

**Fish vs. Power:  
Remaking Salmon, Science and Society on the Fraser River, 1900-1960**

Matthew Dominic Evenden

A thesis submitted to the Faculty of Graduate Studies in partial fulfillment of the  
requirements for the degree of

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## **Abstract**

Overlapping resource demands made the Fraser River a contested site of development politics in twentieth century British Columbia. Since the turn of the century, power interests surveyed the river's flow, sited dams and promoted development schemes. Fisheries interests, on the other hand, sought to maintain the river as salmon spawning habitat. They questioned the necessity of dams, supported fisheries research and rehabilitation and organized anti-development coalitions. Before the mid-1950s a number of dam projects proceeded on Fraser tributaries and major landslides at Hells Gate modeled the dangers of main stem development. Because of the concerted political lobbying of fisheries groups, the skeptical appraisal of fisheries scientists to development proposals and the legal and political authority of the federal Department of Fisheries and the International Pacific Salmon Fisheries Commission, major dam projects were defeated on the Fraser in the late 1950s. Delayed development on the Fraser helped to spur hydroelectric projects on other rivers in the province; the fish-power problem on the Fraser altered the province's spatial economy of power. Once development began on the Columbia and Peace Rivers, the Fraser was protected by implication. The study combines approaches from environmental history, the history of science and political economy to demonstrate the intersections and interactions between nature, knowledge and society. Research was conducted at eleven archives in Canada and the United States in the papers of organizations, corporations, government departments, politicians, scientists and individuals.



## **Acknowledgements**

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I have benefited a great deal from the counsel of fine teachers. My undergraduate mentor, Colin Duncan, now of McGill University, got me started in environmental history and remains a fast friend and valued advisor. At York a number of professors encouraged me in my pursuits: Bettina Bradbury, Ramsay Cook, Conrad Heidenreich, Craig Heron, Richard Hoffmann, Engin Isin, Richard Jarrell, Anders Sandberg and Jack Saywell. Diane Jenner, York's GPH secretary, provided sound advice about logistics and kept the collective ship afloat. Members of my graduate committee provided crucial feedback and helped me on various intellectual fronts. Christopher Armstrong's reminder to put Minerva's owl in its cage shaped my writing more than he knows, but probably less than he would have liked. Elinor Melville shared and fueled my excitement about environmental history and asked where the river had gone at key moments. At a late stage in the project Marlene Shore did all of the work of a committee member. I am grateful to her for that as well as much good advice during her term as graduate director. My external and internal examiners Stephen Bocking, Richard Jarrell and Anders Sandberg provided helpful criticisms and comments. My supervisor Viv Nelles kept me moving and grilled and cheered me when I needed it. Since my MA he has pushed me to define my ideas and helped in every way he could. I owe him a great debt.

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This project took me home, in more ways than one. My parents had my bedroom waiting, traveled with me around the Fraser Basin and talked over many of the key ideas. I couldn't have asked for greater support. My sisters and their partners/husbands, Kirstin and Chris and Maya and Steve all helped me in various ways. Aunty Gwen and Uncle Don made sure I didn't get lonely in Victoria and treated me to Swiss Chalet almost every Sunday. My cousin Brian Effer helped me out and housed me in Toronto on a number of occasions. My thanks to them all. Kirsty Johnston has heard more introductions read aloud in the living room than either of us care to remember. That's not the worst of it, I'm sure. She has persevered and cheered and I am grateful to her. I'll cut to the chase: she's the best. I would like to dedicate this thesis to my family and to Kirsty.

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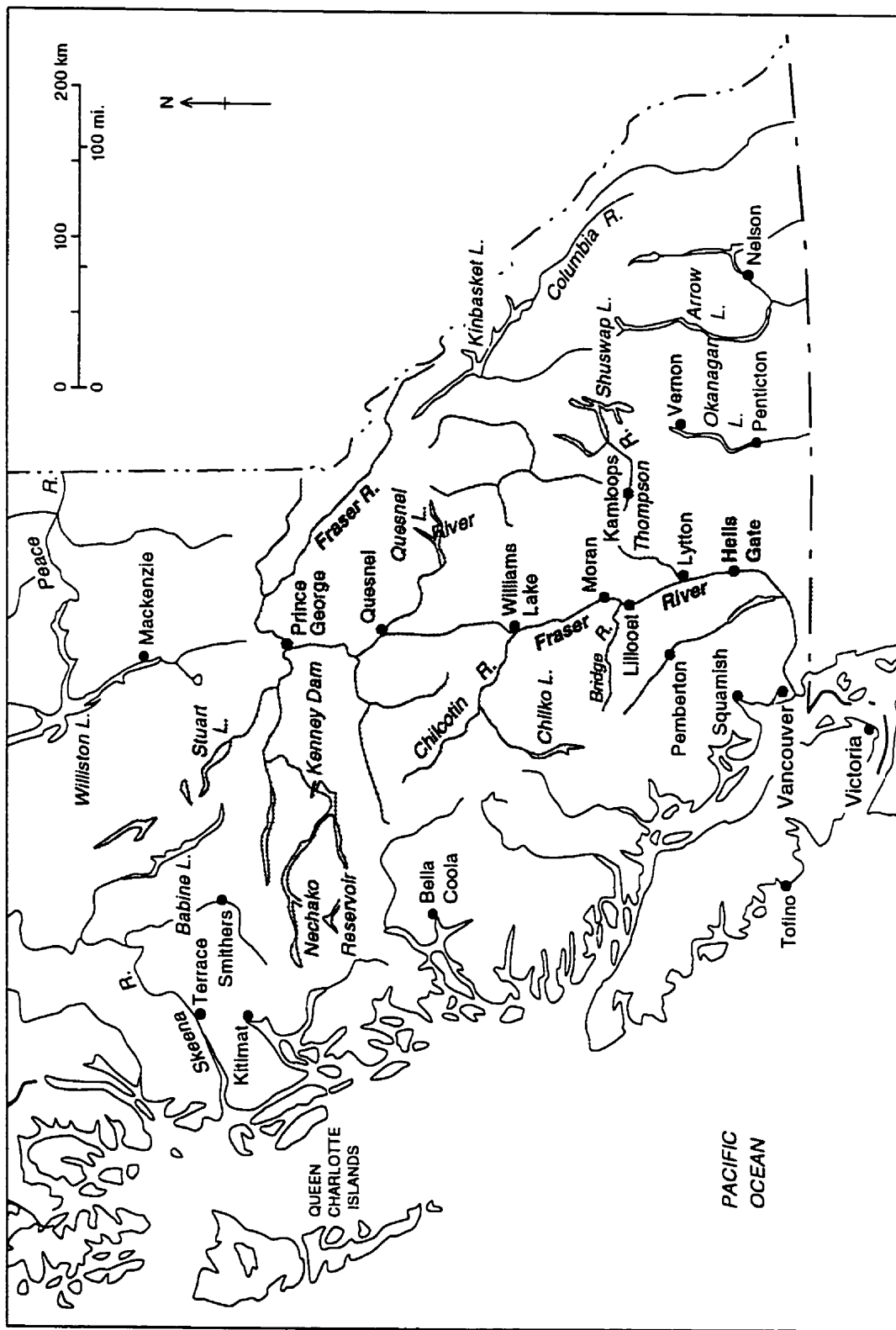
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## Introduction



Map 1: Fraser River and Basin

"You cannot step twice in the same river," observed the pre-Socratic philosopher Heraclitus, "for other waters are continually flowing on."<sup>1</sup> To write a history of a river, then, seems a peculiarly elusive project, chasing a flow that cannot be constrained. And yet, rivers have served as both metaphors and subjects of history for thousands of years. In Canada, rivers became routes for an unfolding nation in an earlier historiography; today they appear more frequently in our writing as sites of pollution.<sup>2</sup> Romantic highways have become sewers.

In British Columbia, rivers flow through the contemporary environmental imagination. They carry salmon that are said to typify a region and its history. They connect us to a place and its past. Frequently in British Columbia we try to step into the same river twice, forgetting how the river has changed, and, more frequently still, how we have changed with it.

\*\*\*\*\*

This thesis is an environmental history of an enduring resource conflict: whether to develop the Fraser River for hydroelectric power or preserve it as salmon spawning habitat. The Fraser is British Columbia's largest river and also the world's most productive salmon stream. Over the twentieth century, it has inspired dreams of waterpower wealth and fisheries growth. Frequently, these dreams have collided. Fish-power contests have punctuated the history of many western North American rivers in the twentieth century, but the Fraser's experience is unique. Whereas parallel cases like the

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<sup>1</sup> Quoted in Philip Wheelwright, *Heraclitus* (New York: Athenum, 1964), p 29.

<sup>2</sup> The classic statement of the Laurentian interpretation of Canadian history is Donald Creighton, *The Commercial Empire of the St. Lawrence* rev. ed. (Toronto: Macmillan, 1956); WH New, "The Great River Theory: Reading MacLennan and Mulgan," *Essays in Canadian Writing* 56 (Fall 1995): 162-182

Columbia River bear the weight of many dams, the Fraser remains undammed on its main stem. This study asks how contending interests have sought to learn about, control and vie for precedence in the river's use and preservation? It asks how this conflict has impacted the river and its fisheries and how changes in the natural world have altered human perceptions and uses? It asks how the river remains undammed?

The Fraser River is large by any measure. Its flow runs at Hope at an annual average of 269 000 meters cubed per second. It stretches over a vast distance, originating in the western slopes of the Rocky Mountains and curves in a long s-shaped southwestern arc towards the delta, 1375 km away. The river's basin covers a wide swath of British Columbia, 233 000 km squared, or about the size of three New Brunswicks. In Canada, only the Mackenzie and St Lawrence Rivers carry more water, on the Pacific coast of North America, only the Columbia. The Fraser is one of the largest undammed rivers in the world.<sup>3</sup>

No single river on the planet produces more salmon than the Fraser. This has likely been the case for thousands of years, not only since the perturbations of modern environmental change have decimated runs elsewhere.<sup>4</sup> Salmon of the genus Oncorhynchus, or Pacific Salmon, have utilized the river since the last ice age, and water bodies across BC for tens of thousands of years. Pacific salmon are anadromous. They

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<sup>3</sup>R Daniel Moore, "Hydrology and Water Supply in the Fraser River Basin," in Anthony HJ Dorsey and Julian R Griggs, eds. Water in Sustainable Development: Exploring Our Common Future in the Fraser River Basin vol 2 (Vancouver: Westwater Research Centre, University of British Columbia, 1991), pp 21-40; TG Northcote and Peter A Larkin, "The Fraser River: A Major Salmonine Production System," in Dodge ed. Proceedings of the International Large River Symposium Canadian Special Publications in Aquatic Science 106 (1989): 172-203; J Lewis Robinson, "The Fraser River," Canadian Encyclopaedia 2<sup>nd</sup> ed. (Edmonton: Hurtig Publishers, 1988) p 841

<sup>4</sup> Northcote and Larkin, "The Fraser River"

spend their early life in fresh water environments, usually food-rich lakes or small streams, migrate to the ocean for the bulk of their life history and, in their final phase, return to natal streams to spawn and die. Five species of Oncorhynchus utilize the river: Pink (Oncorhynchus gorbuscha), Chum (O. keta), Coho (O. kisutch), Sockeye (O. nerka), and Chinook (O. tshawytscha). Sockeye salmon are the most productive, famous and frequently fought over. Much of this thesis will refer to this single species.<sup>5</sup>

The Fraser looms largely in the history of the province, nation and continent. Along its banks complex aboriginal societies made the river home and its salmon a keystone of diet and cultural life for thousands of years before European contact. During the contact period, European explorers traveled to and on the river; fur traders ate aboriginal salmon and traded for it. In the period of resettlement, a gold rush in the Fraser's upper basin marked the beginnings of displacement of native groups and the alienation of resources by an immigrant society. By the latter years of the nineteenth century, a transcontinental railway followed the river's course and numerous settlements emerged on the river's banks. Vancouver, the provincial metropolis and Pacific railway terminus, rose near the river's delta. The river was a central element in British Columbia's development, and it remained so in the twentieth century.

