

**Investigating Cowichan River Collaborative Salmon  
Management Institutions:  
The Cowichan Harvest Roundtable and the  
Traditional Cowichan Fish Weir**

by

Chelsea J. Dale

Department of Environment and Sustainability,  
University of Saskatchewan, Saskatoon

June 2012

A thesis submitted to the University of Saskatchewan  
in partial fulfilment of the requirements of the degree of  
Master's of Environment and Sustainability

Copyright Chelsea J. Dale & Cowichan Tribes Department of Lands and Governance, 2012

## **ABSTRACT**

*The structure of fisheries management institutions is changing all over the world, due in part to issues of sustainability related to exhaustion of resources, fiscal responsibilities, and the exercising of Aboriginal rights to access subsistence and commercial fisheries. As a result of direct action and successful legal challenges, coupled by the ongoing negotiation of modern treaties, changes in the way authority is exercised over fisheries management is occurring and co-management arrangements are being formed between Aboriginal and non-Aboriginal parties. While the study of co-management arrangements is relatively recent, much has been written about their potential to manage fisheries in a sustainable manner. Located on south-eastern Vancouver Island, British Columbia, the Cowichan Valley is the historical homeland of the Cowichan Mustimuhw (people). The Cowichan Mustimuhw once controlled an elaborate salmon fishery on the Cowichan River by way of their historical fish weir. Years of conflict between Cowichan Tribes and the federal Department of Fisheries and Oceans (DFO) over control of the historical weir led to a significant reduction in Cowichan Mustimuhw control over their historical fishery. In 2008, the Cowichan Tribes Fish Committee (representing the interests of Cowichan members) re-vitalized the historical weir for use as a sustainable salmon management institution. The revitalized weir, and, in recent years, the multi-stakeholder Cowichan Harvest Roundtable have emerged as collaborative salmon management institutions designed to sustainably manage Cowichan River salmon harvests.*

*While there is a body of literature devoted to the history of fisheries-related interactions between the Cowichan Tribes and DFO, there is little literature describing the Cowichan Harvest Roundtable and its role as a locally-based, collaborative salmon management institution. Through analyzing the historical Cowichan fish weir and the Cowichan Harvest Roundtable, this research will assess the efficacy of both as sustainable salmon management institutions, and explore the extent to which assertion and re-assertion of authority by the Cowichan Harvest Roundtable and Cowichan Tribes Fish Committee has occurred over the management of the fishery.*

*The methodology for this research includes a combination of semi-structured interviews with both past and present members of the Cowichan Harvest Roundtable and Cowichan Tribes Fish Committee, and participant observation. This research provides a case study of the historical fishing weir and how it has contributed to Western management regimes, and assesses the efficacy of the Cowichan Harvest Roundtable in managing the Cowichan River salmon fishery in a sustainable manner. It is intended that this study will provide valuable information regarding Aboriginal-non-Aboriginal and community-based collaborative fisheries management institutions that can be applied to other case studies both nationally and internationally.*

## **Acknowledgements**

This project is dedicated to the residents of the Cowichan Valley, the Cowichan Mustimuhw, and non-native fishers dependent upon the health and well-being of the Cowichan River salmon runs. Thank you to the countless citizens who dedicate their time and energy to protecting this invaluable ecosystem.

This study would not have been possible without the enthusiastic participation of the members of the Cowichan Tribes Fish Committee, and the Cowichan Harvest Roundtable. Special thanks to Wayne Paige Sr., Cheri Ayers, Tim Kulchyski, and Tom Rutherford for their support and guidance throughout the research process. Many hours were spent conversing over various details of this thesis. Thank you to my parents for their unconditional love and support. You have championed me every step of the way. To my love, Sean, thank you for your encouraging words and for standing by me throughout the entire process. Special thanks to the patrons of Speaker's Corner at the Black Swan Pub for your kind words, financial support and friendship throughout the past few years. Many, many thanks to Larry George for being the visionary behind this project. Last but not least, thanks to Dr.s' David Natcher, Keith Carlson, and Doug Clark for your support and academic guidance; it has truly been a pleasure working with you all. Huy' ch' qa.

## Table of Contents

Abstract.....	i
Acknowledgements.....	iii
<b>1.0 Introduction.....</b>	<b>1</b>
1.1 Introduction.....	1
1.2 Thesis Objectives.....	4
1.3 Thesis Organization.....	5
<b>2.0 The Cowichan Mustimuhw.....</b>	<b>7</b>
2.1 Introduction.....	7
2.2 European (Hwunitum') Settlement.....	10
<b>3.0 Literature Review.....</b>	<b>12</b>
3.1 Introduction.....	12
3.2 Traditional Ecological Knowledge and Fisheries Management.....	14
3.21 Fisheries Management Among the Alaskan Tlingit and the British Columbian Gitxaala.....	16
3.22 A Role for TEK in British Columbia Fisheries.....	17
3.3 Fisheries Co-Management.....	18
3.4 International Co-Management Case Studies.....	23
3.5 Canadian Co-Management Case Studies.....	24
3.6 Criticisms of Co-Management and TEK.....	26
<b>4.0 Research Methodology.....</b>	<b>28</b>
4.1 Introduction.....	28
4.2 Participant Observation.....	28
4.3 Semi-Structured Interviews.....	30
4.4 Interview Logistics.....	30
4.5 Interview Design and Analysis.....	31
4.6 Study Limitations.....	31
4.7 Ethical Considerations.....	33
<b>5.0 The Cowichan Harvest Roundtable.....</b>	<b>34</b>
5.1 Introduction.....	34
5.2 Background.....	34
5.3 Inception of the Cowichan Harvest Roundtable.....	36
5.4 Composition of the Cowichan Harvest Roundtable and Terms of Reference.....	38
5.5 Interview Data and Results.....	40
5.51 Perceptions of Co-Management.....	40
5.52 Co-Management as a Continuum.....	44
5.53 Fisheries Moratorium: A Possible Solution?.....	57
5.6 Conclusion.....	61

<b>6.0</b>	<b>Salmon 'Management' Among the Cowichan First Nation.....</b>	<b>64</b>
6.1	Introduction.....	64
6.11	The Cowichan Fishing Weir.....	64
6.12	Importance of the Central Coast Salish Fishing Weir.....	67
6.13	Historical Locations and Types of Weirs on the Cowichan River.....	67
6.14	Ownership, Control, and Access to Resources.....	69
6.2	Historical Fisheries Interactions and Loss of the Cowichan Weir Fishery.....	73
6.3	Reestablishing the Cowichan Weir.....	75
6.4	The Cowichan Weir Today.....	77
6.5	Negotiating Space Within Cowichan River Fisheries Co-Management Arrangements.....	84
6.6	Conclusion.....	87
<b>7.0</b>	<b>Conclusions.....</b>	<b>89</b>
7.1	Introduction.....	89
7.2	Successes and Challenges of the Cowichan Harvest Roundtable.....	89
7.3	Successes and Challenges of the Cowichan Fish Weir.....	92
7.4	Opportunities for Cross-Scale Fisheries Management.....	94
7.5	Directions for Future Research.....	95

## **Appendices**

Appendix A	Bibliography.....	97
Appendix B	Ethics Approval.....	105
Appendix C	Information Letter to the Community.....	106
Appendix D	Research Consent Form.....	108
Appendix E	Semi-Structured Interview Questions.....	113
Appendix F	Transcript Release Form.....	114

## **List of Figures**

1.1	Map of the Cowichan Basin.....	3
2.1	Map of the Hul'qumi'num Traditional Territory.....	8
3.1	Levels of Analysis in Traditional Ecological Knowledge and Management Systems.....	15
3.2	Co-Management Scale of Decision-Making Authority and Power Sharing.....	22
5.1	Cowichan River Algae Blooms September 2010.....	56
6.1	Historical Weir at Quamichan Village, circa 1866.....	66
6.2	Map of Historical Weir Sites on the Upper and Lower Cowichan River.....	72
6.3	Contemporary Cowichan Fish Weir September 2010.....	79
6.4	Contemporary Cowichan Fish Weir With Platform October 2010.....	80

## **List of Tables**

5.1	Definition of Co-Management.....	41
5.2	Scale of the Harvest Roundtable's Management Decision-Making Authority.....	45
5.3	Is the Harvest Roundtable Effective in Managing Cowichan River Salmon Stocks in a Sustainable Manner?.....	47
5.4	Threats to Salmon and Salmon Management Regimes on the Cowichan River Today.....	52
5.5	Do You See Calling a Moratorium on Cowichan Chinook as Being a Potential Solution to Assist in the Recovery of the Stocks?.....	58
6.1	Space for the Weir Within Current Fisheries Co-Management Arrangements.....	85
7.1	2008 Cowichan River Chinook Salmon Escapement Data.....	93



# CHAPTER 1

## Introduction

### 1.1 Introduction

On southeastern Vancouver Island, the Cowichan River flows 47 km east from its headwaters in Cowichan Lake through the fertile floodplain of the Cowichan Valley to the large ocean estuary at Cowichan Bay (Montgomery and Oke 2009; Harris 2001) (see Figure 1.1). The Cowichan River salmon fishery supported the Cowichan people (Mustimuhw) and neighbouring Salish people for thousands of years, serving as a staple food source in addition to serving other economic, social and ceremonial purposes (Harris 2001; Dyck 2000; Barnett 1955). The Cowichan Mustimuhw once controlled an elaborate historical weir fishery on the Cowichan River, which served as a method of both harvesting and conservation of salmon (see Harris 2001; Dyck 2000; Barnett 1955; Suttles 1987; Rozen 1985, etc.). They constructed, maintained, and operated weirs on the Cowichan River for thousands of years, and participated in extensive trade and barter networks throughout the Salish world, as the incredible productivity of weirs enabled such extensive networks (Suttles 1987, Glavin 1996). In addition to weirs, the Cowichan Mustimuhw utilized other forms of fishing technologies including dipnets, spears and harpoons; however, the weir was likely to have produced the greatest volume of fish out of all the fishing technologies (Newell 1993; Glavin 1996).

Known now as one of the finest angling rivers in the world, the Cowichan River began attracting sports fishermen as early as the late 1880's, and today it continues to be recognized as one of the finest trout rivers in British Columbia (Montgomery and Oke 2009). In 2004 the Cowichan River became the third river in British Columbia to receive Canadian heritage river status in recognition of its cultural, recreational, and natural importance (Montgomery and Oke 2009). Receiving a provincial heritage river designation in 1995, the Cowichan River provides the focal point for ecotourism, as it offers all season tourist activities, including summer swimming, tubing, boating, and year-round fishing, kayaking, drifting, and trail hiking.

Beginning in the late 1800's and continuing to present day, the various uses of the Cowichan River and its resources have placed tremendous pressures on salmon and their supporting habitat that have resulted in a steady decline in stocks, thus triggering concerns from the Cowichan Mustimuhw (as represented by Cowichan Tribes), the Cowichan Valley Regional District (CVRD), the provincial Ministry of Environment (MOE), the federal Department of Fisheries and Oceans (DFO), the commercial sector, the Vancouver Island Sportfish Advisory Committee, and the community at large.



Figure 1.1: Map of the Cowichan Basin

In response to these concerns the Cowichan Harvest Roundtable (CHR) was formed in 2006. As a decentralized local, multi-sectoral institution for salmon management, the Cowichan Harvest Roundtable is a co-management board comprised of representatives from all the major fisheries-dependent user groups on the Cowichan River, including Cowichan Tribes, DFO, MOE, the commercial sector, and the Vancouver Island Sportfish Advisory Committee. The Cowichan Harvest Roundtable now serves as a multi-sectoral institution charged with managing salmon harvests in the Cowichan River from the headwaters at Lake Cowichan, to the terminal area at the ocean estuary in Cowichan Bay. Notwithstanding the formation of the CHR, concerns over the long-term health and viability of the Cowichan River fishery persisted, particularly among Cowichan Tribes members. After two years of involvement on the Cowichan Harvest Roundtable, Cowichan Tribes chose to reestablish their historical fishing weir on the Cowichan River. Despite being made illegal in the 1930's by DFO<sup>1</sup>, Cowichan Tribes saw the use of the weir system as an effective institution for monitoring and potentially revitalizing salmon stocks.

The establishment of the CHR and the revitalized Cowichan weir can be seen as two fundamentally different approaches to fisheries management. In terms of the CHR, this institution has its origins firmly grounded in western notions of public participation and western science, with its legitimacy derived from the state. In the case of the Cowichan weir, it is an institution based on Cowichan institutions of governance and tenure, is informed by Traditional Ecological Knowledge (TEK), and receives its legitimacy from the Cowichan Mustimuhw (as represented by Cowichan Tribes).

## **1.2 Thesis Objectives**

The objectives of this thesis are to:

1. Determine the extent to which the CHR exercises decision-making authority over salmon management on the river.
2. Determine how the Cowichan weir has both historically and since its reestablishment

---

<sup>1</sup> The present-day Department of Fisheries and Oceans has undergone a number of departmental name changes since its inception; however, for clarity and brevity, I will refer to the Department of Fisheries and Oceans as 'DFO' in both its present-day and historical context.

contributed to sustainable salmon management and harvesting practices.

3. Assess the opportunities for cross-scale management institutions (vertical\horizontal), utilizing both the weir and the CHR to manage complex management challenges.

The overall goal of this research is to demonstrate the necessity of securing cross-scale linkages between fisheries management institutions in order to manage human use of fisheries resources more sustainably. In meeting these objectives it is my hope that this thesis can contribute to discussions over how best to improve the management of the Cowichan River fishery, as well as inform other collaborative management efforts being discussed in the province of British Columbia and elsewhere in Canada.

### **1.3 Thesis Organization**

This thesis is structured into 7 chapters. This chapter introduces the thesis, provides a brief synopsis of the importance of the Cowichan River, and sets out my research objectives and goals. Chapter 2 provides a brief history of the Cowichan Mustimuhw and their traditional territory, and discusses the loss of control over resources as a consequence of European settlement. This historical section provides a context that is relevant to the subsequent analysis of historical and current fisheries transactions between Cowichan Tribes and the state regarding the use of the historical weir.

Chapter 3 provides a review of literature that informed the writing of this thesis through the use of international and Canadian case studies. This includes global and regionally-specific threats to fisheries, varying critiques of co-management, and literature devoted to the role of TEK in fisheries management. Theories of co-management and TEK discussed in this chapter inform the analysis of data for the two case studies discussed in chapters 5 and 6.

Chapter 4 discusses the research methodology and includes the rationale for conducting this research. The research methodology outlines the personal factors that inspired this study, methods design and analysis, study limitations, and ethical considerations.

Chapter 5 discusses the history, mandate, and objectives of the Cowichan Harvest Roundtable (CHR), presents the interviewees' ideas of co-management, assesses the level of

decision-making authority over salmon management in the terminal area of the Cowichan River, and discusses the greatest challenges to salmon and management of salmon in the Cowichan River as perceived by CHR members and other key informants. The successes and limitations of the CHR as an institution for sustainable salmon management will be discussed using interview data.

Chapter 6 examines the historical Cowichan fishing weir, providing a description of the historical and current functions as both a harvesting tool and management institution. A brief history of the aboriginal-state interactions surrounding the loss and subsequent re-institution of the weir on the Cowichan River will be presented, while narratives from members of the Cowichan Tribes Fish Committee will be used to illustrate the ways in which the weir is currently being incorporated into current management regimes.

Chapter 7 examines the similarities and differences of the CHR and historical fishing weir as two present-day institutions for salmon management on the Cowichan River, and summarizes the overall conclusions related to the efficacy of the two institutions in managing human access to salmon. This chapter revisits the main findings of this research and concludes that multi-scaled institutions for managing fisheries that can link vertically representative organizations and their respective knowledge systems (i.e. Western science and local knowledge) and horizontally among all those dependent on the Cowichan fishery would improve not only the fishery but the relationships that are anchored around the fishery. The summaries presented in this chapter ultimately place the research within the existing literature on fisheries co-management and TEK.

## CHAPTER 2

### The Cowichan Mustimuhw

#### 2.1 Introduction

The Cowichan Mustimuhw belong to the Central Coast Salish cultural community, and speak a dialect of the Halkomelem language known as Hul'qumi'num, which is closely related to dialects spoken in the Fraser River area (Rozen 1985; Harris 2001). According to Rozen (1985, 3) the approximate geographical boundaries of the Island Hul'qumi'num-speaking tribes are to the north, an area along the east coast of Vancouver Island just south of Qualicum; to the east, the Strait of Georgia; to the west, the Vancouver Island mountains; and to the south, the area around Mill Bay on east Vancouver Island (See Figure 2.1 for a map of the traditional Hul'qumi'num territory).

Historically, the Cowichan River served as the site of the winter villages for the Cowichan Mustimuhw, who occupied as many as fifteen winter villages along the lower course of the river (Dyck 2000; Harris 2001; Marshall 1999; CHRS 2010). In 1888 six villages or residence groups including Kwo`metsen (Quamichan), S7o`mene (Somenos), Kwiemiyaken (Comiaken), Lhemlhe`melets' (Clemclemaluts), Xwe`lkw'sa`le (Koksilah), and Xinepsem (Kanipsim) were merged and recognized by the Federal government as Cowichan Tribes (HTG 2010; Thom 2005).

8



Figure 2.1: Map of the Hul'qumi'num Traditional Territory

Along with other Coast Salish Tribes, the Cowichan Mustimuhw enjoyed a seasonally mobile lifestyle, all the while maintaining complex socio-economic systems based on kinship and affinal ties (Suttles 1987). These ties allowed for a wider distribution of resources beyond the immediate Cowichan territory, as they (and other Salish tribes) shared, bartered and traded food with relatives and neighbours from other territories through granting access to their own resources (Suttles 1987). Harris (2001, 123) explains that seasonal rounds took [the Cowichan] well beyond the Cowichan Valley to neighbouring islands in the Spring and to the mouth of the Fraser River for much of the summer. More specifically, some Cowichans fished in the summer on reef nets belonging to Saanich, and some of the Saanich, who had no important stream in their territory, went to the Cowichan River for the fall runs of fish caught at weirs (Suttles 1987, 21).

Salmon served as the most important form of sustenance for the Cowichan Mustimuhw and other Coast Salish tribes, as well as an important economic resource for trading within and between families and neighbouring tribes (Ashwell 1978; Dyck 2000; Harris 2001). In addition to Cutthroat, rainbow and Steelhead trout, Coho (the'wun), Chinook (stth'aqwi), and Chum (kw'a'luhw) salmon spawn in the river and its many tributaries. Salmon are more than simply a food source for the Salish, rather, they represent a key form of wealth and as such form the basis of elaborate socio-economic relationships with neighbouring tribes (see Barnett 1955; Suttles 1955, 1987; Marshall 1999; Harris 2001).

According to Harold Joe, the Cowichan River is the Cowichan Mustimuhw's provider of life and sustenance (Joe 2004). Practiced extensively throughout the Coast Salish world, the historical First Salmon Ceremony represents the importance and centrality of salmon to the Salish people. According to Underhill (1945) every Salish tribe held its own ceremony, and the arrival of the first Spring (Chinook) salmon run was one of the most important events of the year. Contrary to Underhill's broad description of the ceremony, Barnett (1955) states that the ceremony was closely correlated to Sockeye-bearing rivers, with the exception of the Nanaimo and Squamish rivers, which do not contain Sockeye. In general, it was believed that salmon, in their own world, were human-like beings who transformed into fish and arrived yearly at streams to offer their flesh to humans who, in turn, were obliged to treat the salmon with great care and respect and return its bones and innards to the river (Suttles 1990). The Salish believed the first salmon to be a scout for the entire salmon village; therefore, if the first salmon was not treated

with respect, the salmon people may become offended and not return to the stream (Underhill 1945; Ashwell 1978). As such, the first salmon caught was laid down with its head pointing upstream, so as to direct the run to follow (Ashwell 1978). Albert (Sonny) McHalsie (2007, 91) offers a detailed description of the ceremony from the perspective of the lower mainland Salish:

The major part of the ceremony was actually sharing; even if you just had one little morsel of the salmon, the important part was making sure that a lot of people shared in that salmon. Then the bones would be saved and returned to the river, and that would involve one of the chiefs, a spiritual person, an elder, and a youth: those four people needed to be involved when that was happening. A prayer was said to the salmon and to the river, and then the bones would be returned to the river.

Although the ceremony may have differed slightly according to individual Salish tribes, one aspect was commonly shared in that people were forbidden to fish until the ceremony had been performed (Underhill 1945). The First Salmon Ceremony demonstrates not only the importance of salmon for meeting subsistence needs, it united entire villages and ensured sharing of food amongst the communities, thus strengthening social ties as well as mystical ties that linked humans to seasonally available natural food resources.

## **2.2 European (Hwunitum') Settlement**

It is speculated that southeastern Vancouver Island was visited by European explorers as early as the fifteen hundreds; however, it wasn't until the mid eighteen hundreds that the Cowichan Valley saw the beginnings of permanent settlement by the British (Montgomery and Oke 2009). According to local historian Elizabeth Blanche Norcross, the Cowichans' domination of the Cowichan Valley and its resources ended in 1862, when the first wave of 78 European (Hwunitum') settlers arrived in Cowichan Bay by way of the HMS Hecate (Norcross 1959; Marshall 1999). Covering the valley floor the rich, alluvial soils of the Cowichan River

floodplains and subsequent profitable farming attracted this first wave of Hwunitum' settlers (Montgomery and Oke 2009; Norcross 1959). Although agriculture provided the initial draw to the Cowichan Valley, forestry and logging quickly proved to be a more lucrative and profitable industry for settlers (Homer 2002). Between the years 1850 and 1854, governor James Douglas began acquiring indigenous lands in and around Fort Victoria, Nanaimo, and other locations throughout southern Vancouver Island through a series of 14 'land-sale agreements', now commonly known as the Douglas Treaties (HTG 2010). Through the Douglas Treaties, Aboriginal title to land was effectively extinguished, allowing Hwunitum' to take possession of these lands (HTG 2010; Harris 2001; Marshall 1999). However, the Hul'qumi'num peoples (including the Cowichan Mustimuhw) did not sign any treaties (see Harris 2008 for an in-depth discussion of the creation and history of Aboriginal reservation lands throughout B.C.). The Cowichan currently do not have a signed Treaty, although the Chemainus, Lake Cowichan, Halalt, Penelakut, Lyackson Nations, and the Cowichan Mustimuhw (as represented by Cowichan Tribes) formed the Hul'qumi'num Treaty Group in 1993 to facilitate treaty negotiations with the federal and provincial governments in the BC Treaty process (see [www.hulquminum.ca](http://www.hulquminum.ca) for further information regarding the HTG and Treaty process).

The establishment of the Esquimalt and Nanaimo (E&N) Railway Company and subsequent construction of the railway in the late eighteen hundreds officially opened up the Cowichan Valley (and Cowichan Musitimuhw) territory for waves of Hwunitum' settlement, natural resource extraction, and industrial development (HTG 2010). Though the Cowichan Mustimuhw never surrendered or sold their lands, an estimated 85% of their traditional lands were privatized and sold to various proprietors as a result of the Douglas Treaties and the E&N land sale, thus restricting access to sacred lands, burial sites, and vital resources including salmon-bearing streams (HTG 2010). The Hul'qumi'num Treaty Group are currently engaged in a lawsuit against the Government of Canada for the unlawful sale of traditional lands dating back to the E&N land grant.

These post-European contact historical events have culminated in the creation of a very different landscape from that of the traditional Cowichan territory. As such, the Cowichan Mustimuhw have suffered the disenfranchisement of access to many of their traditional lands and resources.

## CHAPTER 3

### Literature Review

#### 3.1 Introduction

In this chapter I will present a review of the co-management and Traditional Ecological Knowledge (TEK) literature that informed the writing of this thesis. Concepts include the structure and function of fisheries co-management arrangements, definitions of TEK, International, Canadian, and local fisheries co-management case studies, and criticisms of co-management and TEK.

On a global scale, anthropogenic activities including the damming and diking of rivers, overfishing, freshwater and coastal pollution, industrial activities, urbanization, hatchery proliferation, inadequate fisheries management, species invasions, and global climate change are major contributing factors in the declines and extinction of salmon populations (Healey 2009; Bottom et al. 2009; Hanna 2008; Lichatowich 1999; Pinkerton 1994). In the Pacific Northwest coastal region of the U.S., “alterations to habitat and fisheries sufficient to drive many populations [of salmon] to extinction did not develop until the 20<sup>th</sup> century, when European colonists brought industrial forestry, dams, wetland destruction, toxic discharges, urbanization, and increasingly effective fishing methods to the region” (Healey 2009, 5).

