of ESbM.

The results of this study illuminated some interesting issues. It was clear that leadership has a significant impact on stewardship group character and success. The results also reveal that good volunteer management is critical as stream stewardship groups are volunteer driven organizations. The volunteer participation is an important part of community capacity building, which is imperative to meet ESbM objectives. Examining the outcomes of the stewardship groups illustrates that the intersection of science and policy at the community level is a significant challenge. Finally, it is likely that the relative "youth" of CbSS has implications for substantive impact results

Stream stewardship groups face many challenges. A primary challenge for many groups is disseminating the information they collect to the appropriate decision-makers and the pubic. A factor that influences the dissemination of information is the leadership within the stewardship group. The capacity of many stewardship groups to engage in policy discussions and advocacy is often limited. The discussion of the jurisdictional context that stewardship groups contend with highlights the complexity of water management and governance, which makes addressing policy a significant challenge. Groups are

consistently challenged by limitations of time and resources (staff) and this further impedes their ability to engage in advocacy. The groups needs to have some internal capacity to be able to deal with both jurisdictional and ecological complexity of working on an ecosystem basis. It is also a challenge for groups to establish legitimacy with both community and government.

8.2.1 Hagan Creek/KENNES Watershed Project Case Study

Community-based stream stewardship groups engage in the their activities in a variety of ways. When the case study of Hagan Creek/KENNES was evaluated, using the characteristics of success as measures for the evaluation, some interesting findings surfaced. The Hagan Creek/KENNES Project had many successes in its first two years and it did not share many of the characteristics identified to be important to the survey cases. The project had strong institutional support from project partners including the University of Victoria, IOS and Woodwyn Farms. This support was important for securing and leveraging additional resources for the project. This strong institutional support gave the project coordinator the opportunity to pursue project goals without strong community support. The focus of initial project goals were to collect data and do assessments of water quality and supply and then use these finding to build community and government support for the project. The group developed support very gradually and did not begin to do so among a broad community until the second year of the project.

Although the Hagan Creek/KENNES Project undertook a different approach, there are some shortcoming to the approach. The group is very dependent on one charismatic personality. If that personality were to leave the project, then much of the institutional memory would be lost, and the group does not have community buy-in to ensure project longevity. Similarly, this approach does not develop a broad base of connection between community members and the project or their local ecosystem, and there is a lack of local ownership to the process. This approach does not capitalize on the great potential community members have to contribute to improving local ecological conditions. Local ownership will only be cultivated if the group works to develop a wider constituency,

with some of the more difficult players such as other agriculturalists, land owners and the industrial sector. This approach loses the very valuable opportunity to build social capital through social learning, skill development and civic engagement for local watershed management. Because of the complexity of watershed management, building social capital is an important step to developing advocacy strength among stewardship group members and the broader community. Participation in this type of organization provides members and involved communities with a unique opportunity to learn about important ecosystem management issues and the relationship between their daily activities and their local watershed. Raising community consciousness and understanding about the issues is an important factor for implementing ecosystem-based governance.

8.3 Areas for Future Research

Several areas of future research would be contribute to the discussion of ecosystem-based management and the role of stream stewardship groups in developing this management approach. One area of research includes the capacity of consensus design organizations to produce ecologically appropriate policies and decisions. It is important to evaluate collaborative processes used for watershed management (or other ecosystems) to try and determine if a model could be developed. Similarly, it would be useful to study organizational design of stewardship groups, and its relationship to decision outcomes and policy at the local level. It would also be interesting to study what effects the longevity of stream stewardship groups but thus far we do not have groups that have been around longer than five years.

8.4 Limits of Research

There are several limits to the research conducted in this thesis. One limitation was evaluating the case study, Hagan Creek, during its first two years. The first two years of an organization's life can be quite turbulent and the youth of the Hagan Creek Project likely had an impact on the results of the evaluation. The group has come a long way since 1999, and in some ways, the conclusions suggested here may not be as relevant as they would have been earlier in the process. Similarly, the stream stewardship "movement" has come a long way in the last several years, and the majority of primary

research was done several years ago. It is likely that there are now other cases of progressive stream stewardship groups who may have valuable and informative lessons to disseminate. Characteristic vary from community to community, project to project and the recommendations made here are specific to Hagan Creek, though some generalizations can be made in terms of stewardship group design.