The arrival of hydroelectric technology in British Columbia around the turn of the century forever changed the future of the Fraser River. Spinning steel turbines and hydro dams altered the way people viewed the river's purpose and place. By the middle of the century, interests promoting hydroelectricity and fisheries preservation fell into bitter

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<sup>5</sup> C Groot and L Margolis, eds. Pacific Salmon Life Histories (Vancouver: UBC Press, 1991)

conflict. Their dispute seemed modern and recent, a product of postwar science and technology. But its roots lay earlier, with the first turbines and the first dams.

The greatest damages imposed on the Fraser's salmon by dams occurred in the early twentieth century, before clear lines separated rival interests of fish and power and before much scientific understanding of the relevant problems existed. Mining and lumber dams in the upper basin, hydroelectric dams in the lower basin and a series of disastrous landslides in the Fraser Canyon annihilated local runs and leveled salmon populations as a whole after 1913. Regulators, native fishers and the commercial fishery bore the brunt of these changes and adjusted in response. Before 1940, dispersed economic activity changed the river and its fisheries in an era of loose river regulation, fractured interests and modest scientific knowledge of changing environmental conditions.

The Second World War delivered a period of growth in which the rival interests of fish and power began to solidify. In the fisheries, a new international commission restored the Fraser salmon and oversaw an unprecedented rebound in salmon numbers during the 1950s. In a parallel expansive moment, British Columbians demanded and gained more hydroelectric power following a period of wartime restraint and the Fraser flood of 1948. New institutions and corporations sought to develop the river and spur industrial growth. State bureaucracies and key politicians helped to create pan-industry positions in the fisheries. The phrase fish vs. power entered the popular lexicon. Increasing and overlapping demands on a scarce resource forced a definition of opposing interests in what was conceived to be a zero-sum game.

During the 1950s, new contests pressed the boundaries of this game and changed the rules. Major river projects that would place dams on the river's main stem introduced the scope of the problem to public debate. Rival interests sought to portray themselves as proponents of the common interest. British Columbians discussed and debated the meaning of these overlapping demands and asked what they portended for the future and whether rival interests could be made to cooperate? Science was deployed to assist this cooperative impulse, but no 'solution' resulted, only a finer sense of limits. The rules of this game changed only when the parallel and linked development of the Columbia and Peace Rivers reached a fruitful conclusion in the late 1950s and early 1960s. The interior and northern development program gained impetus in part from the fish-power problem on the Fraser and helped to ensure in turn that the Fraser would not be developed. Fish, not power, won this contest, and this thesis seeks to explain why.

Perhaps the first historian of fish and power was Henry Doyle, a BC canner and self taught scholar who produced a history of the Pacific Coast fisheries in the mid-1950s in the hopes of educating the public and warding off the power threat. Although he tried to publish this history, no press would take it, chiefly because of its heterodox theories of salmon biology, but also perhaps because of its fierce denunciations of the power interest.<sup>6</sup> Since Doyle's polemic, the subject has passed. Because there are no dams on the Fraser, presumably, their absence requires little explanation. Students of hydro history have focused naturally enough on the rivers where development did take place.<sup>7</sup>

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<sup>6</sup>UBC Special Collections and Archives, Henry Doyle, The Rise and Decline of the Pacific Salmon Fisheries 2 vols. (nd, 1957?) Unpublished MS.

<sup>7</sup>Neil Swainson, Conflict over the Columbia: The Canadian Background to an Historic Treaty (Montreal-Kingston: McGill-Queen's Press, 1979); David Mitchell, WAC Bennett and the Rise of British Columbia

Historians of BC's fisheries have provided a number of excellent studies on the role of business in the commercial fishery and on aspects of ethnic and native history.<sup>8</sup> Few have asked how close the industry came to an end in the face of dam development.<sup>9</sup>

There is a parallel to be noted in the American literature concerning the Columbia River, though with the opposite emphasis: because dams did triumph mightily on this river, a tone of inevitability has crept into Columbia histories, as if no alternative to development can be imagined.<sup>10</sup> In one case a free-flowing river is taken for granted, in the other development is described but not always questioned.

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(Vancouver: Douglas & McIntyre, 1983); John R Wedley, "The Wenner-Gren and Peace River Power Development Programs," in SA TSE: Historical Perspectives on Northern British Columbia ed. Thomas Thorner (Prince George: College of New Caledonia, 1989); John R Wedley, "Infrastructure and Resources: Governments and Their Promotion of Northern Development in British Columbia, 1945-1975" (PhD thesis, University of Western Ontario, 1986); Jeremy Mouat, The Business of Power: Hydro-Electricity in Southeastern British Columbia, 1897-1997 (Victoria: Sono Nis Press, 1997). On the politics of power, see Mitchell above and Paddy Sherman, Bennett (Toronto: McClelland and Stewart, 1966); Martin Robin, Pillars of Profit: The Company Province, 1934 to 1972 (Toronto: McClelland and Stewart, 1973); Eileen Williston and Betty Keller, Forests, Power and Policy: The Legacy of Ray Williston (Prince George: Caitlin Press, 1997), especially chapter 2 "The Two Rivers Policy."

<sup>8</sup> Kenneth Johnstone, The Aquatic Explorers: A History of the Fisheries Research Board of Canada (Toronto: University of Toronto Press, 1977); Geoff Meggs, Salmon: The Decline of the British Columbia Fishery (Vancouver: Douglas & McIntyre, 1991); Alicja Muszynski, Cheap Wage Labour: Race and Gender in the Fisheries of British Columbia (Montreal and Kingston: McGill-Queen's University Press, 1996); Dianne Newell, Tangled Webs of History: Indians and the Law in Canada's Pacific Coast Fisheries (Toronto: University of Toronto Press, 1993); Dianne Newell, ed The Development of the Pacific Salmon-Canning Industry: A Grown Man's Game (Montreal: McGill-Queen's, 1989); Dianne Newell, "The Politics of Food in World War II: Great Britain's Grip on Canada's Pacific Fishery," Historical Papers 1987 Communications Historique: 178-197; Dianne Newell, "Dispersal and Concentration: the Slowly Changing Spatial Pattern of the British Columbia Salmon Canning Industry," Journal of Historical Geography 14(1) (1988): 22-36; Dianne Newell, "The Rationality of Mechanization in the Pacific Salmon-Canning Industry before the Second World War," Business History Review 62 (Winter 1988): 626-655; David J Reid, "Company Mergers in the Fraser River Salmon Canning Industry, 1885-1902," Canadian Historical Review 58(3) (September 1975): 282-302; Keith Ralston, "Patterns of Trade and Investment on the Pacific Coast, 1867-1892: The Case of the British Columbia Canning Industry," BC Studies 1 (1968-1969): 37-45.

<sup>9</sup> Writers reaching a broader popular audience have raised some of these questions, however: John Roos, Restoring Fraser River Salmon: A History of the International Pacific Salmon Fisheries Commission, 1937-1985 (Vancouver: Pacific Salmon Commission, 1991); Richard Bocking, Mighty River: A Portrait of the Fraser (Vancouver: Douglas and McIntyre, 1997).

<sup>10</sup> Blaine Harden, A River Lost: The Life and Death of the Columbia (New York: Norton, 1996); Paul C Pitzer, Grand Coulee: Harnessing a Dream (Pullman: Washington State University Press, 1994); Richard White, The Organic Machine: The Remaking of the Columbia River (New York: Hill and Wang, 1995)



Many of the problems this study poses fit within the Innisian staples tradition of Canadian political economy.<sup>11</sup> The staples tradition seeks to understand the economic development of Canada by attending to the role of primary export commodities in national development; it provides a broad conceptual framework for understanding the variable development of economies across space, the importance of export markets on peripheral producer regions and the centrality of primary commodities to hinterland development. In the last few decades, variations on this tradition have placed important emphasis on questions of the role of the state and regulation in economic history.<sup>12</sup> By treating two staples in collision, I hope to develop these concerns and understand how states and societies privilege one resource use over another. My approach, however, seeks a different point of departure from the staples tradition by considering how resources are 'made' not found, how development impacts cultures and environments, not just political economies.

In order to build on the staples tradition and in some aspects transform it, I have turned to a growing body of environmental historical literature on the western United States.<sup>13</sup> Environmental historians attempt not only to understand how human history has

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<sup>11</sup> The classic staples texts include: Harold Adams Innis, The Fur Trade in Canada: An Introduction to Canadian Economic History (Toronto: University of Toronto Press, 1970 rev ed.); Essays in Canadian Economic History (Toronto: University of Toronto Press, 1956) ed. Mary Quayle Innis. A more recent collection that draws together much of Innis's diverse writing is: Staples, Markets and Cultural Change ed. Daniel Drache (Montreal: McGill-Queen's Press, 1995)

<sup>12</sup> See, for example, HV Nelles, The Politics of Development: Forests, Mines and Hydro-Electricity in Ontario 1849-1941 (Toronto: Macmillan, 1974) and Christopher Armstrong and HV Nelles, Monopoly's Moment: The Organization and Regulation of Canadian Utilities, 1830-1930 (Philadelphia: Temple University Press, 1986).

<sup>13</sup> Some of the now classic texts of western American environmental history include: William Cronon, Nature's Metropolis: Chicago and the Great West (New York: Norton, 1991); Arthur McEvoy, The Fisherman's Problem: Ecology and the Law in the California Fisheries, 1850-1980 (Cambridge: Cambridge University Press, 1986); Richard White, Land Use, Environment and Social Change: The Shaping of Island

changed the environment, but also how shifts in the rest of nature have in turn shaped an evolving human society. Environmental history, as Richard White suggests, is a history of a relationship.<sup>14</sup> How we portray and question this relationship introduces a number of levels of analysis: the natural (how the rest of nature changes for reasons independent of human forces but also because of human actions), the economic and technological (how the rest of nature is put to use, remade, built upon and consumed) and the conceptual (how the rest of nature is perceived, imagined, studied and represented).<sup>15</sup> Within environmental historiography, considerable debate focuses on how best to weigh these emphases and whether and how we can conceive of the rest of nature as socially constructed. William Cronon's recent collection, Uncommon Ground, has become a lightning rod for these questions.<sup>16</sup> Debate focuses on whether wilderness can or ought to be portrayed as an artifact of human culture or as a place separate from human society.<sup>17</sup> My own approach sees the rest of nature as inextricably linked with humanity (or the

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County, Washington (Seattle: University of Washington Press, 1980); The Organic Machine; Donald Worster, Dust Bowl: The Southern Plains in the 1930s (New York: Oxford University Press, 1979); Rivers of Empire: Water, Growth and the American West (New York: Pantheon, 1985); Under Western Skies: Nature and History in the American West (New York: Oxford University Press, 1992)

<sup>14</sup> The Organic Machine, p x

<sup>15</sup> Donald Worster, "Doing Environmental History," in Ends of the Earth: Perspectives on Modern Environmental History ed. Donald Worster (Cambridge: Cambridge University Press, 1988); Donald Worster, "Transformations of the Earth: Toward an Agroecological Perspective in History," Journal of American History 76(4) (March 1990): 1087-1106; Richard White, "Environmental History, Ecology and Meaning," Journal of American History 76(4) (March 1990): 1111-1116; William Cronon, "Modes of Prophecy and Production: Placing Nature in History," Journal of American History 76(4) (March 1990): 1122-1131

<sup>16</sup> William Cronon ed., Uncommon Ground: Toward Reinventing Nature (New York: Norton and Co., 1995)

<sup>17</sup> A special roundtable discussion in 1996 in Environmental History 1(1) raised many of these concerns: William Cronon, "The Trouble with Wilderness; or, Getting Back to the Wrong Nature," pp 7-28; Samuel P. Hayes, "Comment: The Trouble with Bill Cronon's Wilderness," pp 29-32; Michael P Cohen, "Comment: Resistance to Wilderness," pp 33-42; Thomas R Dunlap, "Comment: But What Did You Go Out into the Wilderness to See?" pp 43-46; William Cronon, "The Trouble with Wilderness: A Response," 47-55

other way around if you prefer), yet begins with the assumption that ideas about the rest of nature undergo continuous revision and change, triggered sometimes by shifts in the environment, but also by cultural or political forces. Nature in this approach must be historicized, just as its independence from human control needs to be considered and examined.