Beginning in 1858 and lasting well into the 20<sup>th</sup> century, the Fraser River gold rush had major, long lasting impacts on salmon habitat (Long 2006). Some of the environmental impacts resulting from mining included enormous loss of water volume for mining activities, scarring of the river bottom due to dredging, and elevated water toxicity levels due to the extensive use of mercury (Long 2006, 9). According to Long, Fraser River salmon populations “have been irrevocably damaged by mining practises, particularly dredges, which greatly disturbed fish pathways and potentially left behind thousands of pounds of mercury” (Long 2006, 9).

Established in the 1870's in rivers and estuaries along B.C.'s coastal region, salmon canneries secured a monopoly in the salmon fishery (Newell 1993; Glavin 1996). Glavin writes

that “a defining historical feature of the public regulation of West Coast fisheries has been the elimination of the coastal canning monopoly's real and perceived competitors: from small-scale fisheries and small-boat fleets to aboriginal fisheries, seals and sea lions” (Glavin 1996, 36). As such, the proliferation of larger fishing fleets and non-selective fishing gear has resulted in a dramatic depletion of salmon in west coast fisheries (Glavin 1996).

The aforementioned anthropogenic changes have altered natural disturbance regimes which are crucial to forming healthy salmon habitats (Waples et al. 2009). Natural disturbance regimes shaping salmon habitats include erosion and formation of floodplain surfaces and banks, shifting locations of woody debris accumulations forming pools, volume of flow, and annual floods (Waples et al. 2009; Bradford et al. 2008). Salmon populations are adapted to these naturally occurring disturbances as their habitats are shaped by them (Waples et al. 2009). Over time, anthropogenic changes and land use activities have consequently altered those natural disturbance regimes to which salmon are inherently adapted to.

Industrial activities including forestry, mining, and agriculture result in serious consequences for healthy salmon populations in freshwater environments (Bottom et al. 2009; Healey 2009; Parrish et al. 1998). According to Waples et al. (2009), land use activities including urban development, construction of logging roads, conversion of riparian forests into agricultural lands, and timber harvests increase the frequency and magnitude of landslides and floods. Depletion of in-stream water flow is a serious consequence of domestic, industrial and agricultural activities, as water is diverted away from streams and rivers, ultimately reducing salmon habitats (Hanna 2008; Parrish et al. 1998). Timber harvesting activities reduce the available supplies of riparian timber in close proximity to salmon-bearing rivers and streams (Bottom et al. 2009). As mentioned previously, timber resources supply watersheds with woody debris, which are crucial to forming in stream habitats for juvenile salmon populations (Bradford et al. 2008).

Climate change is proving to have disastrous effects on global salmon populations, as it overwhelms the resiliency of salmon ecosystems (Bottom et al. 2009). Global climate change is resulting in warmer ocean temperatures and reduced snow packs; climate change alters aquatic conditions as it affects stream flow, inland precipitation, and temperature patterns (Bottom et al. 2009). The effects of global climate change are creating uncertainties as to the adaptive

capacities of wild salmon populations to changing aquatic conditions (Bottom et al. 2009), and these effects have already been observed in some British Columbia salmon populations.

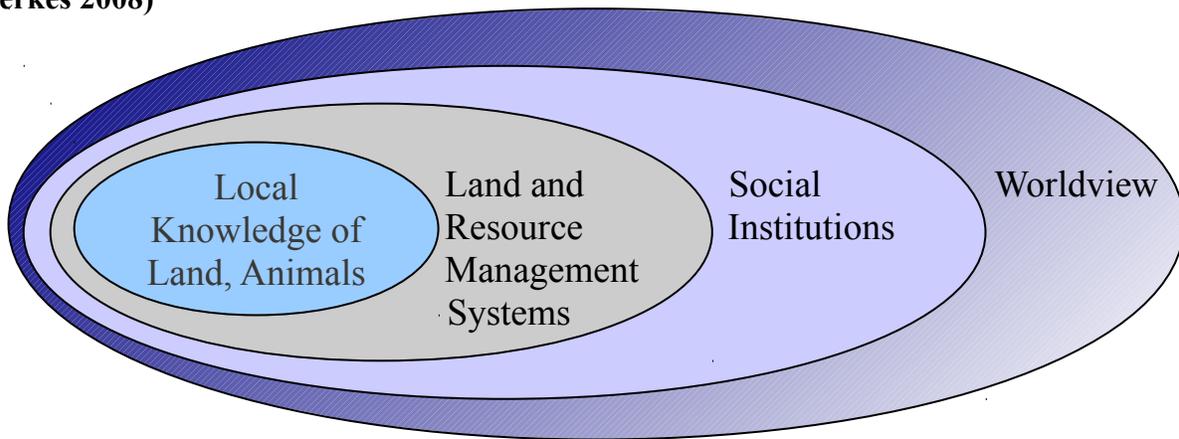
### **3.2 Traditional Ecological Knowledge and Fisheries Management**

Due to the uncertainty of fish stocks all over the world, the limits of Western science to mitigate anthropogenic change in fisheries management are now being recognized. According to McGoodwin, what is most needed now “is a shift away from autocratic and paternalistic modes of management to modes that rely on the collaborative efforts of fishers, scientists, and managers” (McGoodwin 2006, 191). Engaging with TEK (and Local Ecological Knowledge [LEK]) is now considered an alternative or supplemental means to Western resource management, as TEK, LEK, and Fisher's Knowledge is utilized to conserve and manage fisheries in a sustainable manner (Butler 2006; Shackeroff and Campbell 2007; Lauer and Aswani 2009). Incorporating TEK and/or LEK into co-management arrangements can supplement or replace Western scientific knowledge of natural resources, and is a potential means by which sustainability can be achieved (Moller et al. 2004; Butler 2006). Shackeroff and Campbell (2007: 351) define TEK as a “culturally developed framework involving people, their beliefs about the world, and their cultural means of collecting, processing and transmitting information about the environment”. Berkes (2008, 7) offers a more complete definition of TEK as he considers the concept to be “a cumulative body of knowledge, practise, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment”. Berkes (2008, 16), further notes that TEK is comprised of several layers and can be conceptualized as a “knowledge-practice-belief” complex. In understanding how TEK functions as a system of resource management, Berkes (2008, 17-18) presents four interrelated levels of analysis (see Figure 3.1).

1. Local, empirical knowledge of animals, plants, soils, and landscape, including information regarding life histories, taxonomies, behaviour, and distribution in their respective ecosystems;
2. Local resource management system using local environmental knowledge, and

- appropriate sets of management techniques, tools, and practices;
3. Traditional management systems require social institutions, social relationships, norms, and sets of rules-in-use adhered to by all interdependent resource users;
  4. World view shapes environmental perception, and is comprised of belief systems, including ethics and religion.

**Figure 3.1: Levels of Analysis in Traditional Ecological Knowledge and Management Systems (Berkes 2008)**



Having said this, Berkes insists that there is no universally accepted definition of TEK, as “the term is, by necessity, ambiguous” (Berkes 2008, 7).

According to Schreiber and Newell (2006) TEK can serve as a method for strengthening relations between stakeholders and can be used to enhance existing resource management practices. Some authors (Nadasdy 2003; Natcher et al. 2005; Stevenson 2006), however, are quick to warn of the negative aspects of integrating TEK into Western science and subsequent co-management institutions. Nadasdy (2003, 143) offers a critique of TEK integration in stating that “the goal of knowledge-integration forces TEK researchers to compartmentalize and distill Aboriginal people's beliefs, values, and experiences according to external criteria of relevance, seriously distorting them in the process”. Nadasdy adds that the integration of TEK works to further concentrate power in centralized management institutions, rather than in the Aboriginal communities, and warns that TEK “cannot be incorporated into processes of resource

management and environmental assessment until Aboriginal [peoples] have achieved full decision-making authority in these realms” (Nadasdy 2003, 143).

### **3.21 Fisheries Management Among the Alaskan Tlingit and the British Columbian Gitxaala**

The fishing and management practices of the Tlingit on the west coast of the Prince of Wales Archipelago in Alaska offers an example of how TEK and the technologies derived from the knowledge system were used historically to manage salmon populations. As Langdon (2006, 22) explains, the “Tlingit techniques were selectively harvesting salmon stocks in a manner that ensured the survival of a sufficient number of spawners to ensure a continuing supply in the future”. According to Langdon (2006), the Tlingit employed several inter-tidal fishing technologies based upon their detailed understanding of salmon behaviour. As such, inter-tidal fishing traps and weirs, constructed from stone and wood respectively, were used by the Tlingit. The selective harvesting nature of Tlingit traps and weirs operated on three principles that ensured that traps and weirs captured only a portion of the salmon entering these structures, so as to ensure adequate escapement for spawning purposes (Langdon 2006, 43). These principles include (Langdon, 2006, 43-44):

1. Weirs and traps were located in the inter-tidal zone at approximately half tide;
2. Technologies were designed to harvest salmon only on the ebb tide, meaning that at high tide and during incoming tide salmon were free to move through the estuary and into the stream without being obstructed;
3. Traps and weirs were not to block the stream channel above tidal range

By adhering to these operating principles, the Tlingit were able to sustain the salmon fishery for thousands of years. Langdon concludes that:

despite the fact that they had the technical capabilities to radically disrupt and even destroy salmon runs, the operating principles of the Tlingit used in constructing their harvesting technologies were eminently successful in selectively harvesting in a manner that ensured the continuous replenishment of the runs on which they had depended. (Langdon 2006, 45)

Examples of traditional fisheries management practices in British Columbia are plentiful (e.g. Jenness 1977; Duff 1952; Barnett 1955; Copes 1995; etc.). Three methods of fishing were utilized by the Gitxaala Nation on the K'moda River: gaff fishing, stone trap fishing and drag seining (Menziés and Butler 2007). Unlike commercial fishing techniques that rely on the indiscriminate harvesting techniques of trollers, purse seines and gillnets, the Gitxaala fishing techniques were regulated by harvesting principles and community-based use patterns that de-emphasized over accumulation of fish. Menziés and Butler (2007) argue that one step toward achieving truly sustainable fisheries is through the re-introduction of ecologically appropriate, First Nations traditional fishing gear. In addition, Menziés and Butler (2007) emphasize the importance of incorporating TEK into current natural resource management regimes, as TEK can serve as a tool in working toward both immediate resource conservation and long-term sustainability within fisheries management.

### **3.22 A Role for TEK in British Columbia Fisheries**

On May 21, 1998 the Honourable David Anderson, then Minister of the Department of Fisheries and Oceans (DFO), issued a press release stating that scientific evidence had proven that wild Pacific Coho stocks were declining rapidly and were at an extreme risk of extinction (Brown 2006). Anderson then went on to emphasize the importance of practising selective fishing methods as a method of reducing pressure on severely depleted salmon stocks, including Pacific Coho (Brown 2006). Following this public announcement Aboriginal fishers in British Columbia were granted approval to conduct “experimental fisheries that utilized the pre-contact live-capture technologies that allowed for the selection of noncritical species for harvest while allowing for the live release of Coho bycatch” (Brown 2006, 50). According to Brown (2006, 48), while DFO allocated \$500,000 to Aboriginal fishers in British Columbia for the purpose of purchasing selective fishing gear, approximately \$496,020 was used to fund the Aboriginal selective fishing program through the use of traditional fish wheels, beach seines, traps, and dip net stations. Traditional selective fisheries experiments were conducted by First Nations of the Fraser, Skeena, Babine, and Bulkley watersheds. Upon preliminary review, DFO found these

selective fishing projects to have achieved a high level of success in the live capture and release of Coho salmon, thus indicating that traditional selective fisheries are more than capable of harvesting target species without harm to non-target species (Brown 2006, 62; DFO 2005).

Another example of utilizing TEK in contemporary fisheries management is that of the historical fish wheel. As part of DFO's Aboriginal selective fishing program, the Skyway Band of Sto:lo Nation constructed and operated a fish wheel on the Fraser River under a communal license for food, social and ceremonial purposes (Brown 2006). In addition to an approved proposal submitted by the Sumas Band of Sto:lo Nation, approval for the Skyway Band fish wheel project was granted again for the 1999 season (Brown 2006).

Prior to European contact the Nisga'a employed the use of fish wheels mounted on floating platforms as a selective, live-capture method of fishing in the river (Corsiglia 2006). Salmon ascending the river would be scooped up by the fish wheel and guided into submerged holding baskets, where the flowing river kept the fish alive until they were either harvested or released (Corsiglia 2006, 224). According to Corsiglia, the Nisga'a Fisheries Department now utilizes the traditional fish wheel in conjunction with statistical analysis for the purpose of tagging spawning salmon to generate highly accurate fish counts (Corsiglia 2006, 224).

### **3.3 Fisheries Co-Management**

Notwithstanding the value of traditional or local ecological knowledge the world's fisheries continue to be threatened from global demand, environmental pressures, unsustainable fishing practices, and climate change. In fact, the majority of all commercially viable species of fish have become severely depleted, despite the fact that many of these species have been monitored by international agreements or committees (Glavin 1996). These conditions have in some cases prompted state fisheries agencies to engage local communities and begin sharing management responsibility. This willingness, motivated in part by the state of the world's fisheries and local demands for greater involvement in decision-making, has resulted in a range of decentralized, cross-scale co-management institutions that are seen as having the potential to respond to environmental change faster than do centralized agencies (Berkes 2000). These co-

management institutions have become particularly pervasive in fisheries over the past 20 years. The concept of co-management in the literature is synonymous and often equated with concepts of shared management, participatory management, joint management, multi-stakeholder management, and adaptive collaborative co-management, among others (Carlsson and Berkes 2003; Berkes 2002; 2009). Carlsson and Berkes (2003, 2) define co-management as “a situation in which two or more social actors negotiate, define and guarantee amongst themselves a fair sharing of the management functions, entitlements and responsibilities for a given territory, area or set of natural resources”. Similarly, the World Bank describes co-management as the sharing of “responsibilities, rights and duties between primary stakeholders, in particular local communities and the nation state” (Carlsson and Berkes 2003, 3). With respect to co-management arrangements involving Aboriginal peoples, Pinkerton (1999, 3) writes that “participants in locally based institutions that have a significant decision-making role have the potential to devise regulations that are more flexible, adaptable, and appropriate to specific situations than are those more generic ones crafted by centralized agencies”.

Co-management, as described by Notzke (1994, 51) serves to “provide a means for different cultures with conflicting values to share in a resource”. Furthermore, Notzke (1994) writes that the management of fisheries resources by one culture (colonial Canadian society) can result in the nearly complete loss of the fisheries resources to provide for the values and meet the needs of another culture (Aboriginal peoples). The term co-management, according to Campbell (2003), has been used to describe the process of combining TEK and Western scientific knowledge for the purpose of improving resource management. Furthermore, co-management describes the shared decision-making power between Aboriginal peoples, environmental groups, local non-Aboriginal resource users and government bodies (Campbell 2003).

Co-management regimes work to integrate state and local systems, facilitate the merging of different types of knowledge, and allocate control of resources (Natcher 2001; Notzke 1993). Natcher (2001, 149) writes that by sharing relevant information, “co-management institutions are able to incorporate local knowledge into the management process, are more responsive to ecosystemic change and the needs of resource users, and are helping to ensure compliance with agreed-upon rules and regulations”. With regards to its role in community economic development co-management is a power sharing arrangement that works to overcome the

cultural differences between Aboriginal and state institutions (Natcher 2001; McCay 1996). Levels of involvement by Aboriginal peoples within co-management arrangements are determined by the amount of re-asserted authority over resources; furthermore, co-management arrangements should be dynamic, as institutions must negotiate for space within such arrangements (Berkes 2003; Natcher and Davis 2007).

Although a plethora of definitions of co-management exist, common among most is the understanding that co-management is a holistic process involving two or more resource stakeholders (including but not limited to Aboriginal peoples, local communities, government agencies, private sectors, etc.) engaged in the decision-making process (e.g. Pomeroy and Berkes 1997; Borrini-Feyerabend et al. 2004; Berkes 2003; Carlsson and Berkes 2003; Berkes and Davidson-Hunt 2010, etc.). There is no one formulaic model or structure for co-management arrangements; rather, co-management arrangements should be constructed according to each specific situation (Pomeroy and Berkes 1997). Regarding the structure of co-management arrangements several authors (e.g. Berkes 2003; Pinkerton 1994; 2003; Pomeroy and Berkes 1997) describe two different cross-scale linkages: vertical and horizontal cross-scale interactions. According to Berkes (2003) vertical cross-scale interactions link institutions across levels of organization, as with the government and local Aboriginal resource stakeholder. Horizontal cross-scale interactions of institutions occur across geographical space, and include multi-stakeholders, such as several Aboriginal tribes within different territories (Berkes 2000; 2003). Recognizing fisheries co-management arrangements as being 'vertical' and/or 'horizontal' is crucial as fisheries often transcend territorial and international boundaries, thus creating a need for such cross-scale linkages of institutions.

The legitimacy of multi-stakeholder institutions engaged in co-management arrangements is crucial to the success in locally-based resource management. State legitimacy is necessary for locally-based co-management institutions to achieve success in the sustainable management of a resource, as stakeholders are more likely to comply to the management rules and goals created by such institutions (Berkes 2002).

Pinkerton (2003) offers perhaps the most in-depth description of the concept and structure

of co-management as an institution. She argues that the definition of fisheries co-management should be more complex and specific if the concept is to remain useful. Pinkerton (2003) introduces the concept of 'complete co-management' to serve as a template by which to compare and measure less complete variations of fisheries co-management. Regarding the concept of complete co-management, Pinkerton (2003, 64-65) has created a list of seven key principles:

1. Rather than acting as a delegator, government ideally acts as an engaged partner within co-management arrangements.
2. Like management in general, co-management involves far more than the control of fishing effort.
3. Sustainable fisheries co-management arrangements involve some level of control by community partners over the terms and conditions of fish sales.
4. The successful utilization of rights on one level of power depends on the utilization of rights at higher and lower levels, and includes the right to participate in the collection and analysis of data and in setting policy agendas at the highest level of power.
5. As they mature, co-management arrangements will ideally involve multiple horizontal negotiations leading to cooperative activities with other stakeholders, thus leading to a potentially greater democratization of civil society.
6. The power to exclude from defined territories is optimal for creating complete co-management.
7. Collective rights of a group form the foundation of complete co-management arrangements, more so than individual rights.

Carlsson and Berkes (2003, 14-16) introduce a different model that serves to view co-management as a process rather than a fixed state, and in doing so, suggest six steps to follow when conducting co-management research:

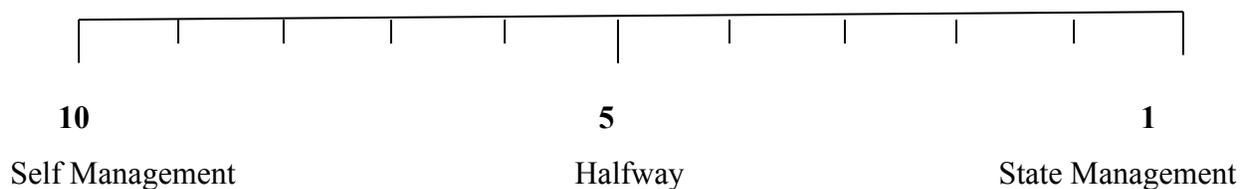
1. Define the social-ecological system to be studied.
2. Map the management tasks to be performed and the subsequent problems to be solved.
3. Identify the participants who are involved in the co-management arrangement and related problem-solving processes.
4. Analyze any cross-scale linkages between institutions.

5. Identifying contributions to participant capacity building.
6. Prescription of solutions.

Natcher et al. (2005, 242) writes that “while each of the above models have contributed to a better understanding of the operational factors that may influence the success or failure of co-management arrangements, they have proven limited thus far to account for the cultural variations present within these cross-cultural institutions, and how this cultural variance might influence management outcomes”. Accounting for cultural variations within co-management arrangements is crucial especially when dealing with Aboriginal-non-Aboriginal institutions as differing world views are present within such arrangements. Folk taxonomies, oral histories, ethnographic materials and TEK serve as important resources when co-management arrangements are formed between differing cultures, specifically Aboriginal-non-Aboriginal institutions.

When analyzing co-management arrangements, it is useful to view these institutions as being dynamic, as all kinds of factors can affect the state of co-management arrangements at any given time. That being said, several authors suggest that co-management is best viewed along a continuum where different levels of decision-making authority and power-sharing are exercised with the state (Pinkerton 1994; Carlsson and Berkes 2003). According to Carlsson and Berkes, the co-management continuum can range from the exchange of information to a formal, equitable partnership (Carlsson and Berkes 2003, 3). Pinkerton (1994) presents a numerical scale measuring levels of devolved decision-making authority and power-sharing with the state (See Figure 3.2: Co-management Continuum).

**Figure 3.2: Co-management Scale of Decision-Making authority and Power Sharing (Pinkerton 1994)**



Based on Pinkerton's (1994) scale of decision-making authority and power sharing, an institution engaged in true co-management would be situated somewhere near the higher end of the continuum, representing self management, whereas an institution lacking power and authority would be situated near the mid to lower end of the continuum, thus acting as a multi-stakeholder body. According to Berkes (2002, 304), multi-stakeholder bodies “link user groups and interests, local and regional, with the government and provide a forum for conflict resolution and negotiation among users”. Multi-stakeholder institutions represent the lower end of the co-management continuum described by Pinkerton (1994), in that they engage with the state in more of an advisory capacity, thus having limited decision-making authority in resource management. As such, multi-stakeholder bodies work to advise the state on resource management issues and often have very little power over management decisions. Berkes offers a criticism of multi-stakeholder bodies, explaining that “they are too easy to set up; they can turn into 'talkshops'; and they can be used by governments as a forum to sound out ideas without conceding any real shared management power to the parties” (Berkes 2002, 304).

### **3.4 International Co-Management Case Studies**

Representing one of the earliest documented legal co-management arrangements (Berkes 2009), Norway's Lofoten Cod fishery (as described by Jentoft and Kristoffersen 1989) is an oft-cited case study of fisheries co-management that has survived through the ages and achieved success in the sustainable management of cod. Dating back to 1897 the Lofoten Law formally established the rules of fisheries co-management, and resulted from conflict among local fishermen over types of gear, as well as over crowding within the Lofoten fishing grounds (Jentoft and Kristoffersen 1989). The original purpose of the Lofoten Law was to “bring the fishermen into the position of deciding the rules for the fishery”, as they were “granted the authority to make rules about the conduct of the fishery, as well as the authority to decide which gears were to be allowed to operate in the Lofoten fishery” (Jentoft and Kristoffersen 1989). Jentoft and Kristoffersen (1989) cite legitimacy of the Lofoten fishery regulatory system as being the main reason as to why the system has been successful in managing sustainably for over a

century. Conversely, Holm et al. (2000) dispute Jentoft and Kristofferson's (1989) presentation of the Lofoten Law as a foundation for sustainable fisheries management, as they argue that the Lofoten Law was not originally created with “conservation and resource management objectives in mind; rather, it was created as an attempt to manage a small fishing space and fishing gear conflicts” (Holm et al. 2000, 153). Despite this, Holm et al. (2000) insist that the Lofoten Law and subsequent fishing regulations can still be viewed from a resource management perspective, regardless of whether or not conservation of cod stocks was the primary goal.

In North America the most significant co-management arrangement between Aboriginal peoples and the government occurred in Washington State with the landmark 'Boldt Decision' in 1974 (Notzke 1994; Pinkerton 2003). In this decision, Judge George Boldt ruled on behalf of 22 Washington State Tribes, thereby affirming their inherent rights to use and manage their fisheries (Notzke 1994). In 1984, after ten years of court cases, the first “joint management projects” were created, and in 1986, tribes successfully negotiated with the Department of Fisheries regarding that season's fishing operations (Notzke 1994). From the Boldt Decision Aboriginal peoples gained increased shares in the annual fisheries harvest as well as new management responsibilities in working with the government, non-Aboriginal user groups, and other tribes (Notzke 1994).