The interview data was the most useful source of information, although it must be recognized that people often offer the information that they want to reveal and their recollection of events may be biased by personal emotions. In the case of my participation in the Hagan Creek Project, there were many nuances, agendas and a history of events that I do not to this day understand. To understand these issues I would have had to be more directly involved in the project. This is one limitation of a master's thesis, where time does not permit the researcher to fully become involved as a participant observer. The use of program documentation for all the stewardship groups was useful and provided a useful cross-reference and verification for interview data.

8.5 Final Words

Evidence shows that the presence of community-based stewardship groups, round tables and watershed committees are changing the face of governance around the world. Many urban dwellers are concerned about water and air quality. In recent years water issues, community-based initiatives and governance has captured the attention of governments, academics and the public. The recent outbreaks of water crisis in Canada since the 2000 Walkerton tragedy has awakened many to the problems associated with water governance. These crisis have heightened the public's awareness to the vulnerability water resources that we, as a country with 20% of the world's fresh water supply, take for granted. There is no level of government that can work unilaterally to deal with the pressures being put on our urban ecosystems. Governments are working to build partnerships with other levels of government and communities to deal with the water management challenge.

Urban centers are becoming the home to most of humanity. Many land and water management decisions are made at the local level, and clearly other levels of government recognize the growing importance of supporting local government. Prime Minister Jean Chretian struck an Urban Task Force in 2001 to examine how the federal government will respond to issues facing urban areas in Canada. If we are to maintain clean water, air and a high quality of life in our urban areas, we need to approach governing these geographic units differently. This thesis suggests that ESbM offers an approach to dealing with this complex management issue, and has shown how community involvement in stream stewardship contributes to an ecosystem-based management approach to governing urban areas. Using an ESbM approach does present a paradigm shift to governments and this approach requires support from local citizens to operationalize this new approach to governance in urban areas. Stream stewardship groups, as units of civil society provide citizens an opportunity to be involved in maintaining healthier ecosystems and safer communities for us all.

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Appendix A - Questionnaire

Questions for Case Study Participants

Title and position of interviewee:
Project Title:

Part I Background information:

1) What are creek/watershed dimensions?
2) Is work done on crown or private lands along the creek/stream?
3) Who instigated the stewardship initiative?
4) What are the range of interests included in the group? (egs. agencies, citizens, landowners ...)
5) How was outreach to the community organized and executed?
a) What was method used for private landowner contact?

6) What is the group's decision-making process? (then seek details)

7) Is there political support?
a) What levels of government? The community at large?
b) Was that support always present? If not, how has it changed?

8) Is the municipal government(s) concerned with environmental issues? How would you rate local government concern about stream health/watershed health? What actions/innovations?
a) Regional government?
b) Is there an environmental planner or officer in local government? If so are they involved in your project?

9) What are the resources available to your group: financial? information?
a) Who provides the resources?

Part II: Process design

1) Who developed process design?
a) Group mandate?

2) Who established mission statements? objectives?

3) What was the nature of the planning process? (open/inclusive, closed/exclusive)

4) How was the process managed?

5) Were there conflicts with watershed mangement objectives? How were they dealt with, if at all?

6) How were stakeholders solicited?

7) What was the level of general community participation? support?

8) What were (if any) the most relevant/useful pieces of legislations for this project?

Part II: Outcome Criteria

1) Was there education as a result of the project?

2) Is there an education effort extended to interested parties?
a) the community at large?
b) relevant governmental authorities? (correlate with #6)
c) Have these interested parties developed an understanding and awareness of the need for the stewardship groups?

3) Has there been an attitude change in:
i) process participants
ii) community members
iii) relevant governmental authorities.
a) How has this been manifested or not?

4) Have resources (money and information) been allocated to achieve the objectives of the stewardship group? How much? Was this sufficient?

5) Have structures i.e. bylaws, planning frameworks been established to promote the goals of the stewardship group? Did they do the job? How? How not?

6) Did participants and community members feel empowered by the process?
b) Are they using the tools/ resources to achieve stated objectives?