A fruitful means to interrogate these problems is by examining the changing ideas of science in society and nature. In the history of the western world, scientific conceptions of the rest of nature hold a privileged status and are frequently considered to be accurate reflections of nature or objective understandings of the world. Recent work in science studies and the history of science seeks to question these assumptions by examining how scientific ideas are created, how social contexts impact scientific ideas, how metaphors help scientists construct the world, how practices change knowledge.<sup>18</sup> Although much of this literature is accused of a relativist stance in its conception of knowledge and reality, one of its leading proponents, Bruno Latour, believes that this work has provided only a more realistic conception of how science operates.<sup>19</sup> While agreeing with his general point, it might be acknowledged that there has been a much greater attempt to understand how society influences science in this literature than how the rest of nature changes ideas.<sup>20</sup> While learning from this literature's attempts to

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<sup>18</sup> For a recent historiographic overview, see: Jan Golinski, Making Natural Knowledge: Constructivism and the History of Science (Cambridge: Cambridge University Press, 1998).

<sup>19</sup> The critique of the social study of science is discussed in Andrew Ross, Science Wars (Durham: Duke University Press, 1996). Latour's latest statement on these matters is: Pandora's Hope: Essays on the Reality of Science Studies (Cambridge: Harvard University Press, 1999).

<sup>20</sup> Other authors make substantially the same point, though draw different conclusions on how we should overcome this bias of exclusion: Stephen Cole, Making Science: Between Nature and Society (Cambridge: Harvard University Press, 1992); Bruno Latour, We Have Never Been Modern (Cambridge: Harvard

evaluate the social conditions of scientific knowledge, I have followed environmental historians Arthur McEvoy, Richard Grove, Nancy Langston and Joseph Taylor III in seeking to understand how scientific ideas frame and impact the environment and how a changing nature forces questions and problems into scientific domains.<sup>21</sup>

Rivers run through jurisdictions, scientists' notebooks and university libraries as well as landscapes. I have consulted a wide range of documentary and archival material in the course of researching this study. Mostly these are the traditional sources of political economy and the history of science: papers of government departments and commissions, politicians and lobby groups, unions and corporations, scientists and university departments. I have also visited many of the places that I will discuss, stepping into the river twice, as it were, gaining a sense of the transformation of this river by tourism rather than hydro dams. Less common to the historian's toolbox is the range of scientific studies that I have consulted in the course of my reading. I have tried to gain some sense of the natural history of this river and the salmon in order to place past scientific ideas in context and understand aspects of the natural changes this river undergoes on an annual basis and has undergone during the past century. No doubt some will criticize my attempts to jump willfully over disciplinary boundaries, without the appropriate footwear. I only hope that they can appreciate the value of making connections.

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University Press, 1993); Andrew Pickering, The Mangle of Practice: Time, Agency, and Science (Chicago: University of Chicago Press, 1995).

<sup>21</sup> McEvoy, The Fisherman's Problem; Richard H Grove, Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Conservation, 1600-1860 (Cambridge: Cambridge University Press, 1995); Nancy Langston, Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West (Seattle: University of Washington Press, 1995); Joseph E. Taylor III, Making Salmon: An Environmental History of the Northwest Fisheries Crisis (Seattle: University of Washington Press, 1999)

The study is organized with a view to both thematic and chronological concerns. Chapter One asks how scientists encountered their subjects, built institutions for their study and interacted with one another, state officials and members of related industries? It compares two fields—fisheries science and hydrology-- to reveal the different and shifting biases of federal and provincial involvement in scientific sponsorship and jurisdictional control, as well as scientific method and practice. The second chapter introduces a major series of landslides at Hells Gate in the Fraser Canyon that occurred between 1911 and 1914. The chapter considers how the slides impacted salmon runs and how fisheries depletion impacted different groups. Chapter Three examines the early use of dams in mining, the forest industry and hydroelectricity and evaluates what means were used to protect blocked salmon runs. On one level a study of the regulatory process, the chapter also explains the contextual reasons why early dam building did not exert more environmental impacts than they did. After the decline of the Fraser sockeye runs after the Hells Gate slides, Canada and the United States negotiated a convention to restore the river and share international management of the resource. Chapter Four studies how scientists re-discovered problems at Hells Gate, focused attention on the site, conducted research and debated results. It asks how scientists came to know a complex environmental site and how they interpreted and acted upon that knowledge? The growth of BC's economy during the Second World War spurred demand for electrical energy, public power development and expansion into hinterland regions. Chapter Five explains the social and economic origins of the mounting political demands for power development, the near-nationalization of the utilities sector in 1945 and the institutional

and political economic foundations of the spatial expansion of hydro development after 1945. Chapter Six considers how the Aluminum Company of Canada's major power development in the upper basin in the late 1940s changed the fish-power debate and inspired the organization of a broadly based fisheries defense. It questions how the state mediated and propelled this conflict and how resource lobbies cohered and divided? During the 1950's the fish-power debate reached full stride. Chapter Seven considers the impact of the fish-power debate on the hydro politics of the province. It seeks to explain how the debate over the Fraser influenced projects on the Columbia and Peace and how the possibility of alternatives held development off the Fraser. Chapter Eight extends this discussion by focusing on the role of science in this debate. It asks how did scientists aim to change the fish vs. power debate, and how did the debate change science?

## **Chapter 1**

**'Nature's Method Has Been Improved Upon':  
The Scientization of Salmon and Water in British Columbia, 1900-1935**

Speaking before the inaugural meeting of the British Columbia Academy of Sciences in 1910, the Anglican Minister George William Taylor delivered a Presidential address in which he reflected on the development of science in the province. "In a new country..." he said, "the efforts of the first settlers must necessarily be directed to the pressing problem of how to win a livelihood on land or sea. From agriculture and hunting their attention may turn to trading or mining; but not perhaps for a long time...to science or art."<sup>1</sup>

By Taylor's evolutionary model of social development, BC was reaching a state of civilized refinement in 1910. Ten years previously a provincial agency had been established to study and conserve the fisheries of the province. In 1908 Taylor had been appointed Director of the Marine Biological Station on Vancouver Island. In 1911, scientific hydrographic surveys would begin to catalogue the waterpowers of BC, and only a year later a provincial forester would be hired to help apply scientific conservation to the province's timber wealth.<sup>2</sup> New fields, experts and institutions were being established in a great period of scientific improvement.

Taylor's model of science in a new land, however, reflected the biases of its author. Although Taylor, a Minister, a naturalist, a student of entomology and marine biology, might have wished to see his life pursuit as the logical outcome of social development, most of his colleagues in the new fields of science would have understood their roles differently. Their task was to understand nature so that it might be improved or exploited more fully. Each of these new fields of science drew on state support and aimed to promote economic growth in some manner. Contrary to Taylor's hopes, much evidence suggests that BC still existed in that evolutionary period when the "pressing

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<sup>1</sup>Quoted in BCARS, Add MSS 2812, ED Taylor, "A Very Gentle Man: The Reverend George William Taylor, MA, FRSC, FZS, 1854-1912" nd, p 18

<sup>2</sup>On the case of forestry, see: Richard A Rajala, Clearcutting the Pacific Rainforest: Production, Science and Regulation (Vancouver: UBC Press, 1998).



problem” remained earning “a livelihood on land or sea.” This new age of science did not represent a flourishing of refined culture, but the creation of knowledge for instrumental goals.

This chapter seeks to consider how a new instrumentalist science re-inscribed the lands, waters and life of British Columbia in the early twentieth century. Salmon and water serve as cases studies of a broader problem. By inquiring into the origins of new scientific institutions, the presumptions and practices of scientists and experts who encountered an unfamiliar nature, and the evolving patterns of knowledge to 1930, the analysis suggests the social and intellectual bases of emerging scientific ideas. The emphasis is on examining how social contexts shape science. Later chapters will take up the important question of how science shapes society. Although there is a limited literature of the history of science in BC,<sup>3</sup> my approach is more influenced by two different but related bodies of literature in the historiography of science: writings on the history of science in hinterland societies, and constructivist approaches to the analysis of scientific knowledge creation.

A parallel exists between Taylor's view and that of George Basalla in his classic evocation of the ‘spread of western science.’<sup>4</sup> For Basalla, science in colonial or hinterland settings emerged as an offshoot of metropolitan influences, reflecting the learning, institutions and theories of western centers of power. A refined colonial elite received western science and modeled their own institutions and studies on metropolitan precedents. As with Taylor's understanding there is a grain of truth in Basalla's model, but not one that stands up to much empirical verification. Over the last twenty years an emerging historiography of colonial and hinterland science has challenged the view that

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<sup>3</sup>For an introduction to aspects of BC science, see: Douglas Cole, "Leisure, Taste and Tradition in British Columbia," in Hugh JM Johnston, ed. The Pacific Province: A History of British Columbia Vancouver: Douglas & McIntyre, 1996), pp 344-381.

<sup>4</sup>George Bassala, "The Spread of Western Science," Science 156(3775) (5 May 1967): 611-622

ideas flow unidirectionally from power, that hinterland societies did not create their own knowledge and that scientific exchange between hinterlands was as important if not more important than metropolitan ideas.<sup>5</sup> In Green Imperialism, for example, Richard Grove argues “modern conservationism developed as an integral part of the European encounter with the tropics and with local classifications and interpretations of the natural world and its symbolism.”<sup>6</sup> In a related vein, Nathan Reingold and Marc Rothenberg propose that centers of ideas and power exist at many levels, “both intranational and international, reflecting intellectual, political and social linkages.” These authors summarize much recent work in this area by dispensing with a model of imperial expansion in favor of a heuristic model of the “polycentric” origins of science.<sup>7</sup>

Constructivist studies suggest approaches that help to transcend the Basalla model of the spread of science by focusing attention fundamentally on local contexts.<sup>8</sup> Contrary to a realist view of science that accepts scientific ideas as reflections of nature with universal meanings, constructivists such as Simon Schaffer and Steven Shapin have redirected attention to the highly contingent social problems involved in creating ‘universal’ knowledge.<sup>9</sup> Rather than accept science as universal, in other words, and study its imperial expansion, constructivists seek to understand how scientists’ ideas are tied to local contexts and relationships, how scientific expertise and cultural authority are

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<sup>5</sup>For a brief discussion of this literature, see: Susan Sheets-Pyenson, Cathedrals of Science: The Development of Colonial Natural History Museums During the Late Nineteenth Century (Montreal: McGill-Queen's Press, 1988), pp. 13-15. In the Canadian context, Richard Jarrell has made the most consistent claims for understanding Canadian science in relation to other scientific hinterlands. See, for example, “Differential National Development and Science in the Nineteenth Century: the Problems of Quebec and Ireland,” in Nathan Reingold and Marc Rothenberg, eds. Scientific Colonialism: A Cross-Cultural Comparison (Washington, DC: Smithsonian Institution Press, 1987), pp. 323-350.