### **3.5 Canadian Co-Management Case Studies**

The first process of devolution in Canada that gained the attention of the public was that of the James Bay and Northern Quebec Agreement (JBNQA) in 1975 (Berkes et al. 2001; Natcher and Davis 2007; Natcher et al. 2005). The JBNQA was created for the purpose of resolving on-going resource management conflicts between the Inuit and Cree of James Bay and the Provincial and Federal governments. Berkes et al. (2001) notes that following the creation of the JBNQA several co-management agreements concerning Arctic resource management were signed, including the Inuvialuit Final Agreement of 1984, the Gwich'in Comprehensive Land Claim Agreement of 1992, the Sahtu Dene and Métis Comprehensive Land Claim Agreement of 1993, the Yukon First Nations Umbrella Final Agreement of 1993, and the Nunavut Land Claims Agreement of 1993.

On May 25<sup>th</sup> 1984, a prominent Elder of the Musqueam Indian Band named Ronald Edward Sparrow was charged under the Fisheries Act with fishing with a drift net that was larger than allowed under the Musqueam Band's food fish license (Newell 1993, 174). Sparrow was tried and convicted under the premise that Aboriginal right (as stated in section 35(1) of the Constitution Act, 1982) could not be claimed unless the Band in question is supported by a specific treaty. Given that the Musqueam Band was without treaty, section 35(1) did not apply to this specific case (Newell 1993). After several failed attempts at appealing this decision the BC Court of Appeals overturned the decision in 1986, “unanimously ruling that section 35(1) meant that an Aboriginal right to fish for food continued to exist in non-treaty areas of British Columbia” (Newell 1993, 175).

As a result of the landmark *R. v. Sparrow* decision, the “Supreme Court confirmed the priority of Aboriginal harvesting, noting that government policy with respect to the BC fishery already provided that, in allocation of the right to take fish, Indian food fishing is to be given priority over the interests of other groups of users” (Newell 1993, 175). In response to concerns over the future of commercial fisheries, in June 1992 the federal government piloted a new fisheries contract for Aboriginal fisheries in B.C., known as the Aboriginal Fisheries Strategy (AFS). The AFS included a pilot program to “assign Indian groups responsibility for managing fisheries and to commercialize the Indian food-license fishery in British Columbia” (Newell 1993, 177). The pilot program, known as the 'Lower Fraser Fishing Authority' (LLFA) collectively represented the Musqueam, Sto:lo and Tsawwassen Nations of the Lower Fraser River (Newell 1993; Parsons 1993; Avio 1994). Under the LLFA the Musqueam, Sto:lo, and Tsawwassen Nations were allocated 395,000 sockeye salmon as part of the overall plan to manage the Fraser River salmon harvest during the 1992 fishing season (Parsons 1993). The LLFA was a departure from previous Aboriginal fisheries agreements as it provided “specific allocations of salmon for the Indian food fishery and allowed sale of a portion of the catch” (Newell 1993, 178).

Regarding coastal British Columbia salmon fisheries Healey (2009) states that in order to ensure efficient salmon harvest and more effective stock conservation the fishing industry, Aboriginal leaders, and coastal communities must all be engaged in an active co-management

program. Through the creation of community-based, co-management arrangements species conservation is placed under the responsibility of the communities that are most dependent upon the well-being of the fisheries (Healey 2009).

### **3.6 Criticisms of Co-Management and TEK**

Over the past decade there have emerged some dissenting views of co-management and suggestions by some that co-management is simply another co-optive process introduced by the state (e.g. Nadasdy 2003; Natcher et al. 2005; Stevenson 2006). While it is generally accepted that local-level institutions are in a better position to respond to environmental change faster than centralized agencies (Berkes and Folke 1998), local-level institutions often lack the resources necessary to adequately respond to and manage changing resource conditions. As such, co-management arrangements are seen by some as a strategy used by the state to offload costly management functions to local-level institutions (Carlsson and Berkes 2003). In addition, Nadasdy (2003) argues that although co-management arrangements have in some cases allowed First Nations greater access to natural resources, the bureaucratic nature of such arrangements are inconsistent with some First Nations practices and beliefs. As a result, First Nations people who participate in these processes “must learn to speak and act in new and uncharacteristic ways, and First Nations must construct elaborate bureaucratic systems that correspond to the federal and territorial bureaucracies with which they must interact” (Nadasdy 2003, 26). Similarly, Natcher and Davis (2007, 272) write that “while the language of devolution and local control permeates local-state interaction, the new institutions for land and resource management (and the ideologies that support them) remain deeply embedded within First Nation administration”. As a result, “the concept of devolution, as applied in the Yukon, remains obscure, if not meaningless, to many First Nation people, and the management of natural resources continues to represent one of the most pervasive remnants of the colonial experience” (Natcher and Davis 2007, 272).

With regards to fisheries co-management arrangements, Davis and Jentoft (2003) write that the implementation of fisheries management systems around the world serve to allocate and regulate participation in and access to fisheries through the use of quotas and licenses. Such systems of allocating quotas and licenses appear to mimic colonization through the further marginalization

of Aboriginal peoples.

In response to these conditions some Aboriginal peoples are challenging state-administered fisheries management systems and are rejecting the co-management model by seeking recognition of their inherent rights to fish. Davis and Jentoft (2003) note that many of the struggles faced by state governments with regards to Aboriginal peoples' rights are related to the state's failure to recognize the desire of Aboriginal peoples to act as self-directing agents. That being said, Davis and Jentoft (2003) suggest that the establishment of Aboriginal fishing rights represents an opportunity for Aboriginal-non-Aboriginal alliances to form localized coastal zone fisheries management bodies; such alliances are critical to further develop local agency in fisheries management (Davis and Jentoft 2003).

Within the literature two contradictory theories exist, resulting in two different conceptual models of co-management. The first describes co-management as a positive, holistic process involving two or more resource stakeholders engaged in the decision-making process and overall sustainable management of a resource (e.g. Pomeroy and Berkes 1997; Borrini-Feyerabend et al. 2004; Berkes 2003; Carlsson and Berkes 2003; Berkes and Davidson-Hunt 2010, etc.), while the second describes co-management as being more of a negative, co-optive process whereby Aboriginal TEK and cultural values are co-opted into government policies of natural resource management, ultimately contributing to the further marginalization of Aboriginal peoples (e.g. Nadasdy 2003; Natcher et al. 2005; Stevenson 2006). Despite the differences, both conceptual models are useful in assessing case studies of co-management. As such, I will base the analysis of the CHR in Chapter 5 upon the concept of co-management as a holistic process, while Cowichan's historical weir will be analyzed using the concept of co-management as a co-optive process.

## CHAPTER 4

### Research Methodology

#### **4.1 Introduction**

The inspiration for this study came from my childhood experience of growing up on the Cowichan River, and my subsequent passion to maintain the ecological health of this beautiful ecosystem for generations to come. Born and raised in Shawnigan Lake, I had the luxury of spending my summers at my Uncle and Aunt's property located on the Cowichan just north of Vimy, a popular public swimming hole. Over the years I have observed many changes to the river, with a decline in salmon stocks being one. My ongoing concern for the health of the riverine ecosystem coupled with my interest in Cowichan culture and traditional fisheries management technology led me to pursue a Master's of Environment and Sustainability at the University of Saskatchewan, with a thesis focused on sustainable fisheries co-management on the Cowichan River.

I first met with Larry George, Manager of Cowichan Tribes' Department of Lands and Governance in the spring of 2009 to discuss ideas for this study. We maintained regular contact throughout my residency in Saskatoon from September 2009 to April 2010, and met on several occasions during this time to further discuss the research objectives and goals. The research objectives and goals were developed in consultation with Larry George and Dr. David Natcher, my research supervisor. The research proposal and initial interview questions were presented to the Cowichan Tribes' Fish Committee in May 2010, where members participated in suggesting ways of fine-tuning the initial set of questions. Upon finalizing the interview questions, members of the Cowichan Tribes Fish Committee (CTFC) and the Cowichan Harvest Roundtable (CHR) were contacted for interviews. A copy of the interview questions can be found in Appendix E.

#### **4.2 Participant Observation**

The methodology used for this thesis is a combination of two qualitative research

methods including semi-structured interviews and, to a lesser extent, participant observation. Despite having deep roots in the field of sociology, anthropologist Bronislaw Malinowski is often credited with being the first scholar to develop participant observation as a serious qualitative research method, and the method is used most consistently in the field of anthropology (Bernard 2006). Participant observation, as defined by Levine et al. (1980, 38) refers “to naturalistic, qualitative research in which the investigator obtains information through relatively intense, prolonged interaction with those being studied and firsthand involvement in the relevant activities of their lives”. Holistic in nature, participant observation data can be collected in a variety of forms including researcher field notes, narratives, semi-structured or unstructured interviews, surveys, ethnographies, and oral histories (Bogdan 1973). The purpose of participant observation is to develop an understanding of complex social settings, relationships, and institutions in both cross-cultural and native environments by seeing them through a holistic lens (Bogdan 1973).

The method of participant observation relates to this research as I have chosen to explore concepts of TEK as it relates to the institution of the historical Cowichan fishing weir. In May and June 2010 I attended and observed several meetings of both the Cowichan Tribes Fish Committee (CTFC) and the Cowichan Harvest Roundtable (CHR), where I was introduced to the members and some of the current issues relevant to each of the committees. In addition to these meetings I attended a workshop hosted by Cowichan Tribes addressing environmental impacts and the health of the Cowichan River estuary in Cowichan Bay. In early October 2010 I participated in monitoring the historical weir with a Cowichan Tribes member on the river. Monitoring the weir involved identifying and counting the different species of salmon as they passed through the weir, and guarding the structure against potential acts of vandalism. While I have not included a concrete set of data resulting from this method, participant observation data informed the semi-structured interviews, as the development of interview questions was a collaborative process with the CTFC. In addition to informing semi-structured interviews, data collected while using this research method is woven into the information presented in the latter chapters of this thesis.

### **4.3 Semi-Structured Interviews**

Due to the nature of this study I opted to use semi-structured, open-ended interviews as my main research method so as to gain a detailed description and understanding of the historical salmon management techniques of the Cowichan Mustimuhw, as well as a sense of participants' perceptions of salmon co-management on the Cowichan River. Semi-structured interviews, often used with the participant observation methodology, reveal much more information than other types of qualitative research methodologies in that they illustrate the participants' thoughts, feelings, descriptions of events, and perceptions of the world (Northey and Tepperman 2007; Jackson 2004; Dunn 2000). Similarly, Taylor and Bogdan (1984, 77) define unstructured, in-depth interviewing as “repeated face-to-face encounters between the researcher and informants directed towards understanding informants' perspectives on their lives, experiences, or situations as expressed in their own words”. Unlike formal, structured interviews that consist of strict question/answer format, semi-structured interviews are more of a conversation-style which is useful in situations where the researcher may be unsure of whether or not questions are properly understood by participants, or in cases where the participants are not comfortable with direct questions (Huntington 2000). The flexibility within the semi-structured interview methodology allowed me to maintain one set of questions for all participants, while at the same time expand or omit specific questions depending upon individual participants. For these reasons, Huntington (1998, 242) writes of the semi-structured interview as being a powerful method for researching TEK, as it “allows the interviewer to capture a wide range of information by directing discussions to the extent necessary to cover topics thoroughly and in detail”.

### **4.4 Interview Logistics**

Interviews were conducted during July and August 2010 where, in total, 16 members from the CTFC and the CHR were interviewed, with seven participants being members of the CTFC, and nine being members of the CHR. Two participants sit on both committees, and were asked to answer each question from the perspectives of both committees, bringing the total number of interviews to 18. Of the 16 participants interviewed, two are female, with one sitting

on each of the two committees. With regards to members of the CHR, I interviewed five representatives from various departments within DFO including stock assessment, enforcement, and management, two representatives from Cowichan Tribes, two representatives from the commercial sector (one representative from Area B seines, and one representative from Area H Troll), and one former representative from the Vancouver Island Sportfish Advisory Board. The same set of interview questions was used for all participants; however, some of the questions may have been omitted and others expanded upon given the nature of each interview.

#### **4.5 Interview Design and Analysis**

Interviews were recorded using a Sony digital recorder and were transcribed using Audacity, a free audio editor and digital recording software. Transcriptions were then typed into Ubuntu Open Office documents and were returned to each participant for review, along with a digital copy of their interview recording. Corrections and modifications were made to the transcripts as per the specifications of each participant and content was analyzed for common themes. Due to the small number of interviews and organization of questions, I did not require the use of any qualitative software to assist with analysis.

#### **4.6 Study Limitations**

Because this research includes Cowichan participants and explores historical salmon management techniques and TEK of the Cowichan Mustimuhw, cross-cultural differences must be considered and addressed within the research process. In addition to the on-going demands of meeting ethical requirements of researching human subjects, cross-cultural research involving TEK poses a greater challenge in that the researcher's own ways of knowing and world-views may differ greatly from those of the Indigenous research participants (Shackeroff and Campbell 2007). As noted by Shackeroff and Campbell (2007) three challenges posed by the context of cross-cultural research involving TEK include situated knowledge, power and politicization, and ethics. In order to lessen the risks to participants in cross-cultural research situations the following ethical considerations must be addressed by the researcher and include working with

the community to develop research objectives, assigning ownership of research data to the community, informed and on-going consent with all participants, and dissemination of study results to the community prior to finalizing the draft report or thesis (Shackeroff and Campbell 2007; Castellano 2004). The ethical considerations relevant to this study are discussed in detail in section 4.7 Ethical Considerations.

While the majority of CTFC members participated in this study, I was unable to contact and arrange an interview with two of the members. Therefore, interview results cannot be applied to the entire CTFC, although they are representative of the majority. With regards to the CHR, several sectors have enlisted substitute representatives in the event that an appointed member is unavailable to attend a meeting; therefore, substitute members may not be familiar with the agendas of past CHR meetings. Several participants are no longer members of the CHR, although they were members at the time of inception and were part of the formation process, thus being very knowledgeable of the CHR's goals and objectives as a co-management institution. Several current members were either unavailable for interviews due to other obligations, or were not interested in participating. Because the interviews took place in July and early August, the commercial reps were out fishing and had limited availability for an interview. In order to overcome this obstacle I engaged in two telephone interviews with the commercial representatives. The provincial Ministry of Environment (MOE), while a CHR member by proxy, declined to participate in the study. While the results and opinions of CHR members are not representative of all members past and present, they are likely indicative of the general thoughts and feelings of CHR members regarding salmon management on the Cowichan River.

Another limitation to this study relates to the general nature of open-ended, semi-structured interviews. Due to the conversation style of interviews, in some cases, questions were omitted as they were answered without having been posed. In other cases, some questions were elaborated depending upon the interview. Where possible I have provided simple statistical references to each response so as to identify the number of participants who answered each question. Researching in a cross-cultural setting can lead to the misinterpretation of data by the researcher. In order to prevent this from occurring, I distributed copies of transcripts to each participant for review and corrected and revised each transcript as indicated by the participants prior to incorporating the data into this thesis.

#### **4.7 Ethical Considerations**

Ethical considerations for this study were addressed in accordance with procedures outlined by the University of Saskatchewan's Behavioural Research Ethics Board (Beh-Reb) and approval for this study (Appendix A) was granted in June 2010. Ownership of CTFC interview data was given to Cowichan Tribes' Department of Lands and Governance, while ownership of CHR interviews was given to the CHR. All research data is being stored at the office of Cowichan Tribes' Department of Land and Governance in Duncan, B.C. Participants were requested to review and sign a consent form (Appendix D) prior to the interview, and were asked to sign a transcript release form (Appendix F) upon review of their transcript. All participants received a photocopy of their signed consent form with their transcript and interview recording.

## CHAPTER 5

### The Cowichan Harvest Roundtable

#### 5.1 Introduction

Designated in 1995 as a British Columbia heritage river and in 2004 a Canadian heritage river, the Cowichan River drains one of the largest watersheds on Vancouver Island and supports returning stocks of Chum, Chinook, and Coho salmon and Steelhead trout. The Cowichan River has long supported Cowichan Tribes' food, social, and ceremonial fisheries and since the late 1800s, commercial and sport fisheries (DFO, Pers. Comm. 2011). Increased regional growth in development and population, competing interests amongst fisheries stakeholders, and the continued decline in Cowichan Chinook salmon stocks prompted the need for a locally-based institution for managing the harvest of Cowichan River salmon. As a result, the Cowichan Harvest Roundtable (CHR) was created in 2006 as a means for ensuring the long-term sustainability of Cowichan River salmon populations (DFO, Pers. Comm. 2011).

In this chapter I will present a case study of the Cowichan River Harvest Roundtable as a collaborative, co-managed institution charged with the responsibility of managing salmon harvests in the terminal area of the Cowichan River. This case study will assess the efficacy of the CHR in managing the harvest of Cowichan River salmon stocks in a sustainable manner, as well as examine the level of decision-making authority exercised by the CHR members over management decisions. Finally, the strengths and weaknesses of the CHR will be discussed along with suggestions from members on how to improve the management performance of the CHR.<sup>2</sup>

#### 5.2 Background

Unsustainable logging practices plagued the Cowichan River in the late eighteen hundreds and early nineteen hundreds, as log drives destroyed salmon spawning grounds and

---

<sup>2</sup> In several documents and interviews, the Cowichan Harvest Roundtable has been referred to as “Cowichan Fisheries Roundtable” or the “Cowichan Salmon Roundtable”; however, to prevent confusion, I will continue to use “Cowichan Harvest Roundtable” or simply “CHR” throughout this chapter.

blocked salmon from migrating up river. The forestry industry posed a serious threat to the health of the river ecosystem, when in the winter of 1890 the first log drive down the river's entire length was launched from Lake Cowichan (Hodding 1998). Frequent log-jams in the river's canyons required the use of dynamite, and once released “the logs and water swept down the river, threatening road and railway bridges, causing extensive damage to the riverbed, and killing the migrating salmon and trout” (Harris 2001, 139). Despite the concerns voiced by Cowichan Mustimuhw and Cowichan settlers (Hwunitum') that log drives on the river were destroying fish weirs, eroding river banks, wiping out buildings and threatening fish migration, the log drives continued until 1913 when the E&N Railway was expanded to accommodate the transportation of lumber (Harris 2001; Hodding 1998). In the 1970's clear cut logging in and around the Cowichan River watershed again posed an enormous threat to the health of the river ecosystem (Homer 2002).

Commercial canneries posed perhaps the biggest threat to the sustainability of salmon stocks on the major salmon-bearing rivers in B.C. including the Cowichan River. In order to fill labour shortages Indians provided cheap labour, serving as the 'labour backbone' of the salmon-canning industry during its rise in the late nineteenth century (Newell 1993). Indian villages in the southern Cowichan Agency were almost entirely deserted as Cowichan Mustimuhw went to work at the salmon canneries on the Fraser River (Newell 1993, 54). According to Marshall (1999) the cannery industry in B.C. peaked during the 1890's, and by 1901 the number of cases of salmon exported reached an astounding 1.25 million, resulting in “an export commodity worth \$6 million” (Marshall 1999, 136). Although local anglers denied the establishment of commercial canneries directly on the Cowichan River, cannery boats began drag-seining and gill netting commercially in Cowichan Bay in the 1890's (see Harris 2001 for an in-depth description of the history of commercial fisheries in Cowichan Bay). The desire of the Hwunitum' to export Cowichan salmon as a commodity all over the world most certainly contributed to the steady decline of salmon on the Cowichan River.

The Cowichan Valley became much more accessible to Hwunitum' settlers with the completion of the Esquimalt and Nanaimo Railway (E&N) in 1884 (HTG 2010), thus attracting sports fishermen from all over the world to the Cowichan River (Harris 2001). Anglers flocked to the Cowichan Valley to participate in the lucrative sport fishery along the river. Harris (2001)

notes that fly-fishing in the nineteenth century was an important aspect of the growing tourism industry; consequently, DFO began to accommodate fishing for purposes with little regard for the subsistence needs of the Cowichan Mustimuhw. The allocation of water for industry and agricultural purposes in the Cowichan Valley has been an additional factor affecting water flow in the Cowichan River, thus adversely affecting salmon habitat and migration. Destruction in and around the river's riparian areas due to logging, unsustainable development, and intensive agricultural practices coupled with increasing exploitation of salmon fisheries for commercial and recreational purposes, ultimately led to the severe decline in salmon stocks on the Cowichan River in the 20<sup>th</sup> century.

### **5.3 Inception of the Cowichan Harvest Roundtable**

In response to the threats noted above the Cowichan Harvest Roundtable began in 2006 as a grassroots ad hoc committee comprised of various stakeholders and levels of government. Owing to its collaborative success the CHR was appointed in 2006 by DFO as an official salmon harvest management institution for the Cowichan River (DFO, Pers. Comm. 2011). The CHR is a community-based co-management board comprised of representatives from Cowichan Tribes, DFO, Ministry of Environment (MOE), and the various fishing sectors including the Commercial Salmon Advisory Board and Vancouver Island Sport Fish Advisory Board.

The CHR was initiated as the third and final table in the “Cowichan River Terminal Allocation and Management Framework” project. This project represented the final step toward completion of the overall Cowichan watershed plan (DFO, Pers. Comm. 2011). Modelled after the previously established Stewardship Roundtable and the Water Use Committee, the CHR was designed to follow a decision-making process where members were assigned increased decision-making authority, leading to the development of local knowledge and shared responsibility of management decisions (DFO, Pers. Comm. 2011) The initial purpose of using the 'roundtable' approach to manage terminal area fisheries was to employ consensus-based decision-making and local knowledge to solve issues concerning resource management, stock assessment, water use, and fisheries production on the Cowichan River (DFO, Pers. Comm. 2011). In discussing the general purpose and structure of the CHR, a member of the CHR offers the following

description:

It's a board set up of different interest groups, commercial, sport fishing, First Nations, and DFO staff. These groups try to have a consensus agreement on the harvest of the salmon species only, in the terminal area of the Cowichan River including the Cowichan River itself. So it's a tool to try and come up with the best management actions and way to harvest fish that are acceptable to the different interest groups, recognizing that DFO is the mandated party for the management of the resource, and that the Cowichan First Nation has a constitutional right to fish for food, social, and ceremonial. (Cowichan Harvest Roundtable Interview #1, 2010)

In addition to the threats to the watershed noted above three additional factors led to the formation of the CHR, those being the need to resolve fisheries-related conflicts amongst terminal area stakeholders, the successes of the previously established Cowichan Stewardship Roundtable and the Cowichan Water Use Committee, and the availability of funding made available through the Pacific Salmon Commission Southern Fund (DFO, Pers. Comm. 2011). Using the initial funding, members of the CHR hired a mediator to draft an official Terms of Reference for the institution. One member of the CHR recalls the allocation of funds within the CHR:

At the beginning we received approximately twelve thousand dollars from the Pacific Salmon Commission Southern Fund, and that was used to get things going. We used that to provide lunches for people, and we hired a moderator to help us run the Terms of Reference procedures. The money lasted a few years, and ran out, and it did its job as it got us going. But there's no dedicated resources for the Roundtable. (Cowichan Harvest Roundtable Interview #7, 2010)

In addition to drafting an official Terms of Reference for the CHR, the initial funding was used to create a series of newsletters made available to the general public. Containing information volunteered by the CHR, the newsletters were designed to convey information regarding issues related to the Cowichan River and fisheries to the community at large (CSRT 2006, 2). When the

initial funding was exacerbated, production of the CHR newsletter was cancelled.

#### **5.4 Composition of the Cowichan Harvest Roundtable and Terms of Reference**

As a locally-based committee charged with the tasks of co-managing the harvesting of terminal area fisheries and resolving fisheries-related conflicts amongst resource users, the CHR is comprised of members representing various government organizations and local stakeholders of in-river and terminal area fisheries on the Cowichan River. Members include Cowichan Tribes, the Department of Fisheries and Oceans (DFO), the provincial Ministry of Environment (MOE), the Vancouver Island Sportfish Advisory Board, and commercial fisheries including Area B seine, Area E gill net, and Area H troll (DFO, Pers. Comm. 2011). Members of the CHR participate on a volunteer basis and meetings are hosted by Cowichan Tribes. While there is no set schedule, meetings occur several times a year and are held in the board room of Cowichan Tribes' Department of Lands and Governance in Duncan, B.C.