7) Has there been measurable success in:
i) changing the patterns in environmentally damaging activities
ii) do stream health indicators show positive changes? Does the stream or areas of the stream appear visibly healthier?
iii) future controls in place?

Appendix B - Telephone Contact and Consent Form

This purpose of this research project is to study watershed and stream stewardship groups in order to evaluate how to design successful stewardship organizations. I was referred to you by _____.

I am a Master's Student with the EcoResearch Chair of Environmental Law and Policy at the University of Victoria. I am currently conducting research on watershed stewardship groups. The purpose of my study is to determine what makes stewardship committees successful in watershed management. Then to use these results as the basis for my discussion of ecosystem-based urban governance. Your participation should require about 45 minutes of your time.

You will be asked about your personal experience with stream stewardship groups. The questions I am asking are about the project you were involved in; particularly about the public process, the design of your stewardship group, as well as problems and successes experienced. The results will be incorporated into my thesis and may be published in a scholarly journal.

Your participation is entirely voluntary and you can withdraw from this interview at any time, without explanation. You may refuse to answer any questions. If you choose to terminate this interview I will destroy all information immediately.

___ Do I have your consent to audio tape and take notes during our interview?
The tapes and notes will be destroyed within the year, or after my defense (whichever comes first).

___ Do you agree/or not agree to being identified?
If no, then your name will not appear in any documentation and your name will be encoded in all transcriptions. Any data collected in the study will remain confidential; interview results will be kept in a locked office. The only people with access to these results will be myself and my supervisor, Michael M'Gonigle.

___ Do you agree/or not agree to being quoted?

____ Do you have any questions before we begin?

____ Would you still like to continue with the interview?

Appendix C: Interviewees

Interviewee's Name	Organization Name	Position
Anne-McMillen	Baker Creek Enhancement Society	Project Coordinator
Andy Motherwell	Baker Creek Enhancement Society	Director Caribou Regional District - FBMB representative and Baker Creek board member
Bruce Simard	Baker Creek Enhancement Society	Planner for City of Quesnell
Nora Nicole	Baker Creek Enhancement Society	Project Coordinator
Roxanne Crick	Baker Creek Enhancement Society	E-Team Participant
Con Steneker	Baker Creek Enhancement Society	Board member
Liz Leedham	Laurel Creek	Facilitator for public process
Pauline Richards	Laurel Creek	Coordinator
Lorraine Bowman	Laurel Creek	Co-Coordinator of Laurel Creek Citizen's Committee
Pete Scales	Langley Partnership Society (LEPS)	Executive Director of LEPS
Greg Mallett	Fraser Basin Council	Program Co-ordinator
Joe Kambeitz	DFO	Fisheries Community Advisor
John McVickers	Salmon River Watershed Roundtable	Member
Fred Mah	Environment Canada	Environmental Conservation Branch
Mike Romaine	DFO	Chief, Integrated Resource Management and Planning
Mike Wallace	Salmon River Watershed Roundtable	Staff Biologist
Beth Singer	Salmon River Watershed Roundtable	E-team member
Al Bangay	Salmon River Watershed Roundtable	Chair of the committee inception of SRWRT
Dorothy Neil	Salmon River Watershed Roundtable	Co-founder of SRWR
Stuart Lee	Hagan Creek/KENNES Project	Steering committee member
Denise Copeland	Hagan Creek/KENNES Project	Steering committee member
Hanna Kohout	Hagan Creek/KENNES Project	Steering committee member
Larry Slugget	Hagan Creek/KENNES Project	Steering committee member
Bob Maxwell	Hagan Creek/KENNES Project	Steering committee member
Kelly Cabrara	Hagan Creek/KENNES Project	Steering committee member/Staff
Katrina Bennett	Hagan Creek/KENNES Project	staff
Misty MacDuffee	Hagan Creek/KENNES Project	Project Co-ordinator
Jade Northruo	Hagan Creek/KENNES Project	Volunteer
Francis Pugh	Hagan Creek/KENNES Project	Steering committee member
John Dendy	Hagan Creek/KENNES Project	Steering committee member

VITA

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December 13, 2001