<sup>6</sup> Richard H Grove, Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Conservation, 1600-1860 (Cambridge: Cambridge University Press, 1995), p.3

<sup>7</sup> Nathan Reingold and Marc Rothenberg, eds. Scientific Colonialism: A Cross-Cultural Comparison (Washington, DC: Smithsonian Institution Press, 1987), p.xii

<sup>8</sup>For an excellent introduction to constructivist studies of science, see: Jan Golinski, Making Natural Knowledge: Constructivism and the History of Science (Cambridge: Cambridge University Press, 1998)

<sup>9</sup>Stephen Shapin and Simon Schaffer, Leviathan and the Air Pump: Hobbes, Boyle and the Experimental Life (Princeton: Princeton University Press, 1985); see also Shapin's A Social History of Truth: Civility and Science in Seventeenth-Century England (Chicago: University of Chicago Press, 1994).

socially constructed and how universal ideas are projected and received in different settings.

This chapter seeks to overcome a two stage (metropolitan-hinterland) model of scientific growth and examine the many levels at which science was created and questioned in early twentieth century BC. Analyzing the origins of state institutions devoted to fisheries and water development demonstrates the various social forces-- industrial, scientific, bureaucratic and regulatory-- that helped to create the conditions for scientific research. The personnel drawn to lead these institutions, and the models employed to design them, suggests a marked dependence on American precedents, at least in the first decades of the century. Following on an early descriptive stage, institutions grew, scientists developed long range research investigations and the spatial and temporal realms of state science expanded. The overarching utilitarian goals of resource conservation and enhanced exploitation framed the questions asked by scientists and their avenues of approach. In the systematization of ideas about nature in scientific investigations and reports, salmon scientists and hydrographic surveyors adopted informal knowledge, dependent on local experience, crossed it with metropolitan theory and metrological instruments and produced novel hybrids. They exercised cultural authority in selecting some ideas and rejecting others. Science was thus “polycentric” in its origins, but also reflective of and contributing to the evolving relationships of social and political power in early twentieth century British Columbia.

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The growth of state science around the turn of the century is a notable feature in the institutional history of Canadian science. Despite previous state activity in the fields of geology and agriculture, it was not until the twentieth century that scientific institutions were invented at the federal and provincial levels devoted to a wide range of natural

resources.<sup>10</sup> A common pattern of growth, however, masks a wide variety of causes for this new engagement of institutions. Industrial interests, scientists, politicians and bureaucrats, all pressed for new areas of state-led research for widely different reasons.

The emergence of fisheries science gained initial impetus as a result of industrial concerns over fisheries depletion on the Fraser River at the turn of the century. Prominent canners pressed the provincial government for the appointment of a scientific fisheries expert for fear of a declining resource. In 1901, the expert arrived in the form of John Pease Babcock, formerly of the California State Board of Fish Commissioners, who would lead the newly invented BC Fish Commission for the rest of his life. In the course of his activities Babcock would help to redefine knowledge of salmon and press for conservation, sometimes against the industry that had backed his appointment.<sup>11</sup>

Babcock was an expert, but he was not a scientist proper. The son of Lorenzo Babcock, the first Attorney General of Minnesota, Babcock was born in 1855 and educated at various private schools in Vermont and Wisconsin, but received no formal scientific training.<sup>12</sup> He gained his reputation as an expert working for the California State Board of Fish Commissioners in the 1890s-- an agency that functioned as a kind of "gentleman's club," according to one historian-- restoring the Sacramento River.<sup>13</sup> Hailed locally for his feats in establishing hatcheries and seemingly reversing the environmental

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<sup>10</sup>On the pattern of marked growth around 1900, see: Richard Jarrell, "Science and Public Policy in Nineteenth Century Canada: Nova Scotia Promotes Agriculture," in Profiles of Science and Society in the Maritimes prior to 1914 ed Paul A Bogaard (Acadiensis Press, 1990), pp 221-242 and "Science and the State in Ontario: The British Connection or North American Patterns," in Roger Hall, William Westfall and Laurel Sefton MacDowell, eds. Patterns of the Past: Interpreting Ontario History (Toronto: Dundurn Press, 1988). For state-directed science before the twentieth century, see: TH Anstey, One Hundred Harvests: Research Branch Agriculture Canada 1886-1986 (Ottawa, 1986); Morris Zaslow, Reading the Rocks: The Story of the Geological Survey of Canada, 1842-1972 (Ottawa, 1975); Suzanne Zeller, Inventing Canada: Early Victorian Science and the Dream of a Transcontinental Nation (Toronto: University of Toronto Press, 1987).

<sup>11</sup> UBC Special Collections and Archives, International Pacific Salmon Fisheries Commission Papers, Canners' Scrapbooks (hereafter CSB), "The Salmon Industry," Victoria Colonist, September 25, 1901

<sup>12</sup>University of Washington Manuscript and Archives (hereafter UWMA), Acc. 2597-77-1, William F Thompson Papers, Box 6, File 3 contains biographical materials on Babcock. See also: "JP Babcock Passes Here," Victoria Daily Times, October 13, 1936.

<sup>13</sup>Michael Black, "Tragic Remedies: A Century of Failed Fishery Policy on California's Sacramento River," Pacific Historical Review 64(1) (1995): 41

destruction of hydraulic mining and over-fishing, Babcock came to the attention of RP Rithet, a BC canner with interests in San Francisco. In the hopes that California fish culture might be brought to the shores of the Fraser, Rithet proffered Babcock's name to provincial politicians.

Fish culture and hatchery development attracted favourable attention from powerful cannery interests in the late nineteenth century. Babcock's fame, it could be said, was the creation of a receptive audience. Developed earlier in eastern North America in response to drastic declines in salmon and trout populations, hatcheries gained wide popularity in the Pacific states in the late nineteenth century.<sup>14</sup> A faith in the ability of technology to improve Nature's faults and a desire to expand stocks without constraining the fishery were at the roots of fish culture's popularity. Individual canners, state agencies, and the US Fish Commission all entered the field in the hopes of making two fish where before there was one.<sup>15</sup> Although fish culture was practiced in BC by the federal government, only one hatchery existed in the Fraser basin before 1900 and cannery interests and newspapers doubted the technical ability of the federal staff.<sup>16</sup> In order to deliver the early promise of American hatchery development, canners in BC believed that expertise would have to be imported and federal authority by-passed.<sup>17</sup> While representatives of the BC Fisherman's Union charged that conservation could be achieved simply by removing Japanese fishers from the industry, BC canners had found the religion of fish culture in the closing years of the nineteenth century and they raised Babcock on their shoulders as the would-be salmon savior.<sup>18</sup>

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<sup>14</sup>On the Canadian Origins of fish culture, see: Hugh MacCrimmon, "The Beginnings of Fish Culture in Canada," *Canadian Geographical Journal* LXXI (3) (Summer 1965): 96-103.

<sup>15</sup>Arthur F McEvoy, *The Fisherman's Problem: Ecology and the Law in the California Fisheries 1850-1980* (Cambridge: Cambridge University Press, 1986), pp 104-108; Joseph E Taylor, III, *Making Salmon: An Environmental History of the Northwest Fisheries Crisis* (Seattle: University of Washington Press, 1999), pp 68-132

<sup>16</sup>CSB, "Provincial Fisheries; Importance of the Preservation of the Spawning Grounds," *Province*, May 17, 1901

<sup>17</sup>CSB, "Mr. Babcock's Appointment," *Province*, October 18, 1901

<sup>18</sup>CSB, "Provincial Fisheries," *Victoria Colonist*, May 2, 1901.

While industrial concerns helped to shape the personnel of the early BC Commission of Fisheries, the opportunity to form the Commission was created by the outcomes of recent constitutional disputes between the province of Ontario and the federal government. As one of a number of challenges to federal authority in the late nineteenth century, Ontario appealed the question of federal jurisdiction of fisheries to the JCPC on the grounds that federal control infringed on provincial proprietary rights.<sup>19</sup> The decision handed down in 1898 effectively split jurisdiction: maintaining the federal right to regulate the fishery, but granting the province the ability to set licenses and leases.<sup>20</sup> Although BC's interest in the matter was limited, there was a background of resentment in the provincial legislature over the fact that the federal department of marine and fisheries spent less on administration in the province than it collected in revenue. In light of the JCPC decision, the provincial government established the Commission chiefly to claw back revenue through licenses; but it failed to follow Ontario's interventionist lead, leaving much of federal jurisdiction unchallenged in the short term.<sup>21</sup> Babcock's appointment to the Commission, therefore, was not based on the requirements of the new agency in a strict sense, but may be read as a concession to the industry, which had expressed concerns about conservation and the need for fish culture. As one newspaper editorial pointed out, this left the would-be savior of the salmon in the peculiar position of being charged with restoring salmon numbers while holding little practical authority to carry out his wishes. Even the collection of fish spawn needed to stock the envisioned hatcheries would require federal permission.<sup>22</sup>

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<sup>19</sup>On the general constitutional context of the fisheries case, see: Christopher Armstrong, The Politics of Federalism: Ontario's Relations with the Federal Government, 1867-1942, chapters 1 and 2.

<sup>20</sup>Anthony Scott and Philip A Neher, The Public Regulation of Commercial Fisheries in Canada (Ottawa: Economic Council of Canada, 1981), pp 11-12; Dianne Newell, ed The Development of the Pacific Salmon-Canning Industry: A Grown Man's Game (Montreal: McGill-Queen's, 1989), p10

<sup>21</sup>Ibid, pp12-13

<sup>22</sup>CSB, "Babcock's Position," Victoria Colonist, October 17, 1901; see also, "Sinecure is What They Say," Province, October 17, 1901.

The federal government belatedly followed the province in hiring expert staff on the Pacific coast in 1908, with the establishment near Nanaimo of a research station of the Board of the Marine Biological Station, later the Biological Board of Canada (starting in 1912). Unlike the earlier provincial move, this effort owed little to industrial pressure. It drew its support from a tacit alliance between scientists within the Board and elements of the naturalist and scientific community across Canada. EE Prince, an English-born scientist with experience as a lecturer in Scotland and as a surveyor of fisheries resources in Ireland, headed up the Board's attempt to establish a Pacific station in close cooperation with George William Taylor, an Anglican Minister and prominent BC naturalist who held the distinction of being the only fellow of the Royal Society of Canada west of Winnipeg.<sup>23</sup> Both men sat on the federal BC Fisheries Commission of 1905 and cooperated to insert a recommendation for the establishment of a research station within the Commission's final proposals. Wearing another hat, as Secretary of the Board, Prince accepted the Commission's suggestion and proposed to act on it. With some political support from BC MPs, such as William Sloan and endorsements from the Vancouver Board of Trade, Prince's project was launched in 1908 by the federal department of marine and fisheries, creating a west coast station to match earlier efforts in Ontario and Nova Scotia. The station was built on donated land from the Lieutenant Governor and local industrialist James Dunsmuir near Nanaimo.<sup>24</sup> Whereas the interest in the provincial agency was strongly practical and members of the industry reached out for an expert knowledgeable of hatcheries, in the federal case, the organized science lobby's interest held sway and Taylor was hired to head up the new enterprise in the interests of science. Although public expectations held that the new station would

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<sup>23</sup>For biographical details of EE Prince, see: CSB, "To Investigate Coast Fisheries," *Province*, August 31, 1905; and for Taylor, see: Taylor, "A Very Gentle Man"; and "George William Taylor," *Transactions of the Royal Society of Canada* Third Series VII (1913): xv-xix.

<sup>24</sup>On the establishment of the Nanaimo station, see: Kenneth Johnstone, *The Aquatic Explorers: A History of the Fisheries Research Board of Canada* (Toronto: University of Toronto Press, 1977), pp 61-66.

perform practical research related to the salmon fishery, no direct connections with the fishing industry were created initially and the research station had no role in regulatory questions.<sup>25</sup> Taylor began instead to reveal God's mysterious creation on the beaches with studies of sea worms and mollusks.