The Terms of Reference outlines the general purpose and responsibilities of the CHR, in addition to describing the geographical area of interest, structure of meetings, decision-making and sharing of information procedures (CFR 2007). A CHR member recalls the original purpose for drafting an official Terms of Reference:

We went through a lot of time and effort to agree and establish what [the Terms of Reference] are, because without knowing what the area or responsibility is, then there's a tendency for people to come in with incorrect expectations, like coming here to fix fisheries, or go talk about something which is not the responsibility of the Roundtable itself. (Cowichan Harvest Roundtable Interview #4, 2010)

The first draft of the Terms of Reference was created in April 2007 with the input of all CHR members and was in effect for the period of one year, at which time it could be amended as needed by members of the CHR.

According to the Terms of Reference, the mandate of the CHR is “to engage in a participatory process to build trust and improve communication between all involved parties in

order to make agreed upon, timely and informed fisheries decisions that benefit our ecosystem, our communities and all stakeholders” (CFR 2007). According to the November 2006 edition of the CHR newsletter some of the issues dealt with by the CHR include Cowichan River salmon assessment projects (biological sampling, tagging, catch estimates, and the enumeration fence), hatchery enhancement, enforcement by DFO fisheries officers and Cowichan guardians, and the sourcing of funds to carry out these projects (CSRT 2006, 2). A CHR member offered a detailed explanation of the purpose and responsibilities of the Roundtable:

It's kind of like a harvest and assessment table. The responsibilities are defined to a local sense, to only the terminal type fishery management actions or the assessment actions, not like having to deal with non-terminal like west coast troll, or Johnson Straits Chum fisheries or anything like that. It's more defined in a geographical area. (Cowichan Harvest Roundtable Interview #4, 2010)

The geographical areas of interest as defined by the Terms of Reference (CFR 2007, 2) include:

- Cowichan River and its tributaries
- Koksilah River and its tributaries
- Lake Cowichan and its tributaries
- All streams flowing into Cowichan Bay
- The marine terminal area defined as the portion of Statistical Area 18 bound to the south by Cape Keppel to Hatch Point, and to the north by Grave Point to Erskine Point.

All decisions concerning terminal area and in-river fisheries are made by consensus, as all members of the CHR must agree prior to moving forward on any decision (DFO, Pers. Comm. 2011). According to the Terms of Reference decisions are to be made by either full or working consensus, with full consensus being “all designated representatives agree and fully support the decision”, and working consensus being “not all designated representatives fully support the decision but can all agree to live with it” (CFR 2007, 2). The consensus-based decision-making design of the CHR represents a holistic method of co-managing, whereby all stakeholder representatives have the opportunity to express their thoughts and opinions regarding issues specific to the Cowichan River.

## **5.5 Interview Data and Results**

In July 2010, four years after its inception, the CHR was continuing to represent the interests of multi-sectoral stakeholders in co-managing in-river and terminal area fisheries on the Cowichan River. Interviews with both past and present members of the CHR reveal their current thoughts and opinions related to co-management, sustainable fisheries management, threats to Cowichan River salmon populations, the possibility of a fisheries moratorium, and the strengths and weaknesses of the CHR as a holistic fisheries co-management institution.

### **5.5.1 Perceptions of Co-Management**

As discussed previously in Chapter 3, many interpretations of co-management of common property resources (CPR's) exist in the literature (e.g. Ostrom 1990; Pinkerton 1994, 1999; Notzke 1994; Pomeroy and Berkes 1997; Berkes 2003; Borrini-Feyerabend et al. 2004). In order to clarify how participants of the CHR view the concept of co-management, members were asked to define the term in their own words. Table 5.1 presents the definitions of co-management as perceived by members of the CHR.

**Table 5.1: Definition of Co-Management**

<b>CHR Member</b>	<b>What is Your Definition of Co-Management?</b>	<b>Is Co-Management occurring with respect to the Cowichan River salmon fishery?</b>	<b>Comments</b>
CHR Member #1	“Co-management to me, is looking at the interests of other user groups and trying to accommodate, and bring those ideas forward into the management process. But it has to be recognized that there's one body that does have ultimate responsibility and when it's decision is made then it has to be final.”	Yes	“In certain ways I would say there is lots of good discussion in how to manage the different fish stocks and in particular with the Cowichan Roundtable it has to do with salmon.”
CHR Member #2	“That's a tough one cause co-management is a huge issue. Are we co-managing a habitat? Or are we co-managing a habitat and a harvest table, or are we co-managing a water table? There's the issues that I struggle [with] when we get into a co-management issue.”	No	“I would say it's occurring in a weak section, it's not really occurring overall.”
CHR Member #3	“I'll tell it as a Cowichan member because co-management is that we have a right to say we need to be allowed to get this many fish because everybody else is catching this many.”	No	“Not really no. From Cowichan's perspective, no.”
CHR Member #4	“Co-management is making decisions where possible together. What else could I say about co-management? It's working together. So basically it's decision-making together in a partnership type arrangement.”	No	“Not quite, in that every group that goes there has some responsibility back to its parent group and there's the jurisdictional legality issue, not quite in the purest sense where those that go there have the complete responsibility themselves to make those decisions.”

CHR Member # 5	N/A	N/A	“DFO still doesn't have a definition of co-management. DFO's version of it I think revolves around the fact 'give us the money and we'll go out and manage and don't talk to us'. DFO is hung up on the concept that you cannot fetter the power of the Minister, which is a legal term, so there was a lot of fear which still exists, and a feeling of inability to make decisions by the senior DFO at a roundtable, because they have to in the end get approval of the Minister for something to happen.”
CHR Member #6	“Co-management is basically what the commercial industry is moving forward on there, and that is that there is a couple of commercial licenses under integrated fishing that have gone to the Cowichan this year.”	Yes	“I guess, I don't know how that's going to be done yet.”
CHR Member #7	“It's the interested parties and that includes all sectors including First Nations, sitting down and making a decision about how the fishery should proceed. They get the information from the technical staff and they proceed and develop a fishery from it. And quite frankly, the authority should lie there, and if it doesn't lie there, there's no point in meeting.”	Yes and No	“In summary, the [CHR] has the ability to make management changes at the local level but they can only provide comments at the regional level on fisheries that affect the Cowichan stocks. These comments do not necessarily result in any changes, but they could.”
CHR Member #8	“My idea is shared responsibility for managing whatever. So it involves I guess sharing the power over decision-making but also sharing the responsibility over the effects of those decisions.”	No	“I think we are closer to a true co-management situation than we were before the table started. I think that good progress has been made but there are still some hurdles, and of course one of the challenging things when it comes to salmon, is a lot of the harvest factors that influence local stocks are

			not involved in terminal fisheries.”
CHR Member #9	“I see co-management as working together, and making decisions together and that's not happening. DFO still has the decision-making and policies, etc. So we have to work together in co-management, and restructure policies or whatever it may be in the Department for us to work together as a whole in other user groups also. That's what I see co-management as, decision-making together.”	No	“In ninety-two AFS came in and I thought that was co-management, working together with the Department of Fisheries and Oceans, and working in the line of their regulations. And we've pushed the regulations, and we forced the regulations, etc. And the short end of the stick again, we've always got the short end of the stick for Cowichan here and it didn't benefit Cowichan again.”
CHR Member #10	“I mean co-management is everybody sitting at the table and hopefully working towards the same goal, but certainly recognizing responsibility and rights has to be right up there.”	Yes	“I think there's some weight given to decisions that the Roundtable makes or suggest, is it real co-management? Maybe not, because we can't make decisions. We aren't incorporated into decisions that are made on Cowichan stocks in other areas.”

The majority of participating CHR members identified several common aspects of co-management within their respective definitions. Members identified co-management arrangements as involving all interested parties in decision-making processes, where it is understood that decision-making authority is shared amongst all stakeholders. In addition to shared decision-making authority, CHR members indicated a shared responsibility amongst all stakeholders for managing a given resource, as well as a shared responsibility over the consequences of such decisions.

In addition to defining co-management, participating CHR members were asked whether or not co-management is occurring with respect to the Cowichan River salmon fishery. Of the nine members who responded, three felt that co-management is in fact occurring, while five members felt that co-management is not occurring. One member felt that co-management is occurring in some respects, but not in others. While several members indicated that decisions made by the CHR are given some weight, the majority felt that the Roundtable doesn't have enough decision-making authority across the board, meaning that many harvesting factors influencing Cowichan salmon stocks are not involved solely in terminal area fisheries. This makes co-managing the resource very difficult, as the CHR is only responsible for decisions affecting the terminal area.

### **5.52 Co-Management as a Continuum**

In Table 5.2 members of the CHR rate the committee's current level of decision-making authority, while Table 5.3 addresses whether or not the CHR is effective in managing the harvest of Cowichan River salmon stocks in a sustainable manner.

<b>TABLE 5.2: Scale of the Harvest Roundtable's Management Decision-Making Authority</b>		
<b>CHR Member</b>	<b>On a scale of 1 to 10, what level of decision-making authority does the Harvest Roundtable have?</b>	<b>Comment</b>
CHR Member #1	7 out of 10	“To me, it is a very good table in that it does have a voice, and a power, and a direction and it's mostly adhered to. I mean we come up decisions that make sense, and DFO adapts them and that's great. I think the biggest stumbling blocks come probably into the commercial aspect of those stocks. That's only a portion of it but because it is a stumbling block it probably takes more of our time than the easy decisions that we can kinda just hammer out right away.”
CHR Member #2	1 out of 10	“The problem we have in this system today is DFO is the manager, we have an overall south coast management plan, and the Roundtable is just one aspect of that management plan, and we're managing around the harvest table without talking to them which we've done for years. And then they bring this Roundtable in and it hasn't quite got a way to fit in properly. [Decision-making authority of the Roundtable is] not very high cause of the complications of how it fits in with everything else.”
CHR Member #3	5 out of 10	“There are DFO employees that sit on that table, and that question was brought up as 'how much say is this table going to have, if any?' They said 'oh no no no, we'll listen.' But ultimately when decisions for a consensus was reached at the table, it didn't really matter because the higher ups at DFO still made the decisions even though there was a consensus with everybody involved. So unfortunately yes, they're listened to, but the decisions are still made higher up.”
CHR Member #4	3 out of 10	“I guess others not involved with the committee would argue we cannot give that committee the ultimate responsibility or any responsibility for the resource, and my argument would be that you have representatives down there from the Department and it's not a voting type where three out of the four major groups can go against the Department or anything like that, it's a decision by consensus so every group needs to agree. So the Department, our representative, can still block that decision if they feel that it's not within the goals and direction that the Department wants to go.”

CHR Member #5	7.5 out of 10	“If you make a decision in a small geographical area which may meet the needs and may be in agreement with the needs of that very small area, you don't want it to have the ability to all of a sudden come in out of the blue and be told that it's a precedent that is now going to determine all future decisions in that kind of a situation. So I think that these harvest roundtables are wisely set up to be consensus driven, and I don't think anything should come out of that process unless it has reached consensus. And then I think DFO needs to come up with a hell of a good reason why not to follow it.”
CHR Member #6	-----	“Well it doesn't have a decision-making voice, but it can be effective in the sense of like what we're doing right now.”
CHR Member #7	7 out of 10	“One of the directions the Department wanted to go to was to get input from multi-sector groups, and this was to try and avoid some of the name calling and finger pointing of 'you're taking too many fish.' So the question is how much real authority they have, or whether they're ignored. I would say we're probably in the middle somewhere, I would say we certainly have input into decision-making, but ultimately the Department has the final say.”
CHR Member #8	3 out of 10	“Up until a year ago I would have said with respect to managing like terminal fisheries only, if ten was good, and one was bad, I would have put it at you know seven, or eight. But now it would be much lower.”
CHR Member #9	3 out of 10	“We take steps and steps but again you know, we don't have the full authority to make decisions where we want to do that within our own terminal areas, and all of the user groups decide how much each group is going to get, but it's the policies with DFO, and DFO has got the last say again. I look at the committee as a good working committee, but again the shortfall is we don't have the decision-making authority where we want to have it.”
CHR Member # 10	-----	“If you're talking about the terminal area, and with respect to some harvest, then I think there's a fair bit of weight. We've made some pretty big decisions at that table as a group.”
<b>Averaged Level of Decision-Making Authority:</b>		<b>4.6 out of 10</b>

Variance:

5

**TABLE 5.3: Is the Harvest Roundtable Effective in Managing Cowichan River Salmon Stocks in a Sustainable Manner?**

<b>CHR Member</b>	<b>Yes/No/Not Sure</b>	<b>Comments</b>
CHR Member #1	Yes	“I would say so. The thing about the Roundtable that I really like is that all members seem to have conservation of fish as their primary objective. I don't think anybody that sits at that table wants to see salmon fish stocks to the Cowichan plunge into extinction. So having said that, it works well, I think people all have that view and so there is that aspect of [the Roundtable] that works.”
CHR Member #2	Yes	N/A
CHR Member #3	Yes	“Yeah, they are. There was finger pointing at first, because I know for a fact Cowichan or any First Nation has never taken every single fish that goes up the system. People have always conserved, and yet that's where the finger was being pointed. It took quite a few meetings for everybody to realize 'yeah, it's not just the Cowichan people.’”
CHR Member #4	Yes	“The short answer, I would say yes, although it would be nicer to have more responsibilities recognized for that group.”
CHR Member #5	N/A	N/A
CHR Member #6	No	“The commercial fishing that impacted any Cowichan fish was all shut down, and things got worse, and worse, and worse, but yet you still had full-bore recreational fishing both sides of Vancouver Island that would be impacting those fish and there was no closures there, so that's the one thing where I say co-management from that point of view is going to be very hard until those things are dealt with.”
CHR Member #7	No	“I would have to say no, because we don't have a say over all the harvest. We only have in theory, we only have a say over what's harvested or the regulations surrounding the local area, so that's in river, that's Cowichan Bay, that's the approach areas, but twenty percent of the Chum are taken up in Johnson Straight. We can't do anything about that, the Chinook are taken off the west coast in west coast troll and sports

		fish. We have no say on that. We can provide comments, we can go to fisheries management and say 'listen, these guys are taking all our Chinook, and they've gotta cut back' but all this is advice. We really don't have any kind of authority to say how the west coast troll conducts their fishery. So that's why I say no.”
CHR Member #8	Yes and No	“No, because local stocks are still intercepted in mixed stock fisheries, and you have to realize that each stock is different. So you could say 'well our Chum stocks are managed sustainably, and other species are managed sustainably but maybe the Chinook are not.' So it's not a blanket statement, you have to look at each stock, and each argument. What about shellfish, right? What about Steel head? What about anadromous trout you know, Cutthroat, I mean they're all different. And I think some are doing better than others, but I think you'd be false to say all Cowichan stocks are being managed sustainably at this time.”
CHR Member # 9	Yes	N/A
CHR Member #10	Yes	“I think probably. The problem is we are left with whatever everyone else has already accessed. So I think for the most part, yes. But then when it comes to lean years, everybody's fighting to get access, they still want access.”

In keeping with the concept that co-management is a continuum rather than a fixed state, participating CHR members were asked to rate the CHR's current level of decision-making authority on a numerical scale of one to ten. With 'one' representing the CHR as having no decision-making authority and acting merely as an advisory body to DFO, and 'ten' representing the CHR as having full decision-making authority and DFO acting as a supportive body to the CHR, members ranked the averaged level of the decision-making authority as 4.6 out of 10, while the variance is 5.1. The average of 4.6 is slightly less than half way along the continuum (Pinkerton 1994), indicating that the CHR members feel they have little decision-making authority and act more as an advisory capacity on issues relating to in-river and terminal area fisheries. This realization for some became most apparent when the CHR endorsed an economic venture that would secure Cowichan Tribes an allocation of the commercial Chum salmon harvest. Made available through the Pacific Integrated Commercial Fisheries Initiative (PICFI), the federal government introduced a program that would enable First Nations to obtain commercial fisheries licenses through a buy-back program (DFO 2011). In 2009, the CHR put forth a motion to DFO supporting an economic opportunity for members of Cowichan Tribes to harvest Cowichan Chum stocks commercially. With PICFI providing the mechanism for Cowichan Tribes to obtain a commercial license the CHR's decision to support Cowichan's request for a sustainable, commercial fishery was ultimately refused by DFO. A member of the CHR explains:

I think the reality was that over the last year or so, the regional executive got nervous, and I don't think we really have the authority that we thought we did in the beginning. It's kind of come to a head with the Cowichan Tribes' request for an economic opportunity fishery. It certainly was possible as we had the fish, we had buy-in from the other commercial sectors. There was disagreement about how it would actually proceed in a technical sense, whether Tribes and commercial would fish on the same day or alternate days and that sort of thing. But that's just technical discussion, the idea that they could have an economic opportunity was there and was supported. The Department is locked into their own policies, and trying to be innovative just doesn't really go anywhere, as the Department gets nervous. (Cowichan Harvest Roundtable Interview #7, 2010)

As a direct result of the failed commercial Chum fishery members of the CHR were uncertain as to the actual amount of authority they had in managing Cowichan fisheries. According to a CHR member, DFO's dismissal of the CHR's decision "did kind of undermine the assumption everyone had that if we can make a decision in this room, we're good to go" (Cowichan Harvest Roundtable Interview #8, 2010). While the commercial Chum fishery was not approved in 2009, members remain hopeful that the CHR decision will eventually be honoured by DFO, and Cowichan Tribes will benefit from a commercial Chum fishery. A member of the CHR expresses optimism for a future economic opportunity:

I don't know if [DFO] is worried about precedent setting or what but in any event, this year things have progressed. I'm not sure what's really happening at the moment, but I think they are working toward using the licenses that were offered last year and actually proceeding on an economic opportunity. Again, Chum was the target for this fishery, and the forecasts are such that there should be some surplus available for both Tribes and a commercial opening. So, here's hoping that things go smoothly, and that we can proceed. (Cowichan Harvest Roundtable Interview #7, 2010)

Another challenge for the CHR is that of secure funding for projects. Once the CHR has made a management-related decision, funding must be sourced to carry out those agreed upon actions. Aside from the initial funding granted at the time of inception, the CHR has no sources of funding available to carry out management tasks. Members meet and participate on a volunteer basis and Cowichan Tribes' Department of Lands and Governance kindly offers a boardroom for the meetings. A CHR member summarizes the difficulty of operating without any fiscal resources:

The Harvest Roundtable has no funding whatsoever. We meet at Cowichan Tribes, they provide the meeting room, and that's the in-kind support. The Department makes the necessary staff available to the meetings but that's just allowing us to go to the meetings. There are the volunteers, so these would be commercial and recreational reps who have no way of paying for their travel costs to get to Duncan to the meetings unless they go to their own individual organizations, and they're

probably not that well funded either. So no, we don't have adequate financial resources, we have none essentially. (Cowichan Harvest Roundtable Interview #7, 2010)

Despite the absence of disposable fiscal resources, the CHR continues to operate through the good will of its members. If funding were made available to the CHR, perhaps more harvest management tasks could be carried out in a timely fashion.

While CHR members indicated that some Cowichan stocks are currently managed sustainably, the greatest challenging is trying to manage mixed stock fisheries. Local salmon populations including the endangered Cowichan Chinook are intercepted in mixed stock fisheries, thus making the task of managing all Cowichan River salmon very difficult. As discussed in sections 5.24 and 5.3, managing salmon populations is exceedingly difficult for the CHR as it has no control over the harvest of Cowichan salmon outside of their jurisdiction in the marine environment. While the CHR is able to monitor and manage in-river and terminal areas in a sustainable manner, it is unable to manage mixed-stock fisheries in the marine environment, as Cowichan stocks are fished from Puget Sound in Washington State, all the way up the coast to Alaska. Consequently, any decisions made by the CHR concerning Cowichan stocks in the marine environment are not necessarily recognized by DFO. A member of the CHR explains that “with other fisheries that impact Cowichan stocks, there isn't a whole lot of weight put onto the Roundtable decisions” (Cowichan Harvest Roundtable Interview #10, 2010).

Based on the responses, there seems to be a general consensus that the CHR is managing in-river and terminal area fisheries in a sustainable manner, although there is no decision-making authority over salmon in the marine environment. Despite these challenges, 6 out of the 9 members (1 unsure) indicated that the CHR is an effective institution for managing the Cowichan River fishery. Based on the comments from the interviews it appears that all members of the CHR remain committed to conserving salmon and protecting the Cowichan River habitat.

With regards to negative impacts on salmon populations, CHR members identified a number of management and environmental issues that continue to threaten the Cowichan River fishery. Table 5.4 outlines threats to the Cowichan River salmon fishery.

<b>TABLE 5.4: Threats to Salmon and Salmon Management Regimes on the Cowichan River Today</b>		
<b>CHR Member</b>	<b>Threat(s) to Salmon on the Cowichan River</b>	<b>Comments</b>
CHR Member #1	<ul style="list-style-type: none"> <li>• Lack of scientific knowledge pertaining to salmon stocks</li> <li>• Marine survival</li> </ul>	“I think being able to adequately protect the Chinook stocks when they're in the mixed fisheries in the ocean, I think that's a mystery. I think everyone would like to find the answer, but I think that's the biggest part, is the mystery of how to manage those stocks so that the fish coming back to the river allow a good access for the Cowichan Tribes as well as the spawning requirements.”
CHR Member #2	<ul style="list-style-type: none"> <li>• Habitat</li> </ul>	“The biggest issue you have in that system is 'what's the weather going to be like and what's going to get washed out' in my mind. I know it's a big system and you can get to the lake and all that, but we seem to deal with washouts all the time.”
CHR Member #3	<ul style="list-style-type: none"> <li>• Marine survival</li> </ul>	“I used to think it was over fishing because our fish are caught west coast, Juan de Fuca, but I think it's just the overall survival in the ocean now, which is the unknown factor.”
CHR Member #4	<ul style="list-style-type: none"> <li>• Lack of stock assessment information</li> <li>• Lack of accountable decision-making</li> <li>• Bureaucracy</li> </ul>	“As far as the management goes, the actual decision-making, I think there has been a lack of understanding or less understanding about the decisions that are being made. I think decision makers are not bold enough to make decisions, so hence no decisions are made kind of thing. And I'm not even talking about whether it's the right or wrong decisions, a lot of times just no decision is made.”
CHR Member #6	<ul style="list-style-type: none"> <li>• Non-localized fishing sectors impacting the local salmon stocks</li> </ul>	“I think some of the fisheries that impact that area are too far from home. The commercial fishing that impacted any Cowichan fish was all shut down, and things got worse, and worse, and worse, but yet you still had full-bore recreational fishing both sides of Vancouver Island that would be impacting those fish, and there were no closures there, so that's the one thing where I say co-management from that point of view is going to be very hard until those things are dealt with.”
CHR Member #7	<ul style="list-style-type: none"> <li>• Marine survival</li> </ul>	“Marine survival is affecting Coho and Chinook specifically, I mean it affects other stocks as well but those two stocks seem to have a much lower marine survival than they did back in the nineties, let's say twenty years ago. Because of that, there's fewer fish around to be harvested. If that turned around, all of a sudden

		we'd have lots of fish and it wouldn't be an issue, so that's kind of the major driving force. Now in the meantime, we have low marine survival, so we have seemingly high exploitation rates because there's just fewer fish surviving to that point.”
CHR Member #8	<ul style="list-style-type: none"> <li>• Global climate change affecting marine survival rates and causing changes in water temperature, water volume, salinity, food chains, etc.</li> <li>• Land-use practices including dyking</li> </ul>	“Marine survivals have dropped significantly over the last couple of decades. For instance, with Coho stocks smolt to adult survival in the late eighties, early nineties, was probably fifteen percent, ten to twenty percent. Now it's one to two percent. So that's a drop in an order of magnitude right? Chinook used to survive probably two to three percent, now we're lucky to get half a percent so again almost an order of magnitude drop. Now what's the causal factor associated with that? Unknown, however it seems to be temperature related. So it seems to be the global climate change is probably a major factor. Recent research seems to indicate that perhaps a lot of the increased mortality is happening inshore, as opposed to offshore so right in the Salish Sea [...]. It's a complex mosaic of factors right, but I don't think I'd be off base to say that global climate change is a major driver with respect to presenting challenges to sustainable management of Cowichan fish stocks.”
CHR Member #9	<ul style="list-style-type: none"> <li>• Marine survival</li> <li>• Seals and California sea lions in the terminal area of the river</li> </ul>	“We always look at the marine survival, I think it's the marine survival. Seals are problematic especially in our area. Once the fry are released from the hatchery, they're just at the mouth of the river. We had twenty, thirty seals before, now we're looking at four hundred seals sitting at the mouth of the river just having a hey day on the salmon fry coming down. You know they're a protected species and not only ourselves, Cowichan, but other First Nations and commercial fishermen have been stressing about the seals. That could be the main source, but it's hard to say cause no one's ever done any surveys or whatever to predict the amount of salmon the seals take.”
CHR Member #10	<ul style="list-style-type: none"> <li>• Exploitation rate</li> <li>• Habitat</li> <li>• In-river water levels</li> <li>• Water temperatures</li> </ul>	“I think exploitation rate is a difficult one. I still think it's too high, and that's where money could be spent on establishing better information on what the actual exploitation rate of these fish are or the harvest levels for any given year. And then the other thing I think would be habitat. Whether that's estuarine or in the river and all the rest, I mean we're seeing that. We're a growing community and certainly on the Cowichan we're losing habitat and we're having effects. The water use is a

		<p>huge one, the whole thing with the lake. We've got catalyst, we've got a weir, we've got lake owners, and holding back water and having enough water to do releases for the Chinook to come in. So part of it too is species dependant. I think some of this water stuff is critical to the Chinook because they're coming in earlier, and when there's low water it makes them more vulnerable to exploitation and that's not just by First Nations by any means, that's by anyone.”</p>
--	--	--

Threats to Cowichan River salmon and salmon management as told by members of the CHR are ranked below in order of number of times cited:

1. Marine survival
2. Habitat
3. Global climate change; lack of scientific knowledge pertaining to salmon stocks; unsustainable rate of exploitation
4. Land use practices
5. Lack of and/or absence of accountable decision-making; bureaucracy; non-localized fishing sectors impacting local fish stocks; invasive species preying on salmon

According to CHR members marine survival encompassing exploitation, global climate change, habitat, and predation is the most significant threat to salmon today. In-river habitat is cited as the second largest threat to salmon today as a combination of pollution, poor land use practices, and low water flows contribute to the degradation of the riverine habitat. While several remediation projects have been carried out to help reclaim former salmon habitat and spawning grounds in the river, it is clear that on-going remediation is necessary to ensure the health of salmon habitats in the future.