The systematic study of water in the province followed a different pattern. The first attempts to provide a broad inventory of provincial waterpowers did not occur until 1911, and the move was propelled more by regulatory concerns than industrial or scientific pressure. In the early 1900s, it was becoming generally acknowledged that the provincial system of granting water rights was in disarray. Since the 1858 Cariboo gold rush and the first legislation on water in the gold mines acts, rights had been extended by the province on a local basis with no central administration. Rights were granted in local land offices to a host of different water users including miners, irrigators, power companies and municipal water agencies. The province had no idea how many water grants existed, the extent of water already alienated or the total flows that might be allocated. In an environment of plenty, haphazard control could continue undisturbed. But when water rights came into conflict on a particular stream or overlapped, disputes arose over who held rights and which rights overrode others. In response to such rising concerns the provincial Minister of Lands, WR Ross appointed a Commission of Investigation in 1907 to consider the problem. A revised Water Act, passed in 1909, established a Board of Inquiry to reassess past licenses and create centralized procedures for new ones.<sup>26</sup>

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<sup>25</sup>On public expectations before the station was established see: CSB, "Fisheries Research Station for BC," Daily World, January 28, 1905; "To Explore New Fishery Grounds," Province, January 28, 1905; "Fisheries Research Station," Victoria Colonist, January 28, 1905.

<sup>26</sup>On the Byzantine nature of early water administration in BC, see: Robert E Cail, Land, Man and the Law: The Dispersal of Crown Lands in British Columbia, 1871-1913 (Vancouver: UBC Press, 1974), pp 115; BCARS, GR 1006, BC Water Rights Branch, Box 1, File 31, "Summary of the Tenure of Office of the Senior Personnel of the Water Rights Branch, Now Known as the Water Resources Service" [1964].



This initial revision of the system, however, was immediately placed in jeopardy by an important test case over jurisdiction launched in 1907. The case pitted the Burrard Power Company against a number of interests holding federal timber leases in the railway belt. The belt was a legacy of the construction of the CPR, and the granted lands, cutting through the economic heart of the province, were under federal jurisdiction. The timber interests feared that the power company's venture establishing a hydroelectric facility on Lillooet Lake would flood their leases and they appealed to the federal government to contest provincial control over water rights in the railway belt. A case followed, and with it a dominion victory. The province's appeal to the JCPC resulted again in a judgment in favour of the dominion in 1910. Past provincial water grants in the railway belt were now invalid and the provincial attempt to rein in contentious water rights cases through enhanced administration was thrown into confusion. A series of federal-provincial agreements over the next two years papered over the difficulty-- granting the province the right to administer the belt's water, while withholding in principle final jurisdiction for the federal government.<sup>27</sup>

In the midst of the difficulty, both the province and the federal government engaged experts to suggest means to improve the situation and establish a basis for regulating water. The province imported a handful of American experts to advise on legal and administrative questions and conducted surveys in the southern interior. Such surveying aimed to reassess water rights, but also reported on potential development possibilities in a variety of watersheds.<sup>28</sup> Shortly before the First World War, Frank Swannell led survey parties in the upper Fraser basin and on coastal streams, as part of a general waterpower survey. With a background in mining engineering gained at the

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<sup>27</sup>*Ibid.*, pp 117-124

<sup>28</sup>Reports by Samuel Fortier, HW Grunsky and OC Merrill, American water development experts, were published in the 1912 *Annual Report* of the BC Department of Lands, along with reports on watersheds and preliminary provincial and federal survey work.

University of Toronto (1897-1899), Swannell entered water surveying following on a short career in mining and railway surveying, some of which took place in the Nechako Valley, the site of his later water studies.<sup>29</sup> The major step towards establishing new knowledge of water, however, occurred at the instigation of the federal government, faced with the prospect of regulating water in the railway belt. Starting in 1911, surveyors with the Department of the Interior's Water Power Branch began a Railway Belt Hydrographic Survey under the direction of CR Adams, a hydrographer with the US Geological Survey. The aims were to provide some basis for granting future water rights, without over-extending supplies, and to establish a knowledge foundation for future hydroelectric development.<sup>30</sup> By the end of 1913, federal engineers had established eighty-four metering stations, within three divisions (Coast, Kamloops and Nelson), each under the charge of a divisional engineer and his survey staff.<sup>31</sup> With a cooperative agreement between the province and the federal government in 1914, the survey extended its efforts across the province. In association with the Commission of Conservation, these provincial results were collected into an inventory of waterpower resources and published. As opposed to the case of salmon, the creation of scientific knowledge of water flows drew from state attempts to control industry, and promote wise use rather than from industrial or scientific attempts to inspire state science.

The establishment of these new institutions and fields of inquiry depended on various scientific traditions and institutional models. In the case of fisheries, the contrast between the provincial and federal approach, at least in terms of personnel, was striking. Whereas the province opted for an American expert with experience in salmon research and hatchery development, an English-born Anglican minister in the naturalist tradition

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<sup>29</sup> BCARS, Frank Swannell Papers, Add. MSS 392, biographical information.

<sup>30</sup> Arthur V White, Water Powers of British Columbia (Ottawa: Commission of Conservation, 1919), p 306.

<sup>31</sup> RG Swan, Report of the British Columbia Hydrographic Survey 1913 (Ottawa: Department of the Interior, Water Power Branch, 1915), pp 5-7

led the federal effort near Nanaimo. Babcock's public statements called for the improvement of nature; his practical efforts involved annual tours of the province's spawning grounds; he engaged prominent zoologists from Stanford to conduct basic research in the province in the 1910s and 1920s and was personally responsible for the development of basic statistical indices of the fisheries. George William Taylor, on the other hand, preached the need to "understand the works of the Creator [and] unravel the secrets of Nature"; he spent his time studying the mysteries of insects and sea shells; and designed the research station as a summer retreat for scientists studying marine biological topics, few of which related to problems of direct economic importance.<sup>32</sup> Although Charles MacLean, Taylor's successor as Director in 1910, would turn to the study of salmon, his research was also not of a practical bent. The scientific as opposed to the practical side of the federal research program was nicely summarized by Wilber Clemens when he recalled that when he first started working at the station in the 1920s, his complete lack of knowledge of west coast fauna was dismissed as irrelevant: many Englishmen and scientists from Ontario had begun work at the station with the same handicap he was told. His scientific credentials were what mattered.<sup>33</sup>

Although the contrast between Babcock and Taylor and the personnel they attracted invites comparisons on the basis of differing national styles of science, there is also a parallel to be noted. Both the Commission of Fisheries and the federal Board drew on American institutional precedents. At the state and federal level, US governments had established different scientific branches to inform fisheries regulation and support hatchery development.<sup>34</sup> In a certain sense, both the provincial and federal institutions adopted different aspects of the US Bureau of Fisheries program: like the Bureau, the

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<sup>32</sup>BCARS, Add MSS 2812, ED Taylor, "A Very Gentle Man," quotation p 19; CSB, "Late Rev GW Taylor," Province, August 27, 1912.

<sup>33</sup>WA Clemens, Education and Fish (Nanaimo: Fisheries Research Board of Canada Station, MS Report Series No 974, May 1968), p 34

<sup>34</sup>On the emergence of fish culture within the Commission, see: Taylor, Making Salmon, pp 68-132.

province had no clear regulatory authority and thus justified its existence by focusing scientific attention on problems of fish culture; the Board's emerging system of research stations, on the other hand, mirrored that of the US Bureau's network, established first in the 1870s.<sup>35</sup> The province thus adopted American concerns and institutional research directions, while the federal department followed a similar institutional framework, while altering the nature of the research agenda.

In the case of water, the development of institutions shows a similar reliance on American models. The province's move to administer water use more closely and reform the system of water rights depended on the advice of American expertise and mirrored previous attempts in western American states to establish uniform water regulations out of a mixture of past legal traditions.<sup>36</sup> The federal Hydrographic Survey and the Commission of Conservation's inventorial project, on the other hand, were created following American advances in conservation planning in the opening years of the century.<sup>37</sup> The Commission of Conservation's efforts to establish a national inventory of waterpower resources directly copied the US Geological Survey's lead and survey work by the US Army Corps of Engineers and the US Bureau of Reclamation.<sup>38</sup> Unlike the case of fisheries in the early years, the survey mainly engaged Canadian engineers and surveyors for its work, even though an American engineer supervised the work. Past hydrological research by the Department of the Interior and in eastern Canada provided

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<sup>35</sup>On the early program of research stations under the control of the US Fish Commission, see: Dean Conrad Allard, jr., Spencer Fullerton Baird and the US Fish Commission (New York: Arno Press, 1978), chapter 8, pp164-179. Although Baird's intention was that the stations should conduct basic biological research, the research mandate of the Commission swung quickly in the direction of fish culture, in terms of budget appropriations.

<sup>36</sup>Donald J Pisani, To Reclaim a Divided West: Water, Law and Public Policy, 1848-1902 (Albuquerque: University of New Mexico Press, 1992)

<sup>37</sup>White, Water Powers, p1

<sup>38</sup>On the origins and early history of American state hydrology, see: Todd Shallat, Structures in the Stream: Water, Science and the Rise of the US Army Corps of Engineers (Austin: University of Texas Press, 1994); Robert Follansbee, A History of the Water Resources Branch, US Geological Survey: Volume 1, From Predecessor Surveys to June 30, 1919 (Washington, DC: US Geological Survey, [1938] 1994). For the international history, see: Asit K Biswas, History of Hydrology (Amsterdam-London: North Holland Publishing Company, 1970)

the agency with a ready domestic supply of technical staff.<sup>39</sup> In the case of the provincial surveys, surviving evidence also suggests the employment of Canadians in positions of technical expertise. The general work of triangulations and surveys also engaged local residents, without any particular expertise, to conduct the work of the surveys under the guidance of trained surveyors and engineers.<sup>40</sup> Nevertheless, individuals employed in survey work at the federal and provincial level had varied backgrounds. It was not out of place, for example, for surveyors to compare their experiences on the Columbia with their earlier studies of the Congo.<sup>41</sup>

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Although the federal Department of Fisheries aimed to establish basic knowledge of fish biology, it was really the provincial Commission of Fisheries, even with its practical orientation, that built up the bulk of basic scientific knowledge about salmon in the early twentieth century. The direction of the provincial commission depended almost solely on the work of Babcock, with occasional and important contributions offered by University scientists supplied on contract. It is no exaggeration to say that the provincial agency, under Babcock's leadership created a new formal knowledge of salmon where before there was none. Only ten years before Babcock's arrival, Ashdown H Green, speaking before the Natural History Society on "The Salmonidae of British Columbia" confessed the overwhelming ignorance of naturalists on the subject: "I would say," he suggested, "that this paper is written not so much to impart information as to shew how little we really know about the most valuable fishes of our Province, and also in the hopes that some of our upcountry members will be interested enough to collect notes of the habits of

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<sup>39</sup>See the list of engineers and surveyors provided at the front of Swan's 1913 report on the hydrographic surveys in the railway belt; three of the eight were members of the Canadian Society of Civil Engineers; the others I have identified as Canadian engineers.

<sup>40</sup> BCARS, Frank Swannell Papers, Add. MSS 392, Surveyor General to Swannell, May 13, 1920 contained in 1920 diary.

<sup>41</sup>HF Meurling, "Description of Work at Hydrographic Station Near Nelson," Annual Report Department of Lands 1912 (1913), p 145

fish in their several localities, and forward them to the Provincial Museum."<sup>42</sup> Nor did this remark reflect the ignorance of one individual or locality. Richard Rathbun, Assistant Secretary of the Smithsonian observed the same problem in his report on fisheries in US boundary waters of Washington in 1896: "the great paucity of detailed or accurate information," he concluded, was at the basis of problems of fisheries regulation.<sup>43</sup> How could the state regulate a resource it did not know?

Babcock started from a position of ignorance and attempted to overcome it by creating a form of braided knowledge. The pattern he adopted for his weave was taken in its general aspects from established scientific ideas generated by University scientists in California. Following the pattern he sought to connect threads of ideas proposed by canners, fishermen, native peoples and locals around the Fraser basin and turn them into something new: derivative of the pattern, but offering variations and specific local findings. The resulting fabric, an uncomfortable weave of contradictory ideas born of experience and interpreted meanings, represented the first systematic and formalized knowledge of salmon biology in twentieth century BC.

The two greatest intellectual influences on Babcock undoubtedly were David Starr Jordan and Charles H Gilbert, both professors of zoology at Stanford, where Jordan held the University presidency. The two scientists formed something of a school: Jordan had taught Gilbert as a graduate student in the 1880s at the University of Indiana, and the two worked closely over their research careers.<sup>44</sup> Whereas Jordan established the broad directions of salmon biology from which Babcock drew, Gilbert provided him with specific guidance and ideas about salmon in BC. Before Jordan put his hand to the

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<sup>42</sup>No author, but probably Ashdown H Green, "The Salmonidae of British Columbia," Papers and Communications Read Before the Natural History Society of British Columbia vol 1(1) (Victoria: Jas. A Cohen Printer, 1891), p.19

<sup>43</sup>Quoted in Johnstone, Aquatic Explorers, p.61

<sup>44</sup>For Jordan's account of Gilbert's career, see David Starr Jordan, "Charles Henry Gilbert," Science LXVII (1748) (June 29 1928): 644-645.

biology of Pacific salmon, the field was a confusion of categories. Early fish biologists judged there to be perhaps thirty-five species of salmon on the Pacific and their definitions of kinds and habits differed widely.<sup>45</sup> With a precise knowledge of ichthyology, Jordan revised understanding in the 1880s when he isolated six distinct species on the coast according to established taxonomic principles. With a greater love of the laboratory than the field, Jordan's knowledge of salmon life history was somewhat less developed, though this did not make his confusions any less influential. Basing his ideas on second-hand reports and the work of assistants, Jordan enjoyed dismantling popular theories of salmon biology: to the notion that salmon spend part of their life in the ocean far from their points of origin, Jordan replied that salmon remain near estuaries in their adult stage; to the claim that salmon spawn in their natal stream, Jordan suggested that salmon displayed no 'homing' ability; and to the idea that salmon return to the sea after spawning, Jordan said that it was not so.<sup>46</sup> It is easy to correct his confusions in retrospect (his first two points were bunk, the last correct), but at the time, his ideas were accepted as authoritative and difficult to question. Interestingly, it would be Jordan's student, Charles Gilbert who would succeed in overturning his principles of salmon life history. Of the two men, Babcock had much the closer relationship with Gilbert. Babcock and Gilbert were close in age and both hailed originally from the American mid-west. Babcock created the conditions for Gilbert to perform scientific work in BC unaffected by politics and paid for the favour. But this is to get ahead slightly, for Gilbert's revisions of Jordan's ideas and his work in BC would not occur until the 1910s and 1920s. Before that time, Babcock wove with Jordan's confused pattern.

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<sup>45</sup>On Jordan's science, see: Tim Smith, *Scaling Fisheries*, pp 28-30; Taylor, "Making Salmon," pp 127-129.

<sup>46</sup>For a clear statement of Jordan's views on the home or parent stream theory, see: David Starr Jordan, *A Guide to the Study of Fishes* Vol II (New York: Henry Holt and Company, 1905), pp 81-86. Jordan claimed in this statement that he went on record as early as the 1880s against the parent stream theory.

Added to intellectual influences was Babcock's practical know-how, the very point that made him an attractive candidate to the cannery interest in BC. The sorry history of the Sacramento fisheries leads one to doubt Babcock's wizard-like ability as was claimed at the time of his appointment, but he did hold a certain set of qualifications that affected his later work on the Fraser.<sup>47</sup> He was first and foremost abreast of the techniques of fish culture. Although not properly a scientific pursuit, this activity was well advanced in California at the time Babcock entered the field and he understood the latest principles of designing incubation boxes, fertilizing eggs, and raising fry, to name some of the necessary stages. His main experience was with Chinook salmon, the Sacramento's prime commercial species, and he held the erroneous idea, based on faith and Jordan's word that salmon from one spawning stream could be transferred to different habitats and raised successfully. Strictly speaking this may be possible, but it is very doubtful that it worked in the hatchery conditions of the late nineteenth century. The great promise Babcock propounded for hatcheries was quickly disappointed on his arrival in BC. He established a hatchery at Seton Lake for Sockeye, not knowing their different rearing habits from the Chinook and transferred eggs without success. Whereas he crowed in early BC reports of his earlier work on the Sacramento ("Nature's method has been improved upon," he wrote),<sup>48</sup> his Seton lake experiments were identified as failures.<sup>49</sup>

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<sup>47</sup>For the history of decline on the Sacramento, see: Black, "Tragic Remedies".

<sup>48</sup>Babcock, Report of the Fisheries Commissioner, 1901 (Victoria, 1902), p.824. For a number of years following his appointment, Babcock delivered lectures on the promise of hatcheries on the basis of his past experience: CSB, "Lecture on Salmon Hatcheries," Victoria Colonist, February 5, 1904; "Mr. Babcock on Salmon Culture," Daily Ledger, February 26, 1904; "Propagation of Salmon," Daily News-Advertiser February 25, 1904.

<sup>49</sup>For descriptions of the Seton lake hatchery--some of them critical--, see: CSB, "Propagating the Salmon," Province, November 4, 1905; "Fish Die in Nursery," Daily World, January 22, 1906; "Chiefs Write Letter to World," Daily World, October 12, 1906; on the failure of the Seton Lake hatchery, see: Geoff Meggs, Salmon: The Decline of the British Columbia Fishery (Vancouver: Douglas & McIntyre, 1991), p 82.



Babcock's Seton Lake hatchery would continue its experiments for decades, but he made his real mark not as a practical improver, as on the Sacramento, but as a compiler and systematizer of extant informal knowledge. In any given year, Babcock's routine included a great deal of travel around the province, initially acquainting himself with conditions, and later reporting on subtle and sometimes dramatic annual variations. From the cannery interest he collected data on the pack in Washington state and BC and compiled an authoritative statement on annual commercial yields. Commercial fishery interests judged it to be far superior to any statistical offerings of the federal department of marine and fisheries and it remains one of the most comprehensive serial sources on the history of the salmon catch.<sup>50</sup>

Babcock's more adventurous work took him upriver, past the nets into the various spawning grounds of rivers like the Fraser, Skeena and Nass. Although he did not tour every river basin in any given year, over his thirty-year career he did become familiar with some of the farthest reaches of salmon in their interior migrations. Babcock was introduced to the spawning grounds through the experience of others and learned to accept, transcribe and reconfigure ideas of locals into systematic statements of conditions. His reports are embedded with the views of people he met along the way, his guides in unknown territory. Although no supporter of native fishing rights, Babcock came to depend on native informants in certain regions, such as the Chilcotin country, to be kept abreast of seasonal patterns. He also developed the habit of tabulating run sizes on the basis of native catches, displayed on drying racks by fishing sites.<sup>51</sup> When natives were restricted in their catch, he noted that his data was lost.<sup>52</sup> Others-- ranchers, railway men, timber cruisers to name a few-- also supplied observations, some of them based on long

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<sup>50</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 2, File 2-12 Doyle to WA Found, October 20, 1921

<sup>51</sup>Babcock, Report of the Commissioner of Fisheries, 1921 (Victoria, 1922), pp 65-66. Babcock's dependence on native informants can be gleaned from every one of his annual reports.

<sup>52</sup>Ibid., p 65

years of observation of specific places. In 1905, for example, Mr. Gavin Hamilton, a resident in the Quesnel District and formerly an HBC factor kept a diary for Babcock of the progress of salmon passing a dam into Quesnel Lake.<sup>53</sup> It is impossible to know the nature of the relationships Babcock formed with informants or how exactly he 'translated' their ideas. Wilber Clemens, a companion on one of Babcock's tours in the 1930s provides only a hint at the social complexity of the fieldwork when he recalled Babcock's technique of smoothing the journey and his connection with informants with a bottle of scotch and a box of Havana cigars. On that occasion, Clemens states, the scotch was stolen from Babcock.<sup>54</sup> The bespeckled American, bottle in hand, undoubtedly cut a mixed figure of sociability and authority in the Fraser's hinterlands: here was a fisheries official who wanted to know things, but to what end? It is plausible-- and there is some limited textual evidence-- that native informants in particular found his presence suspect.<sup>55</sup> After 1907, Babcock's informants were formalized to a degree when the provincial Commission began the practice of hiring fisheries overseers in different districts around the province.<sup>56</sup> Although Babcock still depended on local views to ground his knowledge, he could now call on a staff as well. Brought to BC to restore the Fraser River, Babcock made a career out of telling the province what its people knew. Babcock's task was measurement, and his approach employed a social gauge.

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The paucity of formal knowledge about salmon biology in early twentieth century BC was matched in the case of hydrology, yet with an important variation. At the level of the state, and in the public sphere, there was little formal knowledge of river flows.

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<sup>53</sup>Quoted in Babcock, Report of the Fisheries Commissioners for BC 1905 (Victoria, 1906), pp 5-6.

<sup>54</sup>Clemens, Education and Fish, p.54

<sup>55</sup>Babcock, Report of the Commissioner of Fisheries, 1921 (Victoria, 1922), pp 65-66. Babcock acknowledged, for example, that Indian informants did not wish to discuss catches in periods when they were under federal restrictions.

<sup>56</sup>Scott and Neher, "The Evolution of Fisheries," p 12

"Speaking generally," noted the BC Yearbook of 1911, "there is no subject of economic interest in connection with the exploitation of the provincial resources concerning which there is less known than the extent to which water powers may be rendered available."<sup>57</sup> When in 1903, the Fraser's height rose and recalled memories in Vancouver of the disastrous flood of 1894, the papers did not turn to state experts for advice (there were none), but appealed instead to figures such as Captain Peele, a local authority renowned for charting the river's seasonal heights according to his own system of gauging.<sup>58</sup> Although around the turn of the century there was new state interest in urban water supplies and public health, this was a different concern from flow regimes.<sup>59</sup> On one level, the local knowledge of water was like that of salmon-- present but unsystematic and informal. However, unlike the case of salmon, there were the beginnings of a corporate formal knowledge of water in early twentieth century BC, produced to assist hydroelectric development schemes across the southern portions of the province. The knowledge produced remained local-- it referred to specific development sites rather than river systems-- but was created within the conventions of systematic survey.

Nevertheless, like Babcock's practice of blending informal reports with metropolitan theory, early surveyors created corporate water knowledge from a combination of metrological practices and extant social knowledge. When Charles A Lee, an Assistant Engineer of the British Columbia Electric Railway Company surveyed the Coquahalla River in 1911, for example, he relied on the reports of a local informant (Allan K Stuart) who had observed the changing conditions of the river but had

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<sup>57</sup>Quoted in White, Water Powers of BC, p1

<sup>58</sup>CSB, "Old Father Fraser Rising Steadily," Vancouver Ledger, June, 1903; see also the accounts of "two practical mining men" whose views of the flood threat were presented to the Provincial government, "Waters Rising in Lower Fraser," Province, June 5, 1903.