*Figure 5.1: Algae Blooms on the Lower Cowichan River, September 2010*

### **5.53 Fisheries Moratorium: A Possible Solution?**

Multiple factors have led to the steady decline of Cowichan Chinook over the years. Although considered extreme by some, a Cowichan Chinook fishing moratorium has, in the past, been proposed by several members of the CHR and other parties as a potential strategy to aid in the recovery of Chinook stocks. CHR members were asked whether or not a moratorium was considered a viable management option to assist in the recovery of Cowichan Chinook. Responses are presented below in Table 5.5.

**Table 5.5: Do You See Calling a Moratorium on Cowichan Chinook as Being a Potential Solution to Assist in the Recovery of the Stocks?**

<b>CHR Member</b>	<b>Response</b>	<b>Comments</b>
CHR Member #1	Yes	“So could I see it? Yes, if it need be. If somebody told me 'look, to protect Cowichan fish we need a five year moratorium or something like that to get them back where they should be', I would have no problem with it. I'd be absolutely a hundred percent behind it, but then knowing the nature of how fish are managed, that is very difficult. The biggest part of the problem is you have mixed stock fisheries, and some stocks can handle pressure and some can't. So it's always the old age question of 'how do you deal with that'? How do you save fish that are mixed in with fish that don't need to be saved? The easy answer is shut everything down, then rebuild it. But of course, there's lots of socio-economic benefits and things that are going on that you need to have for the economy right? I mean that's how the world turns. There's a lot of money generated by fishing, commercial fishing, sport fishing, so you know, that's tough.”
CHR Member #2	Not Sure	“Most stocks even when they're in trouble could be harvested to a low twenty percent or so exploitation rate, and that might be happening anyway. What is actually happening in ocean conditions in the last years has a bigger effect on some of these things. You're seeing some Chinook streams come back in bigger numbers than expected, and I'm hoping that Cowichan is also one of those. So we've had some downturn in the system, but I also think there's a few issues on that side with sewer outfalls and stuff like that which hasn't been put on the table as much either.”
CHR Member #3	Yes	“My understanding is that's what they're trying to do. But I've realized sport/rec is big money to DFO, and commercial probably too so it's hard for them to say no because they will lose big money. I know it's talked about, it's [been] talked about every year for the last few years. I think that's kind of the idea they have to do, because it's kind of late in the game. To me, that should have been done a long time ago, instead of having to close fishing like from Port Alberni to Cowichan Bay. It is talked about, but it needs heavy political pressure.”
CHR Member #4	Maybe	“There's a number of actions that you can take to assist on that stock rebuilding, and a moratorium on fishing is only one of them. [A moratorium] has some fairly severe impacts on people that utilize those stocks and there are other things that I think can be done, for example, enhancement and that sort of thing, but also there needs to be looking at other aspects of the whole ecology. Why aren't those salmon coming back? Is it habitat, is it something we've done in the river? For

		example in Cowichan they're cleaning up the silt with the Stoltz Falls stuff. There's a whole pile of stuff that we have been looking at and we should be looking at. Like I say, the easiest one is to stop fishing. But if you look at other examples, if you stop fishing and some of these other stocks and species continue to decline, we probably should have looked at other things besides that.”
CHR Member #5	N/A	N/A
CHR Member #6	No	“I don't think that's necessary. I think before you would get to those measures that you would have to identify what Chinook stocks you're catching in a bigger way. When you have an aggregate fishery, you've got to determine what your encounter rate is of these fish within that aggregate, it might be nothing. To stop everything for that, it doesn't make a lot of sense.”
CHR Member #7	N/A	“We have low marine survival, so we have seemingly high exploitation rates because there's just fewer fish surviving to that point. So what we can actually do is change some of the harvest strategies and then try not to target the Cowichan Chinook. There are certain things you can do, you can limit fisheries to inshore waters, so within a kilometre of the surf line. I guess the idea is that these fish are going off shore to feed out to Laperouse Banks and off the west coast. So if you limit recreational fishing to the inshore fisheries, they're going to target more of the local stocks. And that's one thing that could be done now. Again, because of the current state of the recreational fishery, there's a lot of off shore fisheries you're going to affect. It doesn't matter what you do, you're going to affect people. If we have the status quo we're going to affect people, we're going to affect Tribes cause there's just not that many fish coming back for them.”
CHR Member #8	Yes	“Yeah, well as somebody that doesn't make their living catching fish as a sport fisherman, or a commercial fisherman, that would be great. The numbers are a moving target but probably over the last ten years, on average maybe sixty percent of Cowichan Chinook are harvested before they get into the terminal waters. Do I think it would help? Yes, and would I support it? Well, it's easy for me to say that and it's not costing me anything. Do I think it's going to happen? No, not right away cause basically you'd be shutting down the coast for Chinook harvest. If you want to guarantee you weren't going to catch any Cowichan Chinook, you'd have to say no one, because the Alaskans catch Cowichan Chinook, Washington State catches Cowichan Chinook.”
CHR Member #9	Yes	“That's possible, it is very possible. In the back of my mind and Larry's mind, the manager's mind, etc. that's all possible. We have stressed that to the Department, if the decline is bad, that maybe it's time to stop everyone. If we get our

		<p>Sockeye, yes, I can see that. A moratorium would go up, okay. But if we don't, I don't see that happening at all. If we don't get any Sockeye, these guys are going to go fishing regardless. There's always going to be a handful of people, [even] if there's a restriction, moratorium on Chinook salmon in the river system. It may be sports fishermen, it may be troll fisherman, [but] somebody's going to go and do it. There's always going to be someone. In our end here in the river system there's always going to be a handful of people illegally doing it anyhow. If worse to worse comes, we've looked at that and we said well, we have to do it.”</p>
<p>CHR Member #10</p>	<p>Not Sure</p>	<p>“I don't know. It's an interesting question because although exploitation rate is there, we're also hearing other stuff that the survival rate is so low. Some say that well, even if there was zero harvest they still would decline. I'm not a biologist, I'm not a stock assessment biologist, that's not my background. To me though, if you stop harvest, it makes sense that it would help. But you still have a responsibility to Cowichan, or to any First Nations group that has access to those fish. And that's where it becomes really difficult. I tend to think that yeah, if you had a hundred percent moratorium no more fishing, it would help, but you'd have to do more. There's more stuff to be done and that's why hopefully this whole Chinook rebuilding plan and all the rest will get off the ground, but there's a lot to talk about. It would just be nice to see some forward movement more on that.”</p>

In response to the question “Do you see calling a moratorium on Cowichan Chinook as being a potential solution to aid recovery of the stocks?”, four out of eight members responded 'Yes', while three out of eight responded 'No', and one out of eight responded 'Not Sure/Maybe'. A common concern expressed by members of the CHR relates to the feasibility of implementing a moratorium on Cowichan Chinook stocks, as it will be very difficult to prevent interference with healthier stocks within the mixed stock fishery. Economically speaking, a fisheries moratorium will have a severe impact on the livelihoods of all fisheries stakeholders, as enormous amounts of revenue are generated from commercial and sport fishing. While all members recognize the need for a solution to declining salmon stocks, several members suggested exploring other, less extreme alternatives to a fisheries moratorium. Altering harvest strategies to target other salmon species and limiting the harvest to only inshore waters could potentially minimize the overall impact to Cowichan Chinook stocks. In addition to altering harvest strategies, members cited enhancement and in-river habitat restoration and remediation as other alternatives to a moratorium.

## **5.6 Conclusion**

Notwithstanding the challenges noted above, all members viewed the CHR as being a very positive management institution and recognize the benefits to implementing the 'roundtable' approach to decision-making. Representatives of the various stakeholders, DFO, and Cowichan Tribes make an effort to understand and validate one another, and work together toward the common goal of managing to conserve Cowichan River salmon. One CHR member emphasizes the positive aspects of the CHR:

It's a model, and it just makes things so much easier when people are talking and working together. And even though there may be disagreements on issues as they come up or not, I think all the partners realize that the common interest here is the fish in the river, and that everybody has the best interests of the fish in the river at heart. So even though we can disagree on specific issues or specific ways of handling things, I think we can always kind of come back to that solid foundation,

which is not always the case. (Cowichan Harvest Roundtable Interview #8, 2010)

In only five years the CHR has managed to see several projects through to completion, in addition to amending fishing rules and regulations on the Cowichan River. A CHR member discusses the accomplishments thus far:

We changed fishing boundaries, fishing regulations, we changed everything that was all pertinent to the local fisheries. So that would be like the freshwater trout, or the Cowichan Bay recreational Coho and Chinook fisheries and stuff like that, and now the Pink fishery. (Cowichan Harvest Roundtable Interview #7, 2010)

In response to concerns over the diminishing Cowichan Chinook stocks, Cowichan Tribes voluntarily reduced their food, social, and ceremonial in-river Chinook fishery from seven days to four days per week. Because west coast sport/recreation groups and commercial fisheries intercept Cowichan Chinook, Cowichan Tribes could have requested a closure in Chinook fisheries; however, they worked together with other representatives on the CHR to find other, less extreme solutions (DFO, Pers. Comm. 2011).

The Pink Salmon Project, a somewhat controversial project was initiated by the CHR several years ago (DFO, Pers. Comm. 2011). The objective of this project was to create a new, healthy population for an in-river sport fishery to alleviate the pressure on suffering salmon stocks. In 2009 the Pink Salmon Project was successful in seeing a healthy first return to the Cowichan River. In addition to providing for a new sport fishery, the Pink Salmon Project supplemented Cowichan Tribes' FSC fishery, as Cowichan Mustimuhw harvested Pinks from the Cowichan for the first time.

In the early days of the CHR, a community newsletter entitled Cowichan Salmon Roundtable Newsletter was published and distributed throughout the community using some of the initial funding granted to the committee. The articles within the newsletter were composed by members of the CHR and were designed to educate and convey information to the general public regarding Cowichan River fisheries-related issues. A member of the CHR explains that “through the newsletter we educated the general community about fisheries guardians, the fact that they're there and that they're peace officers and so on, and that was a very positive result” (Cowichan

Harvest Roundtable Interview #5, 2010). The newsletter is no longer in production, as there are no longer any available fiscal resources to continue funding the project.

The future of the CHR is uncertain, yet members feel that as long as they continue to participate and hold meetings, the CHR will survive. However, in order for the CHR to fulfil its initial mandate of managing Cowichan River and terminal area fisheries, DFO should be willing to devolve more authority over management and decision-making. In addition to devolving authority, DFO should clarify the current level of decision-making authority held by the CHR, and revise the Terms of Reference accordingly. As a result of the failure of DFO to act upon the commercial Chum fishery decision, the CHR lacks legitimacy in the eyes of some members, as they are uncertain as to its capacity for managing Cowichan River fisheries. Despite these difficulties the CHR remains a solid model for co-managing in-river and terminal area fisheries, and is one that could be adopted by other watersheds in B.C.'s coastal region. A member of the CHR emphasizes the necessity of the multi-stakeholder Roundtable for the Cowichan River:

I think that Cowichan in a lot of ways, is an excellent model. It's not perfect, but it's certainly heading in the right direction. In the late nineties there was an effort to organize a table, and it was all the people that wanted to work for fish. There were fist fights in that room, literally fist fights. And I look between now and then, fifteen years later, huge improvements. So yeah, it seems to be working.  
(Cowichan Harvest Roundtable Interview #8, 2010)

The CHR exemplifies a holistic approach to co-managing common pool resources and is in direct opposition to the centralized, bureaucratic management style employed by the federal government. With Pacific salmon fisheries on the decline overall we must look to alternative methods of co-managing the resource, and locally-based, multi-stakeholder committees like the Cowichan Harvest Roundtable are acting models of sustainable fisheries management institutions.

## CHAPTER 6

### Salmon ‘Management’ Among the Cowichan First Nation

#### 6.1 Introduction

In this chapter I present a case study of the historical Cowichan fishing weir, where I will compare and contrast its historic and contemporary structure and function, discuss its historic loss and the process of revitalization in 2008, its potential for informing salmon management efforts in the future, and whether or not there is space within current fisheries co-management arrangements to include the weir and other historical fish management techniques. For greater clarity and brevity, I will use the term “historical fish management technique” throughout this chapter to describe the weir in the context of TEK.

#### 6.11 The Cowichan Fishing Weir

Much has been written about the general structure and function of the historical Coast Salish fishing weirs (e.g. Underhill 1945; Duff 1952; Barnett 1955; Stewart 1977); however, few sources exist pertaining specifically to the Cowichan weir. Resembling a lattice-work fence, the weir was a historical fishing tool that was placed in small streams and tributaries for the purpose of delaying salmon and trout swimming up river to spawn (Stewart 1977; Dyck 2000; Hartwig 2000). Though there existed several types of weirs that were utilized by the Central Coast Salish, the most common type “consisted of a lattice-work or slatted panel held onto the frame by pressure of the current” (Dyck 2000, 43). The foundation, consisting of a series of posts driven deeply into the stream or riverbed, remained in place throughout the years, thus validating claims to specific weir sites (Harris 2001). The traditional Katzie weir consisted of “a row of posts driven into the bottom of the stream, against which sections of woven cedar-limbs were tied” (Suttles 1955). The fence panels were constructed from hemlock or vine maple woven together with cedar bark, and were placed against the anchored posts on the upside of the stream

(Underhill 1945, 20). The main posts usually remained in the river throughout the years, while the fence panels were removed in November during higher water levels and were “replaced in early spring when the water was low, in order to catch steelhead and the winter run of spring salmon” (Rozen 1985, 215). **(See Figure 6.1: The Historical Cowichan Weir; Image H-06525 Courtesy of Royal BC Museum, BC Archives).**

Extending across the river weirs acted as barriers, preventing salmon from migrating upstream, with the exception of several openings in the fence panels which led salmon into traps and pens (Suttles 1955; Stewart 1977). According to Suttles (1955) traps and pens were constructed in the same manner as the main fence panels, with sections woven tightly together to contain salmon and trout. According to a Cowichan Tribes Fish Committee (CTFC) member, the weir “could be selective, and once the fish pile up behind the weir, then the guy's just standing there and spearing off the weir. It takes a technique and not too many people could spear off the narrow pole standing there. And if not, you're going for a swim” (Cowichan Tribes Fish Committee Interview # 7, 2010).

For the Cowichan and Nanaimo, Barnett (1955) adds that a board walk or plank was attached to the down-stream side of the weir, where fishermen could spear, gaff, or dip-net salmon. The Cowichan, according to Cowichan Tribes' Fisheries Manager Wayne Paige Sr., historically used alder and maple branches tied together with cedar bark to form fence panels. Historically, the weir was used by the Cowichan Mustimuhw as a selective salmon harvesting tool. A CTFC member discusses both the historic and contemporary function of the weir:

The weir is just basically used as a harvest method. Years back, historically a selective harvest method only. (Cowichan Tribes Fish Committee Interview #7, 2010)



*Figure 6.1: Historical Weir at Quamichan Village, circa 1866*

*Source: Royal BC Museum, BC Archives Image H-06525*

## **6.12 Importance of the Central Coast Salish Fishing Weir**

Numerous sources (e.g. Duff 1952; Suttles 1955, 1987, 1990; Dyck 2000; Harris 2001) attest to the importance of the weir as a socio-political and socio-economic institution as access was shared with other communities and tribes throughout the Central Coast Salish territory. Dyck (2000, 44) writes that “as well as being important to the subsistence and economy of the Cowichan, weirs formed the basis for some important political and social relationships”. An example of this is exhibited in Suttles' *Coast Salish Essays* (1987), where access to marine resources was shared between the Cowichan and the Saanich, as “Cowichans fished in the summer on reef nets belonging to Saanich and some of the Saanich, who had no important stream in their territory, went to the Cowichan River for the fall runs of fish caught at weirs” (Suttles 1987, 21). In addition to the Saanich, the Chemainus held winter fishing sites on the Cowichan River (Harris 2001), and the Cowichan Mustimuhw united to cross the Strait of Georgia every summer to access their Sockeye fishing sites near the mouth of the Fraser River (Harris 2001).

## **6.13 Historical Locations and Types of Weirs on the Cowichan River**

The Cowichan Mustimuhw once controlled an elaborate weir fishery on the Cowichan River, utilizing as many as fourteen or more weirs concurrently to harvest salmon and trout through the fall season (Rozen 1985). Marshall (1999, 55) suggests there were anywhere from fifteen to twenty-one weirs established on the river prior to European contact. Marshall (1999, 55-58) writes of three separate types of traditional weirs used by the Cowichan Mustimuhw: tidal weirs, river weirs and rock weirs.

1. Tidal weirs were placed at Cowichan Bay, catching fish by adapting to the natural tidal action of the ocean.
2. River weirs were placed near falls and rapids and were anchored into the banks of the Cowichan River.
3. Rock weirs were constructed near the top of the river and were used to block ascending

fish, diverting them to the banks of the river where they were speared from atop the weir. Marshall (1999, 55) notes that ascending the river from Quamichan village up to Skutz, as many as nine separate weir sites were established along the river banks, and there is evidence that multiple weir sites were found at the larger villages of Quamichan and Somenos (**refer to Figure 6.2 for a map of the historic locations of villages and weir sites on the upper and lower Cowichan River**).

The concept of the historical fishing weir as a sustainable harvesting technique is not new; rather, Western scientists have attested to its capacity to harvest and manage fish in a sustainable manner. Aboriginal fishing technologies including the weir most certainly had the potential to severely deplete fisheries resources, as the design of these technologies coupled with social and/or population pressures allowed for the potential to over-exploit the resource (Walter et al. 2000; Trospen 2000). For example, in British Columbia the total consumption of salmon by Aboriginal peoples pre-contact was comparable to or higher than contemporary commercial catches (Walter et al. 2000, 274). Given that, over the course of thousands of years, Aboriginal peoples utilized the weir and other historical fishing technologies to maintain such a high rate of exploitation without suffering long-term negative effects on the resource (Walter et al. 2000, 274), one could conclude that Aboriginal fisheries including the Cowichan fishery were far superior in sustainably managing salmon than contemporary salmon management regimes. A CTFC member confirms the concept of the weir as a sustainable fish management technique, and discusses the potential impacts of harvesting using the weir on the Cowichan River prior to European settlement:

Previously, Cowichan would operate a weir on the river system, at a time when fish were extremely plentiful. Even if we were harvesting at moderate levels, you could harvest forever and not have a huge impact on the stocks, given our size, our population and potential impact at the time. And that was one of our primary food resources. (Cowichan Tribes Fish Committee Interview #7, 2010)

In summarizing the sustainability of the central Coast Salish weir Copes (1995) states that the system assured “bountiful harvests with escapement that was quite adequate to maintain the

stocks in a healthy state, as is evidenced by the prosperous condition of the [central Coast Salish] tribes at the time of European contact and the healthy state of the salmon stocks then observed” (Copes 1995, 12).

The methods by which the Cowichan Mustimuwh and other central Coast Salish tribes were able to maintain a prosperous, sustainable fishery over thousands of years include potlaching and reciprocity within and amongst tribes (Underhill 1945; Barnett 1955; Suttles 1955, 1987, 1990; Hill-Tout and Maud 1978), systems of exclusivity regarding access to weirs and fish sites (Duff 1952; Suttles 1955, 1987, 1990; Rozen 1985; Dyck 2000; Harris 2001), and systems of governance enforced by Chiefs that included careful monitoring of salmon stocks and the capacity to adapt harvesting patterns accordingly (Copes 1995; Trospen 2000; Walter et al. 2000; Johnsen 2009). According to Johnsen (2009) weir attendants were directly responsible for decisions concerning which salmon were harvested, and which were allowed to continue the migration up river to spawn. As mentioned previously, a CTFC member states that Cowichan Elders held special knowledge of the health of specific stocks and were responsible for adjusting harvests accordingly (Cowichan Tribes Fish Committee Interview #6, 2010).

The structure and design of weirs played an important role in the sustainable management of salmon as they were constructed to allow a certain number of salmon pass through en route to their spawning grounds. A CTFC member links the traditional environmental ethics of the Cowichan Mustimuhw to the sustainability of the weir:

The weirs, our traditional weirs weren't designed to catch every fish that came up the river. They were designed to catch what a family needed, and you know, that was how I was brought up. You don't go down there spearing just for the fun of it, just to kill salmon. You killed or you speared fish to provide for your family, and the weirs were designed so that a certain number of spawners would get through. We practised conservation long before there was a DFO. (Cowichan Tribes Fish Committee Interview #4, 2010)

#### **6.14 Ownership, Control, and Access to Resources**

Access to weirs and resources was controlled by an elaborate system of property rights

which varied slightly amongst central Coast Salish tribes. Within the literature, the general consensus regarding ownership is that entire communities constructed, controlled, and operated weirs, but with no distinction in access (Suttles 1987). In the case of the Lummi, Suttles (1990, 149) writes that weir sites “seem to have been generally owned by 'families', with the family head credited with the technical and ritual knowledge required to build it”. Amongst the Chilliwack, weirs were constructed by men in adjacent villages but were accessed and used freely by all the Chilliwack (Duff 1952, 67). There are, however, a few minor discrepancies and variances between scholars regarding details of individual ownership of weirs and weir sites along the Cowichan River.

Rozen (1985) and Dyck (2000) state that select high-ranking families within the six villages managed the construction and monitoring of several individual weirs; however, because weir construction was very labour intensive and often involved a large number of village members, elite families allowed lower ranking individuals access to weirs, thus distributing wealth amongst the village (Suttles 1955, 1990; Stewart 1977; Dyck 2000; Harris 2001). Walter et al. (2000, 275) note, however, that on the Cowichan River “anyone could gaff at weirs built communally, but traps and platforms belonged to specific families”. In keeping with the sharing ethic of central Coast Salish communities owners of weir sites, platforms, and traps granted access to fellow community members on days when they were not using their weirs (Suttles 1955; Stewart 1977; Thom 2005). In addition to sharing access to weir sites, families owning weirs located on the lower river routinely opened traps and fence panels on select days so as to ensure salmon made their way up to families located further up river (Underhill 1945; Stewart 1977; Dyck 2000; Harris 2001).