<sup>59</sup>Louis P Cain, "Water and Sanitation Services in Vancouver: An Historical Perspective," BC Studies 30 (Summer 1976): 27-43; In the early 1920s, the City of Vancouver's water observer, W Taylor took water flow estimates on the North Shore on the Capilano River as part of his regular duties: BCARS, Add MSS 2625 W Taylor, Daily Journal 1922. For an account of early surveys in the vicinity of Vancouver, see: Gabrielle Kahrer, From Speculative to Spectacular: The Seymour River Valley 1870s to 1980s: A History of Resource Use (Vancouver: greater Vancouver Regional District Parks, 1989).

never taken any formal gauge readings. "[H]e seems able," judged Lee, "to say with a considerable degree of accuracy what the flow has been during the lowest stages in the past three years." On the basis of Stuart's estimates, Lee pegged the low flow level at four hundred cubic feet per second. Lee further conducted some gauge readings-- after having established that the flow was "normal" on Stuart's advice-- and then elaborated his findings to produce annual totals. To broaden his findings he reported to his superiors about the estimated rainfall for the basin based on local informal reports and described the topography with a view to siting a dam and a power house.<sup>60</sup> Although the findings were expressed in formal terms-- according to conventional procedures of surveying topography and including figures of estimated cubic feet per second (cfs)-- this corporate knowledge was dependent on local informants like Babcock's inventorial studies. Yet unlike Babcock's surveys, Lee's was private, focused on a particular site and aimed only to establish the feasibility of development rather than develop fundamental knowledge.

The waterpower bureau and the Commission of Conservation restricted their collection of secondary knowledge to formal sources and thereby sought to avoid the speculative aspect involved in collecting local knowledge. Faced with a blank map of BC, the hydrological engineers attempted to fill it in by elaboration: previous work done by the US Geological Survey was collected to shed light on boundary rivers; information about seasonal rainfall patterns was received from the Dominion meteorological service and US Weather Bureau; Department of the Interior data as well as that from private companies became foundations upon which to build.<sup>61</sup> Although this data was readily available from government agencies in the US and Canada, the extraction of private

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<sup>60</sup>UBC Special Collections and Archives, BC Electric Railway Company Papers, Box 22, File 521, Charles A Lee, Assistant Engineer to GRG Conway, Chief Engineer, December 7, 1911; and Lee, "Report on the Power Resources of the Coquahalla River". For similar descriptions of survey research practice, see: File B1384 "Extract from a Report by Sanderson and Porter, March 31, 1908" which discusses surveys on the Cowichan River; and Box 121, File 7 James T Garden to FS Barnard, Manager of the Consolidated Mining Company, April 7, 1897 describing the Stave Falls.

<sup>61</sup>White, Water Powers of British Columbia, p 3

knowledge was complicated by the perceived conflict of interest between private development and public conservation. Michel Girard, a historian of the Commission suggests that industrial concerns did not easily supply river flow data to the Commission because of a fear that such information might be put to use in the interests of public development, or the restriction of industrial use.<sup>62</sup> Private knowledge was valuable to investors by the very fact that it was private. To allow this knowledge to be part of the public sphere meant practically sharing it with competitors. Private research contributions, it turned out, proved harder for the commission to collect than glossy corporate photographs of dams.

Whereas salmon biology referred to numbers of fish and depended on various forms of measurement, it was also fundamentally concerned with behaviour and had to depend on experimental and qualitative analyses to develop a 'picture' of the resource. In the case of water flows, the particular behaviour of rivers was not directly the issue, cubic feet per second were. Thus, instead of involving a social gauge in the manner of Babcock, state-led water research rested on a metrological foundation, involving the collection of pre-existing counts and the creation of new ones according to established principles of hydrological survey and units of measurement.<sup>63</sup> While Babcock needed to establish particular explanations about particular sites, employing a theoretical pattern developed in relation to the genus of Pacific salmon, hydrological surveyors employed a seemingly universal technique expressed in a universal idiom about a resource that was defined--for the purpose-- as just so much water passing at a given time. The cfs figure was produced by a velocity-area method and consisted of two kinds of observations-- one for depth and width, using vertical staff gauges and chains, and the other for water speed,

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<sup>62</sup>Michel F Girard, *L'Ecologisme Retrouvé: Essor et déclin de la Commission de la Conservation du Canada* (Ottawa: University of Ottawa Press, 1994), p121

<sup>63</sup>Some provincial surveys depended on local ranchers to operate water gauges in order to develop serial data on flow regimes: E Davis, "The Collection and Filing of Hydrographic Data," *Annual Report of the BC Department of Lands* 1912 (1913), p128.

employing Price electric current meters.<sup>64</sup> Combined, the results yielded a measure of discharge, expressed as quantity over time. A variable flow, in short, was crosscut, measured, turned into a mean figure and tabulated. Contextual information relating to river head (the fall of the river over distance) and topographical features rounded out the estimates. A different agenda--a concern for the potential for flooding, for example--would have required a more thorough on-site approach with recordings at high and low seasons over a period of years, but the survey's inventorial aim to suggest waterpower potential and provide a general sense of flows and amounts for water rights licensing purposes was ably fulfilled by surveys on the fly during lengthy summer seasons. Unlike Babcock who was asked to predict and explain, the water surveyors merely sought to be suggestive, albeit with a seemingly objective technique.

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Babcock's inventorial studies of salmon and the Commission of Conservation's water flow surveys represented a first stage of scientific research. This stage was marked by the problems of systematizing the objects of study for the first time and collecting data to provide general overviews of conditions. The work was overwhelmingly descriptive. Although Babcock speculated on the reasons for cycles in salmon populations, or the growth patterns of fish and their swimming speeds, he did not conduct concrete experimental work; his ideas were derivative of metropolitan influences and local experience. Over the next two decades, the foundations built by this early empirical work in fisheries science and hydrological survey would be expanded upon: analytical studies of salmon life history would be pursued by University scientists attached to the provincial Commission of Fisheries and federal researchers at the Biological Board of Canada research station. New provincial waterpower surveys would add to the Commission's

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<sup>64</sup>RG Swan, Report of the British Columbia Hydrographic Survey 1913 (Ottawa: Department of the Interior, Water Power Branch, 1915), pp 9-10

preliminary work and the inauguration of snow surveys would provide an enhanced predictive capacity.

When Babcock conducted his tours of the spawning grounds in the first decade of the century the salmon he observed and described were undifferentiated in many ways. He knew of different species, understood that salmon spawned in different places, and accepted that there was a pattern of four-year cycles in the fishery.<sup>65</sup> But he could not explain why any of this was so. He hoped merely that intensifying hatchery production and limiting over-fishing would return enough 'seed' to the spawning grounds, much like grain to a field. With the addition of hatcheries, the fluctuations in the run could be stabilized.<sup>66</sup> With time, his perspective widened, and he began to rely less on Jordan's broad pronouncements on salmon biology and more on that of his student, Charles H Gilbert. Starting in 1912 and for over a decade, Babcock employed Gilbert through the Commission on a contract basis to conduct research on BC salmon in order to establish basic features of life history. Published as an appendix to the Commission's annual reports, Gilbert's "Contributions to the Life History of Sockeye Salmon" established a new understanding of salmon that complicated the undifferentiated image and introduced new levels of variety. Gilbert's findings teased apart Babcock's weave; individual strands were shown to contain further threads and braids. The pattern was remade.

Gilbert developed a long term interest in his salmon studies in the possible differences between separate population groups of salmon of the same species and the so-called 'home -stream' theory.<sup>67</sup> The answer to the first problem served to explain the basis of the second. Employing a technique of random sampling of salmon scales,

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<sup>65</sup>Babcock, Report of the Fisheries Commissioner for British Columbia 1902 (Victoria, 1903), pp 3-4

<sup>66</sup>Babcock, Report of the Fisheries Commissioner for British Columbia 1901 (Victoria, 1902), p 823; Report of the Fisheries Commissioner for British Columbia 1903 (Victoria, 1904), p 3

<sup>67</sup>My discussion of Gilbert's contribution rests heavily on Tim Smith. Scaling Fisheries: The Science of Measuring the Effects of Fishing, 1855-1955 (Cambridge: Cambridge University Press, 1994), p 28-33. As well, see Gilbert's annual studies, "Contributions to the life history of Pacific Salmon," in the annual reports of the BC Fish Commission.

Gilbert developed a system to explain the age and spawning location of fish by counting growth rings under magnification, much as one might count the rings of a tree in cross-section. Age of maturity could be determined by the number of rings, and aspects of life history-- early habitat location and spawning grounds-- could be extrapolated from characteristic patterns in the rings from salmon of the same locations. Whereas previously the age of spawning salmon was a cause for debate, Gilbert began to determine locations of four-year runs, and their environmental contexts over their life history. These points alone held significant implications for fisheries regulation and hatchery work, but his further insight into spawning habitats and populations recast the formal understanding of the laws of motion of salmon in nature. Gilbert suggested that the popular home-stream theory, disparaged by Jordan and Babcock in turn,<sup>68</sup> held some basis in fact: salmon species, he concluded, contained various "sub-races" or "colonies" which returned to natal spawning grounds according to regular patterns of timing. "Evidence accumulates," Gilbert stated in 1921, "that the colonies bound for different tributaries enter the river in regular order and on comparatively constant dates. Year by year, relative to the other colonies, they seem to maintain their proper place in the procession."<sup>69</sup> Whereas previously salmon runs were considered simply as one aspect of a species whole, with no particular characteristics, Gilbert introduced new levels of differentiation. Although Jordan remained skeptical of Gilbert's claims, Gilbert provided the most comprehensive basis to date for understanding population swings in the fishery.<sup>70</sup> Now that age of maturity could be determined, as well as the location of spawning, the further insight that population trends were not merely variable, but related to spawning conditions four years before maturation in specific locations, could be firmly

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<sup>68</sup>Babcock, Report of the Fisheries Commissioner for British Columbia 1905 (Victoria, 1906), p 6

<sup>69</sup>Charles Gilbert, "Contributions to the Life History of Sockeye Salmon No 7," Report of the Commissioner of Fisheries, 1921 (Victoria, 1922), p.17

<sup>70</sup>Tim Smith, Scaling Fisheries, p 30



made. Although his ideas were not made the basis of policy in the short term, Gilbert's research suggested the necessity of a staggered closure period in the fishery, allowing salmon of different "sub-races" to pass unhindered at their different times of migration. Joining with Babcock he pointed to the problem of over-fishing as the single greatest threat to the continuation of the fishery. "How complicated this business is becoming," Gilbert said to Babcock in 1927, "the more we know of the habits of the little beasties."<sup>71</sup>

Federal research added its own contributions to the increasingly complicated understanding of salmon life history that Gilbert identified. Charles MacLean, the director of the Nanaimo station from 1911 to 1917, increasingly emphasized practical concerns in the station's research agenda and hired personnel with a view to the analysis of salmon fishery problems. MacLean's research testified to the importance of Gilbert's lead by focusing on the scale analysis of Coho salmon, after Gilbert's method. Over his career MacLean would become well known as a specialist in this area. In 1917 he was hired at the newly established University of British Columbia (founded in 1915) to head up the University's fledgling biology department and in so doing helped to set a precedent to be followed frequently in years to come of an exchange of personnel between the University and the Nanaimo station.<sup>72</sup>

The more marked shift towards practical scientific work occurred in the 1920s. In the late 1910s, the lack of emphasis on applied research at the Board's research stations was called to account by the department of marine and fisheries, and the Board's independence was very nearly ended. Under the chairmanship of AP Knight (1921-1925), the Board re-oriented the research agenda and encouraged closer attention to practical regulatory and developmental problems.<sup>73</sup> In BC, this new outlook provided for

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<sup>71</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 2, File 2, Gilbert to Babcock, Nov 7, 1927

<sup>72</sup>For biographical aspects, see the file list for the Charles MacLean Papers, UBC Special Collections and Archives; Box 1 on of the collection contains the notebooks for MacLean's studies of salmon and scales.