Historically, it is known that only select individuals held the responsibility of monitoring each weir, usually a village headman or Chief, or select Elders (Rozen 1985; Harris 2001). A Cowichan Tribes biologist and CTFC member explains:

We had a very strict management system on the river in which the weir operated similarly to the actual counting fence that's also utilized by Fisheries and Oceans now. But it would be manned by Elders. There were select Elders that had a long-term knowledge and an understanding and history of salmon stocks, so they knew what stocks would be coming which even for Chinook, you know, the Chinook

stocks would be completely broken up in their timing, and so they knew which stocks were healthy and when, and had a limited controlled harvest, so that you could fine-tune any harvesting to perhaps take a little more from healthier stocks, and lean much less heavily on endangered stocks. This is what they're trying to do with Sockeye stocks on the Fraser River, but definitely on a much more effective level. And it was only select Elders that were allowed at the time to operate the weir. And they literally they manned it, in a sense they almost policed it, because they had that knowledge. They also had the necessary respect to ensure that over generations to come, those stocks would still be there. (Cowichan Tribes Fish Committee Interview #6, 2010)

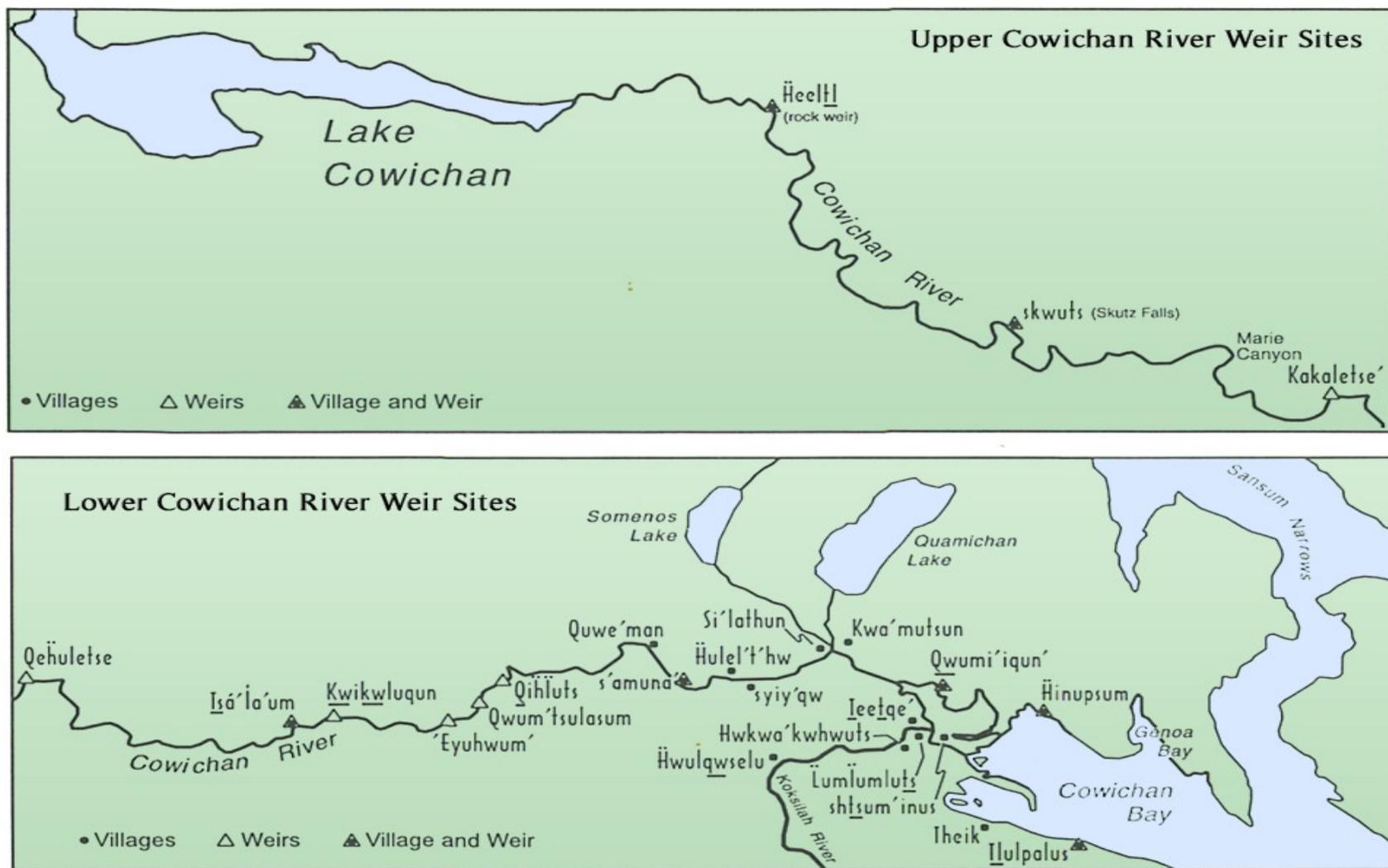


Figure 6.2: Map of Historical Weir Sites on the Upper and Lower Cowichan River (Marshall 1999)

## **6.2 Historical Fisheries Interactions and Loss of the Cowichan Weir Fishery**

Three poignant accounts exist of the historical fisheries-related interactions between the Cowichan Mustimuhw and the Canadian state leading up to the loss of the Cowichan weir. While it is not my intention here to recap all of the historical details of the Cowichan's fight to defend their weir fishery, I will touch on a few of the main points as described by Marshall (1999), Dyck (2000), and Harris (2001) respectively.

According to Daniel Marshall, the Cowichan Mustimuhw held pre-existing rights to continue their historical fishing methods post-European contact and settlement, as legally recognized by the Royal Proclamation of 1763 and the Fort Victoria Treaties; therefore, they were exempt from the “Salmon Fisheries Regulations for British Columbia” ratified on May 30<sup>th</sup>, 1878 (Marshall 1999, 139). As such, the Cowichan continued to practice historical fishing methods throughout the late 1870's and into the early 1880's, until the Federal government began to enforce the Fisheries Act against the Cowichan Mustimuhw, thus marking the first of many attempts to ban the historical weirs from the Cowichan River (Marshall 1999). According to Harris (2001, 127) historical fishing weirs had been “prohibited on British Columbian rivers under Canadian law since 1877, yet the Cowichan continued to build them for sixty years, often with support from the local settler population and the Department of Indian Affairs, and sometimes with permission from the Department of Fisheries”. Harris (2001, 128) note that although Aboriginal and non-Aboriginal interests “frequently clashed, the conflict did not always follow this cultural divide, and elements within both groups sought broader alliances to keep competing users off the river”. Throughout their sixty year battle against DFO the Cowichan Mustimuhw continued to construct and operate their weirs on the river.

The introduction of logging in the Cowichan Valley in the late 1870's threatened the existence of the weirs as logs were sent down the river from Lake Cowichan to the mill in Cowichan Bay (Dyck 2000; Harris 2001; Hartwig 2000). The destruction of the Cowichan weir fishery caused by logging sparked extensive debate “between Indian Affairs and [the Department of] Fisheries over the applicability of the Fisheries Act to Native Peoples in British Columbia” (Harris 2008, 138).

According to Glavin “weirs were perhaps the most widespread aboriginal fishing technology employed on Canada's west coast until they were banned by federal authorities under pressure from the coastal salmon-canning industry in the late 1800s” (Glavin 1996, 57). Upon realization of the great economic potential for exporting fish around the world, the government sought to curtail the Indian food fishery in favour of the canneries (Newell 1993; Marshall 1999). With the rapid growth of the west coast salmon-canning industry, canners wanted both the guarantee of Native labour as harvesters and plant workers during the fishing season, as well as a larger share of the fish. As such, canners sought assistance from the government in moving Natives into cannery camps and away from their traditional food fishing grounds (Newell 1993). According to Newell “government officials decided that obstructions, including fishing barricades that Indians built on northern streams, were the most important matters concerning the conservation of the B.C. fisheries” (Newell 1993, 90). Consequently, the Department of Fisheries and Oceans (DFO) attempted on numerous occasions to banish the Cowichan's historical weirs under the premise that weirs were unsustainable and were an unnecessary method for fishing (Dyck 2000; Harris 2001; 2008). More recently, a CTFC member addresses DFO's historic claims of the weir being unsustainable:

The non-Natives saw it as a detriment to the fish, but when in reality, I think it was more safe to use because you only took out what you needed. And I don't think they understood what the weir was about. (Cowichan Tribes Fish Committee Interview #5, 2010)

Exercising its federal government authority, DFO challenged the legitimacy and sustainability of the Cowichan weir through repeated court cases where the Cowichan Mustimuhw defended their legal traditions, “insisting that human use of the river and the fish in it were allocated under and subject to Cowichan laws” (Harris 2001, 127). Though DFO consistently lost these court cases, fisheries officers continued to harass Cowichan Mustimuhw and in some cases destroyed weirs and confiscated their property (Dyck 2000; Harris 2001).

By the 1930's DFO began issuing permits making available new fishing technologies, namely gill nets, to the Cowichan Mustimuhw in exchange for abandoning the use of weirs. As

alleged by Harris, DFO provided gill nets to Comiakem, Khenipsen and Clemclemeluts (the three lower villages on the river) in an effort to create divisions within Cowichan society, as nets were a more effective fishing method than weirs for use in tidal waters (Harris 2001, 177). Quamichan and Somenos villages, however, were not prepared to relinquish their weirs in exchange for gill nets. DFO began to exploit this division amongst the Cowichan Mustimuhw to achieve their goal of removing all weirs from the river (Harris, 2001). A CTFC member recounts the exchange of gill nets and the subsequent relinquishment of weirs:

It's been years since they've taken the weir down. The Department stressed that we could gill net in the river system if we take the weirs down, that was years back. So we've taken that down to allow our members to fish by gill nets, but seeing as a fishery manager, seeing the catches in the river system and thinking of a management scheme of how to protect and how we can get salmon up in the spawning areas, we declined our own membership of using gill nets. (Cowichan Tribes Fish Committee Interview #7, 2010)

Out of concern for the long-term health and sustainability of the Cowichan fishery the Cowichan Mustimuhw chose to restrict the use of gill nets among their own members citing such methods as being destructive and unsustainable. Under pressure from the burgeoning commercial and canning industries and enticed by a highly lucrative sport fishery, DFO took every opportunity to extinguish the Cowichan weir fishery from the river. Arguing that it was in fact the weir fishing that was destructive to the fishery, DFO ultimately seized control over the Cowichan River fishery, with the last Cowichan weir being removed from the river in 1936. The government's removal of historical fishing weirs throughout the province not only destroyed a vitally important riverine fisheries institution of the Coast Salish, it severed the elaborate socio-political alliances and socio-economic ties enabled by the weir throughout the Coast Salish territory. In the end, the Cowichan weirs were regulated out of existence by the federal government, as 'Cowichan law' was effectively usurped by colonial law (Harris 2001).

### **6.3 Reestablishing the Cowichan Weir**

As a symbol of protest against the loss of their fishery Cowichan Tribes resurrected the

weir in 1973, but were soon after forced to abandoned their historical fishing weir (Harris 2001). This enduring conflict, as noted by Harris (2001, 128), “remains between the claims of the Cowichan Mustimuhw and the Canadian state over ownership and control, and over the legitimacy of different but increasingly intertwined legal traditions”.

The Aboriginal Fisheries Strategy (AFS) was launched by DFO as a response to the landmark Sparrow decision in 1990, which represented a new legal recognition of Aboriginal fishing rights (see Walter et al. 2000). In brief, the decision found that Aboriginal rights to fish for food, social, and ceremonial purposes take priority after conservation, over other users of the resource (Newell 1993). Because the Cowichan Mustimuhw, as represented by Cowichan Tribes, are not under Treaty, all aspects of fishing for food, social, and ceremonial purposes are negotiated through an AFS agreement on a government-to-government level with DFO (see <http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/afs/afsoc03-eng.htm> for DFO's perspective of the AFS).

In order to engage with the government under this new framework the Cowichan Tribes Fish Committee (CTFC) was formed. Comprised of various representatives from the Cowichan membership, the CTFC advises Chief and Counsel on all fisheries-related matters concerning the Cowichan Mustimuhw. Members of the CTFC are either appointed by Chief and Council, or are elected through an application process inviting any member of Cowichan Tribes to apply. Informed by advice by the CTFC, Chief and Council then negotiate fisheries-related issues and concerns with DFO as pertaining to the current AFS agreement.

While most matters pertaining to the Cowichan fishery have, since 1992, been discussed and negotiated between DFO and the CTFC, one matter the CTFC did not seek approval on was the 2008 decision to revitalized the historical Cowichan fishing weir. When asked whether or not the CTFC and/or Chief and Council negotiated the right to re-institute the weir, Cowichan Tribes Fisheries manager Wayne Paige Sr. replied “no, they didn't have to get permission from DFO, Cowichan Tribes just decided to bring [the weir] back in 2008” (Wayne Paige, Pers. Comm. 2010). With guidance from Elders, Cowichan Tribes staff relied on historical photographs of Cowichan weirs to assist with the construction of the reestablishment of the weir (Wayne Paige, Pers. Comm. 2010). After nearly 70 years Cowichan Tribes' decision to re-institute their

historical weir represents not only the reclamation of an important cultural and economic institution, it also represents the reaffirmation of control over their historical fishery.

#### **6.4 The Cowichan Weir Today**

During the summer of 2008 Cowichan Tribes constructed and erected a historical fishing weir to display at the North American Indigenous Games (NAIG) being held in Duncan, B.C. A CTFC member recounts the Committee's decision to resurrect the weir for NAIG:

I think that when we had NAIG here we sat there as a committee and we decided we could use the weir for a tourist attraction, for a cultural point, but we had to be very careful because again we're talking about showing a culture off that might hurt something too, because the salmon ain't there. But the weir was a really a strong issue where we needed to say 'it does exist' and we need to keep that alive. And it comes back to our rights and what we want to do with it, how we want to utilize it in a good way, or a protest way, or whatever. And I think there's always been a good relationship with DFO in some points. They may not approve of a lot of that but I think they have to look at the cultural points, and the good understanding between how things are set up. (Cowichan Tribes Fish Committee Interview# 3, 2010)

Owing to the more or less positive response received from community members, the public and even some DFO officials, the weir was placed back into the river during the fall of 2008. Used exclusively for conservation purposes, the weir was used in counting and identifying migrating Chinook, Coho, and Chum salmon, and steelhead stocks. The summer of 2009 marked the second year of utilizing the weir for conservation purposes during fall runs of Chinook, Coho, and Chum, and the weir was constructed and placed in the river for a third consecutive year in late September 2010, where it was once again used for conservation purposes only. The weir remained in the river until mid October before being washed away as a result of several days of pulse flooding from the Lake Cowichan Catalyst weir, as river water levels were deemed too low for Chinook and Coho to make their way up river to their spawning grounds. Since the

revitalization of the weir in 2008, Wayne Sr. and his colleagues have continued to use historic materials, namely alder and maple branches in constructing the weir (**See Figures 6.3 & 6.4**); however, the traditional cedar bark tie downs used to secure woven branches in the lattice-work fence panels have been replaced by store-bought twine (Wayne Paige, Pers. Comm. 2010).



*Figure 6.3: Contemporary Cowichan Fish Weir September 2010*



*Figure 6.4: Contemporary Cowichan Fish Weir with Platform October 2010*

Historically, weirs were managed by select Elders and village Chiefs, whereas today, the construction and management of the contemporary weir is primarily overseen by the Cowichan Tribes Fish Committee and Cowichan Tribes staff. A CTFC member compares and contrasts the historical and contemporary management processes:

There would have originally been a budget, but we don't have the physical resources to compensate people for working on the [weir] you know, with fish, so today we have to compensate people with pay. So people are actually physically paid to work on the [weir]. It's still manned by Cowichan staff and so they're under the guidance of the Fish Committee, which also takes direction from Cowichan and from the Elders Committee, but it's not the same as it would have originally been in that it would have been selected Elders. So there are still selected Elders that give guidance, but not necessarily selected Elders that are actually manning the [weir]. (Cowichan Tribes Fish Committee Interview #6, 2010)

After more than 70 years of its absence on the Cowichan River the revitalization of the weir in 2008 was enabled by the Cowichan Tribes' Fish Committee members and Chief and Council, who have continued to support and oversee the decision-making surrounding all aspects of the weir. How then, after more than 70 years of federal government-imposed exclusion from the river, did Cowichan Tribes manage to revitalize and re-institute the weir on an annual basis? A CTFC member recounts the means by which the weir was revitalized in 2008, along with the reasons for doing so:

A demonstration, a demonstration. The weir was put in as a demonstration for the NAIG games that came in August the other year. So that was good to see. The younger generation today including myself, we didn't know how to structure a weir, we just looked at the pictures and away we went. We hired a few of the membership and our guardians put the weir together, and they did a decent job for the first time putting the weir in. When the river came up a bit it fell; the river came up too high and pushed the weir out, so we learned why and what we need this

summer and this fall to stabilize the weir a lot better. It's a learning process and it was good to get the weir back, and I think it's going to be a tool that may be used constantly every year. So if the numbers [of salmon] start coming up higher then we'll be able to use that as a harvest tool, as a selective fishery. But other than that, it was good to see the weir back in and hopefully it continues. It's entirely up to the Fish Committee if they want the weir up or not. It's their decision, and Council's. (Cowichan Tribes Fish Committee Interview #7, 2010)

This CTFC member stresses the fact that Cowichan Tribes initiated the re-institution of the weir without consultation with DFO. The weir, in its contemporary form, is used solely for conservation purposes, thus representing a historical fish management technique working to promote a sustainable fishery.

Since 2008, the contemporary weir has been placed approximately 200 metres up river from the Silver Bridge, adjacent to the Quw'utsun' Cultural and Conference Centre. The revitalized weir has been utilized as a sustainable fisheries management institution, as it has been used to monitor salmon escapement during the autumn runs. A CTFC member discusses the potential of the contemporary weir to be used as a sustainable fish management institution for both monitoring escapement and for harvesting in future years:

I think it's very sustainable. It's a safe method where no species would be injured or damaged in that process, and if there are females caught in the pens they can be released to be to travel up river. (Cowichan Tribes Fish Committee Interview #2, 2010)

Since its revitalization in 2008 the contemporary Cowichan weir has been used to monitor and collect salmon escapement data, and is located slightly down-stream from the location of DFO's counting fence. Every autumn DFO operates a high-tech, aluminium counting fence and Didson sonar counter on the river so as to monitor salmon escapement and collect data. From September to November migrating salmon are filmed on video camera 24 hours a day, seven days a week. The video recordings are then reviewed by DFO staff to determine numbers of returning salmon according to species and age. In 2008 the Cowichan weir aided DFO by providing escapement

data for a week as DFO's counting fence was a week late going in the river, due to its relocation from its traditional site since the 1980's. A CHR member explains:

Fisheries has a really good data set from [the fence], it's part of the Canada/US key stream indicator [program], and they've got a real good handle on what's going on. But they missed that week of data, and Cowichan Tribes had the traditional fence in and were able to supply them with the fish counts from the week that they missed which they wouldn't have had. (Cowichan Harvest Roundtable Interview #8, 2010)

In addition to supplementing DFO's escapement numbers with data collected using the weir, a CTFC member also discusses the prospects for the weir in 2010:

DFO has got a counting fence in the river system that doesn't get installed until September. And we want our weir by end of July, and we're getting salmon in early. DFO is missing that early salmon count, and the numbers that's gone forward at the end of the season is very low, but they've missed a lot of fish. So we're hoping to use our weir as a counting fence, but also harvest and hopefully come up with some good escapement numbers for what the Department has missed. (Cowichan Tribes Fish Committee Interview #7, 2010)

Another CTFC member speaks of similar projections for the weir in 2010:

Now we're using [the weir] as a tool to collect data and salmon escapement, but also we can use it as a harvest method. So we may use it for two-thousand-ten both for collecting data and a harvest method. (Cowichan Tribes Fish Committee Interview #7, 2010)

The Cowichan weir was not in the river until September for the 2010 season; however, plans are currently in place to have the weir constructed and in the river by the beginning of July 2011 so as to monitor and collect escapement data for early runs of Chinook salmon. The CTFC plans to continue its salmon escapement data collection program and are considering using the weir to harvest a Chum fishery in future years.

Coupled with reciprocity and the general sharing ethic of the community the Cowichan weir provided a sustainable method for harvesting salmon that ensured adequate salmon returns for thousands of years. In its contemporary form, the Cowichan weir still represents a sustainable salmon management institution, albeit in a different form, as its revitalized form is used primarily in aiding conservation of salmon.

## **6.5 Negotiating Space Within Cowichan River Fisheries Co-Management Arrangements**

Berkes (2001, 236) writes that “perhaps the most useful way to think about indigenous conservation is that it is complementary to Western conservation, not a replacement for it”. The contemporary Cowichan weir is currently being used primarily to aid salmon conservation objectives on the Cowichan River, an objective shared with DFO’s conservation goals. That being said, an important question remains: Is there room for historical salmon management techniques including the Cowichan weir within current Cowichan River fisheries co-management arrangements? In an effort to find an answer, this question was posed to members of both the CTFC and the CHR. The results of this question along with supporting responses are presented below in table format (see **Table 6.1**).

**Table 6.1: Space for the Weir within Current Fisheries Co-Management Arrangements**

<b>Is There “Space” Within Current Fisheries Co-Management Arrangements for the Inclusion of the Historical Cowichan Fishing Weir and Other Forms of Historical Fish Management Techniques?</b>		
<b>Cowichan Harvest Roundtable/Cowichan Tribes Fish Committee Member</b>	<b>Yes/No</b>	<b>Comments</b>
CTFC Member # 4	Yes	“The trouble is that there aren't enough of our Elders left around to really make sure that we're building the weirs the way they used to be.”
CTFC Member # 5	Possibly	“I think Cowichan Tribes may be interested in it because it's a tool that our ancestors had used, but I don't know about DFO sanctioning it or not, because from my experience of what little I know about them is that they always say no.”
CTFC Member # 6	Yes	“There is room, it's not fully acknowledged yet, but I think there's definitely room for a number of different avenues for that to happen, for Elders that are still currently active and on the river system and have a knowledge of what the stocks are like now, for them to have input. And I think it's something that we have to further develop on our own, but also find a way to have that voice heard by the Harvest Roundtable, by Fisheries and Oceans, by sports fishermen, by the community at large. There's room there, but it still needs development for it to have an effective voice.”
CHR Member # 4	Yes	“Oh yeah, I think there's lots of room. I think those types of projects or other types of assessment are quite beneficial. We have a fairly large structure, the counting fence down there, and before the counting fence went in, the weir was there and that gave us some very valuable information in order to assess the beginning of the salmon run. Without the weir we would not have that information.”
CHR Member # 7	Yes	“One year Cowichan Tribes did provide me some information because we were changing systems over that Fall. We didn't quite get the counting fence in the river in time, and Cowichan Tribes ran their weir which overlapped with mine, and they were able to provide me with data on the number of Chinook that were

		coming by during that period of time. That's great, and really I see a role for the weir, I think it would be great if they could do that in the future.”
CHR Member # 8	Yes	“I just applaud the fact that it's in and it's obviously a very significant thing for Cowichan people, and it's great to see, and it's a lot of work. So I think they take justifiable pride in having the weir in, and I hope that they continue to do that.”
CHR Member #10	Yes	“I think there is room, and the Harvest Roundtable certainly supported [the weir].”

Based on the responses listed above, the majority of participants (6 out of 7) feel there is space for the weir and other forms of historical fish management techniques within current co-management arrangements for the Cowichan River salmon fishery. There are, however, several concerns as noted by three CTFC members regarding the loss of Elders' knowledge, legitimacy from DFO, and the lack of understanding of the weir and its functions by the community at large. In an effort to alleviate some of the concerns regarding the legitimacy of the weir, Larry George, manager of Cowichan Tribes' Department of Lands and Governance, has emphasized the need for education for the community at large with regards to the contemporary function and sustainability of the weir as well as its contributions to Cowichan River salmon conservation (Larry George, Pers. Comm. 2010).

Despite concerns of DFO the weir has been and continues to be supported by the members of the CHR as a contemporary institution for conservation since its revitalization in 2008. CHR members also recognize the cultural significance of the weir's revitalization process, as one CHR member explains:

I've heard Larry George and Chief Hwitsum speak about it quite eloquently about the significance and the importance of it, how that fishing kind of methodology was banned by Europeans, and all the baggage that was kind of caught up in that decision, and I think the pride the community had in re-establishing their right and ability to put a fence in and to fish it, and all that stuff in my mind is super positive. (Cowichan Harvest Roundtable Interview #8, 2010)

## **6.6 Conclusion**

This case study presents the cultural significance of the reestablishment of the Cowichan fish weir and demonstrates how historical fish management techniques can contribute to conservation practices, and in some cases, supplement data in the field of salmon conservation. The revitalization of the historical fish weir represents both a culturally and politically significant milestone in the Cowichan's fight to regain some control over salmon management on the

Cowichan River. The North American Indigenous Games (NAIG) hosted in Duncan, BC in August 2008 provided Cowichan Tribes with an opportunity to showcase the weir as a historical selective harvesting technology, as well as an appropriate platform to re-introduce the weir as a contemporary salmon management institution. The self-determination of the Cowichan Mustimuwh with regards to re-asserting authority over their historical fishery continues to be supported by the CHR, comprised of representatives from the commercial sector, sport/recreation sector, DFO, and Cowichan Tribes, thus securing legitimacy within a cross-scale link to another Cowichan River salmon management institution. Although the more than 70 year exclusion of the Cowichan weir has led to the loss of some historical weir knowledge, Cowichan Tribes' fisheries staff look to Elders for knowledge and old photographs of weirs to aid in the construction process. For the past three years the contemporary weir has been used strictly for monitoring salmon escapement and collecting data; however, members of the CTFC intend to use the weir for harvesting healthier salmon stocks in future years, thus exercising their rights and authority over their Cowichan River fishery. The revitalization of the weir reaffirms the legitimacy of Cowichan's authority over their historical weir fishery, and demonstrates how TEK and historical fish management techniques can contribute to conservation practises without being co-opted into federal fisheries policy.

## CHAPTER 7

### Conclusions

#### **7.1 Introduction**

Though differing in institutional structure and function, the Cowichan historical fish weir and the Cowichan Harvest Roundtable (CHR) represent two management approaches that depart from state administered regimes. These institutions have experienced varying degrees of success, as well as challenges in recent years. In addition to discussing the respective successes and challenges of each institution in managing Cowichan salmon stocks sustainably, this concluding chapter will address potential areas of future research related to fisheries TEK and localized, collaborative management institutions.

#### **7.2 Successes and Challenges of the Cowichan Harvest Roundtable**

Since its formal establishment as a collaborative co-management institution in 2006, the CHR has proven successful in influencing the management of salmon harvests in the Cowichan River and terminal area. Perhaps the most impressive aspect of the CHR has been its members' ability to manage and reduce conflict among stakeholder groups and minimize the fighting and 'finger-pointing' that previously characterized the Cowichan fishery. All members come to the table as co-workers with conservation of Cowichan salmon stocks as a common goal. As one member points out, the existence of the CHR "is better than not having the table, because people are communicating and people understand everyone's perspective which was never the case before" (Cowichan Harvest Roundtable Interview #8, 2010). Perhaps at the most basic level, this sentiment suggests the CHR is a success.

As mentioned in Chapter 5 the CHR implemented several changes to fishing regulations in the Cowichan River and terminal area, so as to lessen the impact on declining Cowichan Chinook. Echoing the CHR's concerns over declining Chinook, Cowichan Tribes voluntarily reduced their members' number of weekly fishing days from seven to four, thus alleviating

pressure on Chinook. In addition to changing fishing regulations the CHR passed a consensus-based decision to create a terminal area and in-river Pink salmon fishery for sports fishing purposes. In turn, the Pink salmon fishery project achieved success as a sports fishery, and as a by-product, it provided for another food, social, and ceremonial (FSC) fishery for the Cowichan Mustimuhw. The publication and distribution of several newsletters to the community provided a means of educating the general public on issues ranging from the state of salmon in the Cowichan River, current remediation projects, tagging and enumeration programs, and demonstrated a united partnership between all stakeholders, government, and Cowichan Tribes in working towards the goal of conservation. During its short institutional life the CHR has achieved a number of successes, with the most pertinent being its demonstration of a cohesive multi-stakeholder institution collectively working towards a common goal.

In addition to its achievements the CHR has also experienced several challenges. Based on interviews with CHR members and personal communications with several DFO managers and higher-ranking employees, a clear contradiction regarding perceptions of authority and power-sharing exists between many of the interviewees and DFO. As mentioned in Chapter 5, members of the CHR felt they initially had decision-making authority and power over harvest management based upon DFO's acceptance implementation of the CHR decisions. One CHR member explains:

The mandate, as I interpret it, would be to provide a local committee as comprised of interested parties and to provide them an opportunity to manage local salmon stocks in the Cowichan River. Now that was our intent at the beginning, that we would have that kind of authority. This was supported by the region, by Pacific Region of Fisheries and Oceans, and certainly there were things that we did that changed things. (Cowichan Harvest Roundtable Interview #7, 2010)

Upon DFO's rejection of the CHR's 2009 decision to pursue an economic opportunity for Cowichan Tribes to harvest Chum salmon commercially, members of the CHR became discouraged and began to question the level of decision-making authority held by the Roundtable. As of today, the majority of the CHR members do not. As a direct result of the failed Chum commercial fishery members of the CHR were forced to re-evaluate their initial

understanding of their decision-making power. The perceptions of power and authority held by members of the CHR contradict those held by DFO, in that DFO maintains that it was never their intention to devolve decision-making authority and power to the CHR. A DFO manager explains their position relating to decision-making authority and adaptive collaborative management:

The Roundtable represents an evolving and adaptive process where the Department, First Nations, and stakeholders are moving towards a more collaborative and integrated resource management process. All the parties support the process, but it is in process. Therefore, I don't think the Table can be described as initially one thing, and now another. Instead it is a process whereby all the participants are working towards collaboration. The Roundtable Terms of Reference discuss consensus; however the concept of devolution of authority has never been defined, nor was it the intention that it would be. Therefore, to attach that outcome to the Roundtable process is not correct. (Anonymous, Pers. Comm. 2011)

At this time, many of the members do not see the CHR engaged in a co-management process, although they continue to work toward achieving true co-management over the Cowichan River salmon harvests.

The lack of clarity and differing opinions related to perceived decision-making authority held by the CHR have proved to be a stumbling block since 2009. As such, several members question the legitimacy of the CHR as well as its ability to overcome setbacks. To date, the members of the CHR still meet and discuss concerns related to salmon harvesting, thus proving the institution's commitment to the fishery.

A lack of institutional history for the CHR presents another challenge, as does the large number of alternate members. The past five years have seen many new members to the CHR and access to archived newsletters, reports, minutes, etc. would be of great value to orient new members on past projects. Access to this information could also help to clarify misconceptions, such as the apparent lack of clarity and differing opinions of DFO and CHR members regarding decision-making authority.

Another challenge faced by the CHR is a lack of funding to carry out management projects. As mentioned in Chapter 5 the CHR does not receive any consistent allotment of funds from the state; any funding from outside grants, governments and non-governmental

organizations is sourced by members of the CHR. Members participate on a volunteer basis and meetings are hosted by Cowichan Tribes' Department of Land and Governance. An initial start-up grant was used to provide lunches for meetings, draft an official Terms of Reference for the Roundtable, and produce a series of newsletters for the community at large. Securing a reliable source of funding whether from DFO, Cowichan Tribes, Sport and Commercial sectors, non-governmental organizations (NGO's), grants, or elsewhere, the CHR would be better equipped to fund in-river management programs, and could resume publishing newsletters and support community education programs.

### **7.3 Success and Challenges of the Cowichan Fish Weir**

After more than 70 years of state-enforced exclusion the Cowichan weir was resurrected as a cultural showcase for the 2008 North American Indigenous Games (NAIG) held in Duncan, BC. NAIG served as a political platform utilized by the Cowichan Tribes Fish Committee (CTFC) to resurrect the historical weir and to leverage power and opportunities in the Cowichan River salmon fishery. More importantly, the revitalization of the historical weir allowed Cowichan Tribes the opportunity to reassert authority over their historical fishery, specifically over historical harvest and fish management techniques. To date, Cowichan Tribes staff (under the guidance of the CTFC) have revitalized the weir for monitoring salmon escapement without interference by DFO, and it has not been co-opted into DFO fisheries policy. A member of the CTFC discusses the concern of co-opting the weir into DFO policy:

I wouldn't really say it's co-opted by DFO, I would say we've co-opted DFO in the institution of the [weir]. That would be my way of saying it, and I say that because DFO doesn't really have any control over the [weir]. (Cowichan Tribes Fish Committee interview #6, 2010)

The Cowichan weir case study shares some of the concerns raised by Nadasdy (2003) over TEK integration into state resource management policies, in that TEK is often compromised as a result of integration. The re-institution of the weir by the CTFC in 2008 signified Cowichan Tribes' reassertion of authority over their historical weir fishery, which was completely independent of

DFO and their AFS agreement. However, the revitalized weir is not currently used for harvesting purposes as it was historically; rather, it is now used strictly as a method of monitoring salmon escapement. This aspect lends to Nadasdy's statement that when TEK is integrated into Western resource management it becomes distilled and compartmentalized, and is often expressed in forms that are compatible with existing government institutions and resource management policy (Nadasdy 2003, 123). Despite the fact that DFO has not co-opted the weir into their fisheries policies, they still have some control over the fishery as Cowichan has not yet used the weir as a salmon harvest method. However, the CTFC continues to direct all decisions over the weir independent of DFO and their AFS, and future plans are in place for the weir to serve as both a salmon management and escapement monitoring tool as well as a selective harvesting method.

Today the Cowichan weir functions independently of DFO as construction and operating costs are funded by Cowichan Tribes. By sourcing their own funding for the weir Cowichan Tribes has effectively eliminated any fiscal involvement by DFO, thus securing further autonomy and authority over their institution.

As explained in Chapter 6 the revitalized weir is constructed and utilized by Cowichan Tribes' Department of Land and Governance for the purpose of monitoring returning salmon and collecting escapement data each fall season. All escapement data collected by the Cowichan weir is combined with escapement data collected by the DFO counting fence and is used as a baseline measure for returning Cowichan salmon stocks, specifically for Coho and Chinook. Table 7.1 shows the fall 2008 Chinook escapement data for both the Cowichan weir and DFO counting fence.

<b>Table 7.1: 2008 Cowichan River Chinook Salmon Escapement Data</b>			
<b>Cowichan Weir Data</b> (September 3 <sup>rd</sup> to 24 <sup>th</sup> , 2008)		<b>DFO Counting Fence Data</b> (September 16 <sup>th</sup> to October 29 <sup>th</sup> , 2008)	
Adult Chinook	176	Adult Chinook	826
Juvenile Chinook	95	Juvenile Chinook	135
<b>Total: (Adult &amp; Juvenile Chinook)</b>	271	<b>Total: (Adult &amp; Juvenile Chinook)</b>	961
<b>Combined Total Number of Adult Chinook:</b>		<b>1002</b>	
<b>Combined Total Number of Juvenile Chinook:</b>		<b>230</b>	

The contribution of data collected by the Cowichan weir is consistent with Stevenson's (2006) two-row wampum method of TEK and Western science working together to achieve a shared outcome without interfering with one another, as both the weir and counting fence work to monitor Cowichan salmon escapement, albeit in differing ways. As discussed in Chapter 6 the revitalized weir has gained legitimacy through securing cross-scale linkages to the CHR, representing another locally-based salmon management institution.

Challenges of the weir as a sustainable salmon management institution are limited as to date it has achieved success in a number of areas. However, greater public support will be necessary in order to strengthen its place within the overall watershed management arena. Unfortunately, education for the general public has been limited to the Cowichan Newsleader, the local weekly paper circulated throughout the Cowichan Valley. Further public education regarding the function of the weir and its role as a sustainable salmon management institution and a selective harvesting method is essential to gain public support and legitimacy. While the past three years have seen Cowichan Tribes achieve positive results with the revitalization of their historical weir, the future outlook remains unclear. Cowichan Tribes will continue constructing and utilizing their historical weir and plans are in place to extend the period of salmon escapement data collection to include early runs beginning in July 2011.

#### **7.4 Opportunities for Cross-Scale Fisheries Management**

Due to the complexity of fisheries management, Berkes (2000; 2003) emphasizes the need for cross-scale linkages between collaborative fisheries management institutions so as to ensure legitimacy and support for locally-based institutions. Given this requirement there seems to be a unique opportunity for the CHR to engage with the CTFC to create cross-scale linkages with varying levels of decision-making authority. As mentioned in Chapter 5 the CHR is the last of three locally-based, multi-stakeholder Cowichan River salmon management institutions established as part of the overall Cowichan River watershed plan; as such, the CHR is already

linked to the other two local management institutions, namely the Cowichan Water Use Committee and the Cowichan Stewardship Roundtable. Due to the complexities of local and global marine management challenges, the CHR would benefit from linkages to other Pacific regional management institutions. The creation of such horizontal linkages would help to alleviate some of the challenges related to trans-boundary management, as connections to other local and regional institutions will create dialogue, thus paving the way for problem solving. Vertical linkages between the CHR and DFO will serve to assist policy makers in making informed management decisions regarding local observations of salmon habitat, mortality, environmental threats, etc. The trans-boundary nature of marine salmon habitat requires cross-scale linkages between regions and nations; therefore, linkages between the CHR and institutions governing U.S. Pacific salmon policies are necessary to ensure compliance to fishing restrictions and regulations on endangered salmon species. Members of the CHR repeatedly expressed the concern that without such cross-scale linkages between local, federal, and international institutions, the CHR will continue to face obstacles in managing Cowichan salmon stocks.

## **7.5 Directions For Future Research**

Both the revitalized Cowichan fish weir and the CHR have demonstrated a great deal of success in just a few short years. The revitalized weir, under the guidance of the CTFC, is autonomous from DFO and Western resource management policy, as the Cowichan Mustimuhw have effectively reasserted authority over their historical fish management techniques. The CHR has also demonstrated notable success. A member of the CHR discusses the importance of the institution:

If you look at the Fisheries Roundtable, and the Stewardship Roundtable, and the water board, those are three really good examples of grass roots organizations, certainly bottom up models of trying to tackle really, really difficult issues. People love to fight about water, or they love to fight about fish, they love to fight about money right, so there's three things that those tables deal with. That's not easy.  
(Cowichan Harvest Roundtable Interview #8, 2010)

Both the CHR and the revitalized Cowichan weir can be seen as models of sustainable salmon management institutions for other watersheds and First Nations, yet how they perform in coming years remains to be seen. Is there 'space' for the weir and TEK within other Pacific region multi-stakeholder salmon management institutions? In what capacity will the CHR be operating in five to ten years from now? What will DFO's collaborative and integrated fisheries management process look like in the future, and where will the CHR sit within that process? Finally, how does the CHR fit in with other multi-stakeholder salmon management institutions in the Pacific region? Where these institutions will be in the future remains to be seen, as both are in the early stages of their institutional lives. It is hopeful that the CHR will continue to be viewed as an example of an alternative, holistic fisheries management process, and that the revitalized Cowichan weir will inspire other Pacific region First Nations to re-assert authority over their historical fisheries and fish management technologies.

## APPENDIX A: Bibliography

Ashwell, Reg. 1978. *Coast Salish: Their Art, Culture and Legends*. Surrey, BC: Hancock House Publishers Ltd.

Avio, K. L. 1994. Aboriginal Rights and Property in Canada: A Contradictarian Interpretation of R. v. Sparrow. *Canadian Public Policy* 20(4): 415-429.

Barnett, H.G. 1955. *The Coast Salish of British Columbia*. Eugene, Oregon: University of Oregon.

Berkes, Fikret. 2000. "Cross-scale Institutional Linkages: Perspectives From the Bottom Up." Paper presented at the IASCP 2000 Conference, Indiana University, June 2000.

- - - . 2002. Cross-scale Institutional Linkages: Perspectives From the Bottom Up. In *The Drama of the Commons*. Edited by Elinor Ostrom, Thomas Dietz, Nives Dolsak, Paul C. Stearn, Susan Stronich, and Elke U. Weber, 293-322. Washington, DC: National Academy Press.

- - - . 2003. "Can Cross-Scale Linkages Increase the Resilience of Social-Ecological Systems?" Paper presented at RCSD International Conference, Politics of the Commons, Chiang Mai, July 2003.

- - - . 2008. *Sacred Ecology* 2<sup>nd</sup> ed. New York: Taylor & Francis.

- - - . 2009. Evolution of Co-Management: Role of Knowledge Generation Bridging Organizations and Social Learning. *Journal of Environmental Management* 90 (2009): 1692-1702.

Berkes, Fikret, and Iain Davidson-Hunt. 2010. "Innovating Through Commons Use: Community-Based Enterprises." *International Journal of the Commons* 4 (1): 1-7.  
<http://www.thecommonsjournal.org>

Berkes, Fikret, Jack Mathias, Mina Kislalioglu, and Helen Fast. 2001. "The Canadian Arctic and the *Oceans Act*: The Development of Participatory Environmental Research and Management." *Oceans & Coastal Management* 44 (7-8): 451-469.

Bernard, Russell H. 2006. *Research Methods in Anthropology: Qualitative and Quantitative Approaches* 4<sup>th</sup> ed. Lanham, MD: Altamira Press.

Bogdan, Robert. 1973. "Participant observation." *Peabody Journal of Education* 50 (4): 302-308.  
<http://www.jstor.org/stable/1492424>

Borrini-Feyerabend, Grazia, Michel Pimbert, M. Taghi Farvar, Ashish Kothari, and Yves Renard. 2004. *Sharing Power: A Global Guide to Collaborative Management of Natural Resources Throughout the World*. London: Earthscan.

Bottom, Daniel L., Kim K. Jones, Charles A. Simenstad, and Courtland L. Smith. 2009. Reconnecting Social and Ecological Resilience in Salmon Ecosystems. *Ecology and Society* 14 (1): 5.

Bradford, Michael J., Jake Duncan, and Jean W. Jang. 2008. Downstream Migrations of Juvenile Salmon and Other Fishes in the Upper Yukon River. *Arctic* 61 (3): 255-264.

Brown, Kimberly Linkous. 2006. "As It Was in the Past: A Return to the Use of Live-Capture Technology in the Aboriginal Riverine Fishery". In *Traditional Ecological Knowledge and Natural Resource Management*. Edited by Charles R. Menzies, 47-64. Lincoln, NE: University of Nebraska Press.

Butler, Caroline. 2006. "Historicizing Indigenous Knowledge: Practical and Political Issues". In *Traditional Ecological Knowledge and Natural Resource Management*. Edited by Charles R. Menzies, 107-126. Lincoln, NE: University of Nebraska Press.

Campbell, Tracy. 2003. "Co-management of Aboriginal Resources." In *Natural Resources and Aboriginal People in Canada: Readings, Cases and Commentary*, edited by Robert B. Anderson and Robert M. Bone, 47-53. Concord, Ontario: Captus Press.

Canadian Heritage Rivers System (CHRS). "Cowichan River, British Columbia: A Shared Treasure." [http://www.chrs.ca/Rivers/Cowichan/Cowichan\\_e.htm](http://www.chrs.ca/Rivers/Cowichan/Cowichan_e.htm). Accessed on November 3/09.

Carlsson, Lars, and Fikret Berkes. 2003. "Co-management: Concepts and Methodological Implications." *Journal of Environmental Management* 75: 65-76.

Castellano, Marlene Brant. 2004. "Ethics of Aboriginal Research." *Journal of Aboriginal Health* (January 2004): 98-114.

Copes, Parzival. 1995. "The Profits of Restoring Justice: Restoring Aboriginal Fisheries in British Columbia." Paper presented at the Workshop in Political Theory and Policy Analysis, University of Indiana, Bloomington Indiana, August 1995.

Corsiglia, John. 2006. "Traditional Wisdom as Practiced and Transmitted in Northwestern British Columbia, Canada". In *Traditional Ecological Knowledge and Natural Resource Management*. Edited by Charles R. Menzies, 221-236. Lincoln, NE: University of Nebraska Press.

Cowichan Fisheries Round Table (CFR). 2007. "Terms of Reference: Cowichan Fisheries Roundtable". Drafted April 4<sup>th</sup>, 2007.

Cowichan Salmon Round Table (CSRT) Newsletter. November 2006. 1 (1): 1-2.

Davis, Anthony, and Svein Jentoft. 2003. "The challenge and the Promise of Indigenous Peoples' Fishing Rights: From Dependency to Agency." In *Indigenous Peoples: Resource Management and Global Rights*, edited by Svein Jentoft, Henry Minde and Ragnar Nilsen, 185-211. Netherlands: Eburon Academic Publishers.

Duff, Wilson. 1952. *The Upper Stalo Indians of the Fraser River Valley, British Columbia*. Anthropology in British Columbia Memoir No. 1. Victoria, BC: British Columbia Provincial Museum

Dunn, Kevin 2000. "Interviewing." In *Qualitative Research Methods In Human Geography*, edited by Iain Hay, 50-82. South Melbourne, Victoria, Australia: Oxford University Press.

Dyck, Jos. 2000. "To Take the Food From Our Mouths: The Cowichans' Fight to Maintain Their Fishery, 1894-1914." *Native Studies Review* 13 (1):41-70.

Fisheries and Oceans Canada (DFO). 2003. *Strengthening Our Relationship- The Aboriginal Fisheries Strategy and Beyond*. <http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/afs/afsoct03-eng.htm> Accessed in November 2010.

---. 2005. *Pacific Salmon Selective Fishing Program Evaluation: Final Report*. <http://www.dfo-mpo.gc.ca/ae-ve/evaluations/04-05/salmon-saumon-eng.htm>. Accessed April 2011.

---. 2011. *Pacific Integrated Commercial Fisheries Initiative*. <http://www.pac.dfo-mpo.gc.ca/fm-gp/picfi-ipcip/index-eng.htm>. Accessed January 2011.

Glavin, Terry. 1996. *Dead Reckoning: Confronting the Crisis in Pacific Fisheries*. Vancouver BC: Douglas & McIntyre Ltd.

Hanna, Susan S. 2008. *Institutions For Managing Resilient Salmon Ecosystems: The Role of Incentives and Transaction Costs*. *Ecology and Society* 13 (2): 35.

Harris, Douglas C. 2001. *Fish, Law, and Colonialism: The Legal Capture of Salmon in British Columbia*. Toronto: University of Toronto Press.

---. 2008. *Landing Native Fisheries: Indian Reserves and Fishing Rights in British Columbia, 1849-1925*. Vancouver: UBC Press.

Hartwig, Carol. 2000. *Wisdom of the River: Salmon Culture of the Cowichan*. 28 mins. Duncan, BC: Cowichan Tribes.

Healey, Michael C. 2009. "Resilient Salmon, Resilient Fisheries for British Columbia, Canada." *Ecology and Society* 14 (1): 2.

Hill-Tout, Charles, and Ralph Maud. 1978. *The Salish People: The Sechelt and the Southeastern Tribes of Vancouver Island*. Vancouver: Talonbooks.

Hodding, Bruce A. 1998. *North Cowichan: A History in Photographs*. North Cowichan, BC: Hignell Book Printing.

Holm, Petter, Bjorn Hersoug, and Stein Arne Ranæs. 2000. "Revisiting Lofoten: Co-Managing Fish Stocks or Fishing Space?" *Human Organization* 59 (3): 353-364.

Homer, Edward. 2002. *The Cowichan River Story*. 26 mins. Gabriola Island, BC: Inside Edge Communications Inc.

Hul'qumi'num Treaty Group (HTG). <http://www.htg-humanrights.bc.ca/docs.html>. Accessed in 2010.

Huntington, Henry P. 1998. "Observations on the Utility of the Semi-Directive Interview for Documenting Traditional Ecological Knowledge." *Arctic* 51 (3): 237-242.

[http://proquest.umi.com.cyber.usask.ca/pqdlink?  
did=390671451&sid=1&Fmt=3&clientId=12306&RQT=309&VName=POD](http://proquest.umi.com.cyber.usask.ca/pqdlink?did=390671451&sid=1&Fmt=3&clientId=12306&RQT=309&VName=POD)

- - -. 2000. "Using Traditional Ecological Knowledge in Science: Methods and Applications." *Ecological Applications* 10 (5): 1270-1274. <http://www.jstor.org/stable/2641282>

Jackson, Winston. 2004. *Methods: Doing Social Research* 2<sup>nd</sup> ed. Scarborough, Ontario: Prentice-Hall Canada.

Jenness, Diamond. 1977. *The Indians of Canada* 7<sup>th</sup> ed. National Museum of Man, Ottawa, Ont.

Jentoft, Svein, and Trond Kristoffersen. 1989. "Fishermen's Co-Management: The Case of the Lofoten Fishery." *Human Organization* 48 (4): 355-365.

Joe, Harold C. 2004. *Traditional Fishing on the Cowichan River*. 9 mins. A Film by Harold Joe.

Johnsen, D. Bruce. 2009. "Salmon, Science and Reciprocity on the Northwest Coast." In "The Privilege to Fish." Guest editors: Mimi E. Lam and Meaghan Calcari. Special Issue. *Ecology and Society* 14(2): 43. <http://www.ecologyandsociety.org/vol14/iss2/art43/>

Langdon, Steve J. 2006. "Tidal Pulse Fishing: Selective Traditional Tlingit Salmon Fishing Techniques on the West Coast of the Prince of Wales Archipelago". In *Traditional Ecological Knowledge and Natural Resource Management*. Edited by Charles R. Menzies, 22-46. Lincoln, NE: University of Nebraska Press.

Larson, Anne M., and Fernanda Soto. 2008. "Decentralization of Natural Resource Governance

Regimes.” *Annual Review of Environment and Resources* 33 (1): 213-239.

Lauer, Matthew, and Shankar Aswani. 2009. “Indigenous Ecological Knowledge as Situated Practices: Understanding Fishers' Knowledge in the Western Solomon Islands.” *American Anthropologist* 111 (3): 317-329. DOI: 10.1111/j.1548-1433.2009.01135.x

Levine, Harold G., Ronald Gallimore, Thomas S. Weisner, and Jim L. Turner. 1980. “Teaching Participant-Observation Research Methods: A Skills-Building Approach.” *Anthropology and Education Quarterly* 11 (1): 30-54. <http://www.jstor.org/stable/3216611>

Lichatowich, J., L. Mobrand, and L. Lestelle. 1999. Depletion and Extinction of Pacific Salmon (*Oncorhynchus* spp.): A Different Perspective. *ICES Journal of Marine Science* 56: 467-472.

Long, Alan. 2006. Emory Creek: The Environmental Legacy of Gold Mining on the Fraser River. *British Columbia History* 39(3): 8-10.

Marshall, Daniel Patrick. 1999. *Those Who Fell From the Sky: A History of the Cowichan Peoples*. Duncan, BC: Cowichan Tribes Cultural & Education Centre.

McCay, Bonnie J. 1996. Common and Private Concerns. In *Rights to Nature: Ecological, Economic, Cultural, and Political Principles of Institutions for the Environment*. Edited by Susan S. Hanna, Carl Folke and Karl-Goran Maler, 111-125. Beijer International Institute of Ecological Economics, The Royal Swedish Academy of Science, Stockholm, Sweden: Island Press.

McGoodwin, James R. 2006. “Integrating Fishers' Knowledge into Fisheries Science and Management: Possibilities, Prospects, and Problems.” In *Traditional Ecological Knowledge and Natural Resource Management*. Edited by Charles R. Menzies, 175-192. Lincoln, NE: University of Nebraska Press.

McHalsie, Naxaxalhts'i, Albert (Sonny). 2007. “We Have to Take Care of Everything That Belongs to Us” In *Be of Good Mind: Essays on the Coast Salish*. Edited by Bruce Granville Miller. Vancouver: UBC Press.

Menzies, Charles R., and Caroline F. Butler. 2007. “Returning to Selective Fishing Through Indigenous Fisheries Knowledge: The Example of K'moda, Gitxaala Territory.” *The American Indian Quarterly* 31.3: 441-464.

Moller, Henrik, Fikret Berkes, Philip O'Brian Lyver, and Mina Kislalioglu. 2004. “Combining Science and Traditional Ecological Knowledge: Monitoring Populations for Co-Management.” *Ecology and Society* 9 (3): 2. <http://www.ecologyandsociety.org/vol9/iss3/art2>

Montgomery, Georgina, and Kevin Oke. 2009. *The Cowichan: Duncan, Chemainus, Ladysmith and Region Including Cobble Hill, Cowichan Bay, Cowichan Lake and Communities, Crofton,*

*Glenora, Maple Bay, Mill Bay and Shawnigan Lake*. Madeira Park, BC: Harbour Publishing Co. Ltd.

Morales, Robert. (no date). "The Great Land Grab: Colonialism and the Esquimalt & Nanaimo Railway Land Grant in Hul'qumi'num Territory". Hul'qumi'num Treaty Group, Ladysmith, BC. <http://www.hulquminum.bc.ca/news>.

Nadasdy, Paul. 2003. *Hunters and Bureaucrats: Power, Knowledge, and Aboriginal-State Relations in the Southwest Yukon*. Vancouver: UBC Press.

Natcher, David C. 2001. "Co-management: An Aboriginal Response to Frontier Development." *The Northern Review* 23: 146-163.

Natcher, David C., and Susan Davis. 2007. "Rethinking Devolution: Challenges for Aboriginal Resource Management in the Yukon Territory." *Society and Natural Resources* 20: 271-279.

Natcher, David C., Susan Davis, and Clifford G Hickey. 2005. "Co-management: Managing Relationships, Not Resources." *Human Organization* 64 (3): 240-250.

Newell, Dianne. 1993. *Tangled Webs of History: Indians and the Law in Canada's Pacific Coast Fisheries*. Toronto, ON: University of Toronto Press.

Norcross, Elizabeth Blanche. 1959. *The Warm Land*. Nanaimo, BC: Evergreen Press Ltd.

Northey, Margot, and Lorne Tepperman. 2007. *Making Sense: A Student's Guide to Research and Writing: Social Sciences* 3<sup>rd</sup> ed. Oxford University Press.

Notzke, Claudia. 1993. The Barriere Lake Trilateral Agreement. Barriere Lake, QC: Barriere Lake Indian Government.

- - - . 1994. Aboriginal Peoples and Natural Resources in Canada. Centre for Aboriginal Management Education and Training (CAMET). North York, Ontario. 33-59.

Parrish, Donna L., Robert J. Behnke, Stephen R. Gephard, Stephen D. McCormick, and Gordon H. 1998. Why Aren't There More Atlantic Salmon (*Salmo salar*)? *Canadian Journal of Fisheries & Aquatic Sciences* 55 (Supp. 1): 281-287.

Parsons, L. S. 1993. *Management of Marine Fisheries in Canada*. Ottawa, ON: Canadian Bulletin of Fisheries and Aquatic Sciences, no. 225.

Pinkerton, Evelyn. 1994. "Local Fisheries Co-Management: A Review of International Experiences and Their Implications for Salmon Management in British Columbia." *Canadian Journal of Fisheries and Aquatic Sciences* 51 (10): 2363.

- - - . 1999. "Factors in Overcoming Barriers to Implementing Co-Management in British Columbia Salmon Fisheries." *Ecology and Society* The Resilience Alliance 3 (2).
- - - . 2003. *Toward Specificity in Complexity: Understanding Co-Management From a Social Science Perspective*. Dordrecht, The Netherlands. Leluwer Academic Publishers.
- Pomeroy, Robert S., and Fikret Berkes. 1997. "Two to Tango: The Role of Government in Fisheries Co-Management." *Marine Policy* 21 (5): 465-480.
- Rozen, David. "Place-Names of the Island Halkomelem Indian People." MA Thesis, University of British Columbia, 1985.
- Shackeroff, Janna M., and Lisa M. Campbell. 2007. "Traditional Ecological Knowledge in Conservation Research: Problems and Prospects for their Constructive Engagement." *Conservation and Society* 5 (3): 343-360.
- Schreiber, Dorothee and Dianne Newell. 2006. "Negotiating TEK in BC Salmon Farming: Learning from Each Other or Managing Tradition and Eliminating Contention?" *BC Studies* 150: 79-102.
- Stevenson, Marc G. 2006. "The Possibility of Difference: Re-thinking Co-Management." *Human Organization* 65 (2): 167-180.
- Stewart, Hilary. 1977. *Indian Fishing: Early Methods on the Northwest Coast*. Vancouver: Douglas & McIntyre.
- Suttles, Wayne. 1955. *Katzie Ethnographic Notes: The Faith of a Coast Salish Indian*. Victoria, BC: British Columbia Provincial Museum.
- - - . 1987. *Coast Salish Essays*. Vancouver: Talonbooks.
- Suttles, Wayne. 1990. "Central Coast Salish." In *Handbook of North American Indians, Volume 7: Northwest Coast*, edited by Wayne Suttles, 453-475. Washington DC: Smithsonian Institute.
- Taylor, Steven J., and Robert Bogdan. 1984. *Introduction to Qualitative Research Methods: The Search for Meanings* 2<sup>nd</sup> ed. New York: John Wiley & Sons, Inc.
- Thom, Brian. "Coast Salish Senses of Place: Dwelling, Meaning, Power, Property and Territory in the Coast Salish World." PhD diss., McGill University, 2005.
- Trosper, Ronald L. 2000. "Northwest Coast Indigenous Institutions That Supported Resilience and Sustainability." *Ecological Economics* 41: 329-344.

Underhill, Ruth. 1945. *Indians of the Pacific Northwest*. Washington, DC: Bureau of Indian Affairs Branch of Education.

Walter, Emily R., Michael M. M'Gonigle, and Celeste McKay. 2000. "Fishing Around the Law: The Pacific Salmon Management System as a 'Structural Infringement' of Aboriginal Rights." *McGill Law Journal* 45: 263-313.

Waples, Robin S., Tim Beechie, and George R. Pess. 2009. Evolutionary History, Habitat Disturbance Regimes, and Anthropogenic Changes: What Do These Mean For Resilience of Pacific Salmon Populations? *Ecology and Society* 14 (1): 3

## APPENDIX B: Ethics Approval



UNIVERSITY OF  
SASKATCHEWAN

Behavioural Research Ethics Board (Beh-REB)

### *Certificate of Approval*

PRINCIPAL INVESTIGATOR  
David C Natcher

DEPARTMENT  
Agricultural Economics

BEH#  
10-119

INSTITUTION(S) WHERE RESEARCH WILL BE CONDUCTED  
University of Saskatchewan

STUDENT RESEARCHERS  
Chelsea Dale

SPONSOR  
UNIVERSITY OF SASKATCHEWAN

TITLE  
Investigating Cowichan Tribes' Fisheries Co-Management Arrangements

ORIGINAL REVIEW DATE  
01-May-2010

APPROVAL ON  
28-Jun-2010

APPROVAL OF:  
Ethics Application  
Consent Protocol

EXPIRY DATE  
28-Jun-2011

Full Board Meeting

Date of Full Board Meeting:

Delegated Review

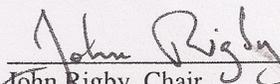
#### CERTIFICATION

The University of Saskatchewan Behavioural Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol or consent process or documents.

Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

#### ONGOING REVIEW REQUIREMENTS

In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for further instructions: [http://www.usask.ca/research/ethics\\_review/](http://www.usask.ca/research/ethics_review/)

  
\_\_\_\_\_  
John Rigby, Chair  
University of Saskatchewan  
Behavioural Research Ethics Board

## **APPENDIX C: Information Letter to the Community**

Chelsea Dale, MES candidate  
P.O. Box 64  
Shawnigan Lake, BC. V0R 2W0  
Home: 250-743-4321 Cell: 250-510-1953  
[cjd293@mail.usask.ca](mailto:cjd293@mail.usask.ca)

David C. Natcher, PhD  
Associate Professor  
Department of Bioresource Policy, Business & Economics  
College of Agriculture and Bioresources  
Room 2D08, Agriculture Building - 51 Campus Drive  
Saskatoon, SK S7N 5A8  
Phone: 306-966-4045 Fax: 306-966-8413  
E-mail: [david.natcher@usask.ca](mailto:david.natcher@usask.ca)

Cowichan Tribes, together with Chelsea Dale (graduate student researcher) from the University of Saskatchewan, have initiated research to investigate the efficacy and sustainability of the Cowichan Harvest Roundtable and the traditional Cowichan fish weir in managing Cowichan River salmon. This research is being directed by Chelsea Dale, with the assistance of Cowichan Tribes' Department of Land and Governance manager Larry George. The results will aid Cowichan Tribes in assessing their authority over the Cowichan River salmon fishery. This research will also serve to educate the community as to the function of both the Cowichan Harvest Roundtable, and the weir as sustainable salmon management institutions. Last, this research will assist in facilitating further discussions between Cowichan Tribes, local stakeholders, and the DFO as to ensure the sustainable management of the salmon fishery. By participating in this research, you will help Cowichan Tribes identify potential gaps within current fisheries co-management arrangements that may inhibit the sustainable management of the Cowichan River salmon fishery.

During this research, I am hoping to interview members of the Cowichan Tribes Fish Committee, and as many active and former members of the Cowichan Harvest Roundtable including DFO employees, commercial fisheries stakeholders, sport/recreational stakeholders, and members of Cowichan Tribes. Although Cowichan Tribes' department of Land and Governance has identified several initial contacts, I welcome your assistance in identifying key persons who exemplify any of these characteristics who would be willing to participate in this research.

The anonymity and identity of all participants will be protected, and steps will be taken to ensure that names, addresses, and any other identifying information will be removed from the study. Only the information provided, and consented to, will be written within the final report and published materials.

This research will contribute to the writing of a graduate thesis (Chelsea Dale) and may be published in academic journals for any interested party to read. Funding for this project has been provided by Dr. David Natcher, from the University of Saskatchewan.

If you would like to receive additional information on the project, or would like to speak directly to the graduate student researcher, please contact Chelsea Dale (graduate student researcher) at (250)-743-4321, or (250)-510-1953, Larry George (Land and Governance Manager) at (250)-748-3196, or Dr. David Natcher (thesis supervisor) at (306) 966-4045 at the University of Saskatchewan. We thank you for reading this invitation and we look forward to your support.

Sincerely,

Chelsea Dale  
University of Saskatchewan

Larry George  
Department of Land and Governance

Dr. David C. Natcher  
University of Saskatchewan

## **APPENDIX D: Research Consent Form**

### **Investigating Cowichan River Collaborative Salmon Management Institutions: The Cowichan Harvest Roundtable and the Traditional Cowichan Fish Weir**

You, as a member of the Cowichan Tribes Fish Committee, or member of the Cowichan Harvest Roundtable, are being asked to participate in a research study to determine the level of decision-making authority and power sharing held by the Cowichan Harvest Roundtable in managing Cowichan River salmon harvests, how much decision-making authority has been re-asserted by Cowichan Tribes over their traditional fishery and fish management techniques, and to determine the efficacy of the locally-based, multi-stakeholder Cowichan Harvest Roundtable in sustainably managing salmon harvests in the Cowichan River and terminal area. The results of this research will contribute to the greater understanding of the sustainability of fisheries co-management arrangements on the Cowichan River.

#### **INFORMATION ABOUT THIS RESEARCH STUDY**

#### **Title of study: Investigating Investigating Cowichan River Collaborative Salmon Management Institutions: The Cowichan Harvest Roundtable and the Traditional Cowichan Fish Weir**

David C. Natcher, PhD  
Associate Professor  
Department of Bioresource Policy, Business & Economics  
College of Agriculture and Bioresources  
Room 2D08, Agriculture Building - 51 Campus Drive  
Saskatoon, SK S7N 5A8  
Phone: 306-966-4045 Fax: 306-966-8413  
E-mail: [david.natcher@usask.ca](mailto:david.natcher@usask.ca)

Researcher:  
Chelsea Dale, MES candidate  
P.O. Box 64  
Shawnigan Lake, BC. V0R 2W0  
Home: 250-743-4321 Cell: 250-510-1953  
[cjd293@mail.usask.ca](mailto:cjd293@mail.usask.ca)

#### **Purpose of this study:**

This project will investigate the efficacy and sustainability of salmon co-management arrangements between Cowichan Tribes and the federal Department of Fisheries and Oceans (DFO). In collaboration with Cowichan Tribes' Department of Land and Governance, I will be investigating the extent to which re-assertion of authority by the Cowichan Tribes over the

management of the Cowichan River salmon fishery has occurred. I will also investigate the efficacy of the Cowichan Harvest Roundtable in managing Cowichan River salmon sustainably. The results of this research will serve as a basis for understanding collaborative salmon management institutions as to their efficacy of managing the Cowichan River salmon fishery in a sustainable manner.

#### CONSENT FORM INFORMATION:

##### **Benefits of the study:**

While participants will not experience individual benefits, the results of this research **will benefit** Cowichan Tribes by helping them to assess their level of authority over the Cowichan River salmon fishery. This research will also serve as a foundation for future negotiations between Cowichan Tribes and the DFO concerning Cowichan River salmon management policies. This study will assist in facilitating further discussions between Cowichan Tribes, local stakeholders, and the DFO in achieving sustainable management of the Cowichan River salmon fishery.

##### **Research procedures to be followed:**

**Through key informant interviews** I will examine the efficacy of the Cowichan Harvest Roundtable and the traditional Cowichan fish weir as sustainable Cowichan River salmon management institutions. In addition to this, key informant interviews will identify the extent to which the re-assertion of authority by Cowichan Tribes in the management of their salmon fishery has occurred. Interviews will explore the level of efficiency of the Harvest Roundtable and Cowichan Tribes in their ability to manage the salmon fishery, and will identify possible reasons as to why these institutions are, or are not effective as to the sustainable management of salmon.

Interviews will be conducted by the graduate student researcher (Chelsea Dale), either at Cowichan Tribes, the participant's home, or at a location convenient to the participant. Interview analysis will take place at the Cowichan Tribes' Department of Lands and Governance in Duncan, British Columbia. Interviews are expected to be approximately one hour in length.

##### **Risks and right to withdraw:**

We do not anticipate any risks or discomforts with this research; however, if any discomfort should arise you may withdraw at any time. Should you choose to participate in this study, you may refuse to answer any questions or cancel the interview at any point. Should you change your mind following the interview session, and wish to cancel your participation, your record will be removed and destroyed. Your participation in this study is completely voluntary.

##### **Confidentiality:**

Your anonymity and identity will be protected, and steps will be taken to ensure that your name,

and any other identifying information will remain confidential. Prior to your participation, and following an initial agreement to partake in the study, you will be asked to sign a consent form. After the consent form is signed, your identity will only be referenced by a random pseudonym. Only the information you provide, and consent to, will be made publicly available.

Only the researcher (Chelsea Dale), student supervisor (Dr. David Natcher), Cowichan Tribes' Department of Land and Governance, and participating members of the Cowichan Harvest Roundtable will have access to interview data referenced only by random pseudonyms.

Data collected, in the form of transcribed interviews, will be stored in electronic form after being encoded, and paper copies of data will be stored in a locked office file cabinet located in Cowichan Tribes' Department of Land and Governance, and a secured office of the graduate student supervisor at the University of Saskatchewan. All paper materials will be destroyed after five years after the completion of the study. All information with names will be deleted with numbers or pseudonyms being replaced in the electronic copies. Every effort has and will be made to protect the privacy and confidentiality of participants, however no absolute guarantees can be assured.

Please be reminded that you can withdraw from any section of the study at any time.

**Use of information provided:**

Upon signing the consent form participants agree to allow the information gathered in the study to be reported in journal articles, conference presentations, or funding reports. The information will be then communicated broadly and effectively (as approved by the Cowichan Tribes Fish Committee and Cowichan Harvest Roundtable), including but not limited to briefing Cowichan Tribes Chief and Council, and presentations to the Cowichan Tribes Fish Committee and the Cowichan Harvest Roundtable.

**Contact:**

If you have any questions or future concerns about your participation within this study, please contact the Ethics Office at the University of Saskatchewan (306) 966-2084. Participants who are calling from outside of Saskatoon can also call collect.

**Ethics approval:**

This research study was reviewed and approved by the University of Saskatchewan Research Ethics Board on June 30<sup>th</sup> 2010.

**Consent:**

I have read the information regarding this study focusing on the sustainability and efficacy of Cowichan River fisheries collaborative management institutions. I have been given the

opportunity to inquire for more information about the research, and acknowledge that I may withdraw my participation in this research study at any time. I am providing my consent to partake in this study and a copy of this consent form has been provided to me for my own records.

Signature of Participant: \_\_\_\_\_ Date: \_\_\_\_\_

Signature of Interviewer: \_\_\_\_\_ Date: \_\_\_\_\_

**Other Points:**

The researcher/interviewer would like to use an electronic recording device during the interview, and with your consent would like to create an audiotape of the session. Please be aware that you may shut off the audiotape at any time by indicating to the interviewer you would like the tape to be off or to erase any portion of the interview you do not feel comfortable with.

Do you agree to the use of an electronic recording device during the interview?

\_\_\_\_ Yes

\_\_\_\_ No

Please mark below how you would like your information to be identified within the research study?

\_\_\_\_ The researchers may use my first name in their study from the interview information.

\_\_\_\_ The researchers may NOT use my first name in their study from the interview information.

\_\_\_\_ I would prefer the use of a fictitious name of \_\_\_\_\_

Do you want to review the transcript of the interview prior to analysis of the findings?

\_\_\_\_ Yes

\_\_\_\_ No

Would you be willing to participate in a second interview if necessary?

\_\_\_\_ Yes

\_\_\_\_ No

Thank you,

---

(Signature of Participant)

---

(Date)

---

(Signature of Researcher)

---

(Date)

## **APPENDIX E: Semi-Structured Interview Questions**

What are the roles/responsibilities of the Cowichan Tribes Fish Committee/Cowichan Harvest Roundtable?

How are members appointed to the committee?

What is your idea of co-management?

Is it taking place with respect to the Cowichan fishery?

If not, are there some elements of co-management that are taking place?

Are they effective in the sustainable management of the fishery?

In your opinion, what are the biggest threats to sustainable salmon management today?

Are there adequate financial resources available to carry out fisheries monitoring and management tasks?

How much decision-making authority does the Cowichan Harvest Roundtable/Cowichan Tribes Fish Committee have over management of the salmon fishery?

Is the current co-management arrangement between Cowichan Tribes and DFO effective in preserving the salmon fishery in a sustainable manner?

Do you see calling a moratorium on Cowichan Chinook as being a potential solution to assist in the recovery of the stocks?

What traditional management practices are still in place and how are they working to increase effectiveness?

Which practices are no longer used and is there room to use them again in a co-management relationship?

Is there 'space' within current fisheries co-management arrangements for the inclusion of the historical Cowichan fish weir and/or other forms of historical fish management techniques and technology?

## APPENDIX F: Transcript Release Form

I, \_\_\_\_\_, who was interviewed during Chelsea Dale's research project, *Investigating Cowichan River Collaborative Salmon Management Institutions: The Cowichan Harvest Roundtable and the Traditional Cowichan Fish Weir*, have reviewed the transcription of my interview and have been given the opportunity to change, add, or delete any information in the document to better reflect my understandings and experiences. Any changes I felt were necessary to better reflect my interpretation of the program, I feel, will be handled correctly by the researchers.

I hereby authorize the use of this transcript to be used by Chelsea Dale to be used within the analysis of the research project, in the form I specified on my consent form. I have retained a copy of this transcript for my own records, and have received an envelope, pre-stamped, that will enable me to return a signed copy of this release form to Chelsea Dale.

If I have any further questions or concerns about any area of the study, I am aware that I can contact Larry George, Department of Land and Governance manager at Cowichan Tribes through the number (250)-748-3196, Dr. David Natcher at the University of Saskatchewan through the number (306) 966-4045; or the Research Ethics Office at the University of Saskatchewan (can call collect) at (306) 966-2084.

\_\_\_\_\_  
Participant Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Researcher  
(Chelsea Dale)

\_\_\_\_\_  
Date