<sup>73</sup>Johnstone, *Aquatic Explorers*, pp 100-105

the establishment of a new technological station at Prince Rupert and the engagement at the Nanaimo station of a new class of researchers trained in PhD programs in Canada and the US. Wilber Clemens (PhD Cornell), the Director of the station starting in 1924 and RE Foerster (PhD University of Toronto) pursued basic research in salmon life history, like their predecessors, but connected this work more directly to practical management problems.

The new practical direction of federal research was shown most concretely in Foerster's study of hatchery returns conducted at Cultus Lake in the 1920s.<sup>74</sup> Following the collapse in Fraser salmon numbers after 1917 (see Chapter 2), it became increasingly clear that hatcheries could not maintain or restore Fraser River stocks. Babcock's early optimistic claim that hatcheries produced ninety per cent mature salmon from eggs as opposed to ten per cent under natural conditions could not be born out by the tallies of the post-1917 period.<sup>75</sup> In 1925, Babcock suggested privately to federal fisheries staff "we are groping in the darkness for lack of data... Our field of ignorance of Nature's methods is as great now as it was seventy years ago."<sup>76</sup> Questions arose in public, in the press and in government as to how to improve hatcheries and restore the fishery.<sup>77</sup> Within this discussion there was little certainty as to the actual effects of hatcheries; throughout the history of west coast fish culture, no experimental work on fish returns had occurred. In order to contribute to this debate and reassess the productivity of federal hatchery work, Foerster proposed an ambitious research program, centered on the spawning beds at

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<sup>74</sup>Other practical work in this period centered on tagging investigations conducted to assess the ocean movements of salmon.

<sup>75</sup>Babcock, Report of the Fisheries Commissioner, 1901 (Victoria, 1902), p 823

<sup>76</sup>BCARS, GR 435, BC Department of Fisheries, Box 58, File 536, Babcock to JA Motherwell, Chief Inspector of Fisheries, March 6, 1925 (copy)

<sup>77</sup>NA, RG 23, Department of Fisheries, Vol 15, File 3, WA Found. "Memo Re: Need for a Scientific Specialist to Study Salmon Hatchery Methods and the Life History of the Salmon in British Columbia," September 29, 1920; Vol 1494, File 769-6-8, "Resolutions Passed by the Biological Board of Canada Dec. 30<sup>th</sup>, 1924 Pertaining to Fish Culture"; FA Carman, "A Half Century of Waste," Montreal Daily Star, April 11, 1925; "Resolutions Passed by the Biological Board of Canada, December 30, 1924 Pertaining to Fish Culture"; "Artificial Propagation on Trial," Canadian Fisherman, January 1925; CSB, "Official Defends Fish Hatcheries," Victoria Colonist, July 31, 1920.

Cultus Lake south of Vancouver, long the site of a federal hatchery. To know how many fish left the lake as fry and returned as spawners two years later, he argued, researchers would have to count each fish.<sup>78</sup> Because a narrow stream entered the lake, it would be possible to erect counting fences to assess the number of departing two-year-old fry and returning spawners. By comparing the resulting figures with the fry release from the hatchery, it would be possible to gain a sense of the productivity of the Cultus hatchery-raised fish and the federal department's fish culture program in general. From 1922 to 1931, this work proceeded under Foerster's guidance with the support of Clemens. When Foerster reported in 1931 after several cycles of the experiment that the hatchery raised salmon returned at about the same rate as 'natural runs' (4.16 % plus or minus 0.6 %), the federal department of marine and fisheries adopted his results and closed all federal hatcheries in the province.<sup>79</sup> The speed with which Foerster's ideas gained official acceptance may have been due largely to budgetary constraints. Expenditures on Fraser River hatcheries alone from 1912 to 1931 totaled \$775,365.01; for the province as a whole, the department spent \$2,173,884.99 from 1913 to 1934.<sup>80</sup> This represented the third largest budget item of the department's expenditures in the province, only behind the Fisheries Patrol and the separate Fisheries Protective Service. Despite the financial aspect, however, it is noteworthy that the research station's science was now granted a prominent role in policymaking. Unlike the United States where fish culture remained a

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<sup>78</sup>Details of the Cultus Lake work can be found in NA, RG 23, Department of Fisheries, Vol 1495. Charles Gilbert, not one given to praising Canadian federal scientists, judged the project to be very important: BCARS GR435 BC Department of Fisheries, Box 58, File 536, Gilbert to Doyle, February 24, 1925. See also: Johnstone, *Aquatic Explorers*, p127

<sup>79</sup>Johnstone, *Aquatic Explorers*, p 127; RE Foerster, "A Comparison of the Natural and Artificial Propagation of Salmon," *Transactions of the American Fisheries Society* 61 (1931): 121-130; RE Foerster, "Comparative Studies of the Natural and Artificial Propagation of Sockeye Salmon." *Proceedings of the Fifth Pacific Science Congress Canada, 1933* V (1934): 3593-3597; RE Foerster, "An Investigation of the Relative Efficiencies of Natural and Artificial Propagation of Sockeye Salmon (*Oncorhynchus nerka*) at Cultus Lake, British Columbia," *Journal of the Fisheries Research Board of Canada* 4 (3) (December 1938): 151-161.

<sup>80</sup>BCARS GR 1378 BC Commercial Fisheries Branch, Box 1, File 4, Department of Fisheries Canada, "Cost of Fish Culture Service (Fraser River Watershed) From 1912-13 to 1930-31"; and NA RG 23 Department of Fisheries, Vol 17, File 1, "Expenditure & Revenue re Fisheries Services for British Columbia from 1913-14 to 1933-34 inclusive."

cornerstone of fisheries management, despite compelling criticism, in Canada hatcheries lost their beneficent reputation and would not reappear as an aspect of fisheries management until the 1950s.<sup>81</sup> Foerster's study provided the justification for this shift in fisheries management.

While Babcock had initiated the earliest work on salmon in the province in 1901, by the 1930s, the federal research station at Nanaimo had overtaken the provincial Department of Fisheries in terms of research ability and practical contributions. The growth of federal research occurred with the expansion of federal funding to research stations and the incorporation of University-trained scientists in the 1920s.<sup>82</sup> Although Babcock remained in his position until the mid-1930s and in an advisory role to the province until his death in 1936, his research remained largely descriptive and focused on practical problems such as river obstructions and lobbying for an international treaty to conserve Fraser sockeye. Praised as a man of science on his arrival to BC in 1901, he was remembered in the 1950s by the journalist Bruce Hutchison as a rugged, white-haired man, devoted to his practical tasks of touring the spawning beds and warning the industry of impending doom.<sup>83</sup> His successor, George Alexander, was a man with long experience in the commercial fishery, as a fisher and cannery manager but with no credentials as a scientist.<sup>84</sup> The federal researchers by contrast were looked to increasingly in the 1920s and 30s as the leading scientific experts on Pacific salmon. To complete the symbolic transformation in roles, Wilber Clemens and his wife took over Gilbert's studies of life history in different BC watersheds in 1924.<sup>85</sup>

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<sup>81</sup> Alaska's fish hatcheries were similarly closed. For a perspective on the comparative causes of closure and non-closure, see: Taylor, "Making Salmon," pp 346-350.

<sup>82</sup> This period of growth would come to an abrupt end in 1930. On the Board's depression years, see: Johnstone, *Aquatic Explorers*, Chapter 13.

<sup>83</sup> Bruce Hutchison, *The Fraser* (Toronto: Clarke, Irwin & Company, 1982 [1950]), pp 270-273

<sup>84</sup> Cicely Lyons, *Salmon Our Heritage: The Story of a Province and an Industry* (Vancouver: BC Packers, 1969), p 408

<sup>85</sup> Johnstone, *Aquatic Explorers*, p 128

The inversion of relative institutional importance in the field of fisheries research from the beginning of the century to the late 1930s, was paralleled by a similar switch in water power survey research, though with the opposite federal-provincial emphasis: the leading research of the early part of the century conducted by the water power branch and the Commission of Conservation was overtaken by new provincial efforts in the 1920's and 1930's. Although federal gauging work continued in the dominion waterpower branch after the demise of the Commission of Conservation in 1920, the province assumed the lead in surveying new waterpower sources. In contrast to the early era of hydrological surveying, provincial research turned increasingly to applied problems and away from general inventorial work. Since the appointment of the Board of Investigation in 1909, the provincial department of lands had taken on the responsibility of surveying water rights cases, but also conducted some studies of power development potential, particularly in the southern portions of the province in the vicinity of mining areas. Under the auspices of a the water resources section in 1920, this earlier activity was extended in order to provide concrete data and power estimates on rivers susceptible of development. Rather than merely establishing estimates of flow as ~~the~~ with Commission surveys, the water survey branch pursued a focused agenda of surveying ninety prime development sites between 1920 and 1924. The aim was to allow private interests to assess development possibilities.<sup>86</sup>

One of the leaders of this program was Frederick Knewstubb, a Civil Engineer and surveyor who conducted some of the most important water surveys in the interwar period. Educated at McGill University in the early years of the century, he joined the provincial water branch in 1911 as a draughtsman, advancing to the position of division engineer before leaving for war in 1916. Following his return, he became central to the

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<sup>86</sup>BCARS GR1006, Box 4, File 10, Draft History, "1920-1946", 1979, p. 1. Authorship of this history is unclear; it may be Mary Aikens and Stephanie Parker.

post-war waterpower surveys, and, despite lingering ailments from his military service, led teams of surveyors on long summer field seasons during the late 1910's and 1920's. Knewstubb, his assistants and their mule trains, marched up and down the Campbell, Quesnel, Nechako and Homathko Rivers over these years. By 1928, he attained the post of Chief Hydraulic Engineer of BC and used his new authority and a window of generous provincial funding to press forward on an extensive survey program between 1928 and 1931. Much of this work drew from Knewstubb's conviction that BC's great water development opportunities lay in interior-to-coast diversions. By damming rivers of the upper Fraser basin, he observed, and diverting their flow through the coast range, sharp vertical drops could be maximized and converted into massive hydroelectric head.<sup>87</sup>

The Homathko River project epitomized these possibilities and became the promotional jewel in the water branch crown when it came under investigation in 1928. The Homathko River was a westward flowing stream that descended from the Coastal range to the sea north of the lower mainland. It paralleled the Chilko River in some sections, had a high head and a variable seasonal flow. If only waters from the Chilko-- a Fraser tributary-- could be diverted into its main course, provincial engineers believed, it would be ripe for damming. From 1928 to 1930, teams of survey crews hacked their way along the Homathko's course, gauging flows, surveying dam and powerhouse sites and considering the problems of diversion.<sup>88</sup> Although properly systematic, the work aimed to market opportunities to the private sector, not establish baseline data. Similar surveys, though in less depth, followed on the Nechako River, at Taseko Lake and at Moran on the Fraser River. Although none of these projects attracted investors in the short term, and

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<sup>87</sup> WH Sparks, "The Early British Columbia Water Surveys of FW Knewstubb," Transactions of the Seventh British Columbia Natural Resources Conference (Victoria: BC Natural Resources Conference, 1954), pp 29-32

<sup>88</sup>For accounts of this work from the surveyors point of view, see: BCARS, Add Mss 1147, Stanley Howard Frame Papers, diaries from 1928-1934 covering survey work on the Homathko project; and RC Farrow, "The Search for Power in the British Columbia Coast," Geographical Journal CVI (3-4) (September-October 1945): 89-117.

the surveys were canceled after 1931 in the course of provincial cuts, each of these promotional surveys gained the attention of power companies in the post-war period. Fish-power controversies of the late 1940s and 1950s would find their origin in blueprints that Knewstubb and his crews penciled in the wilderness.

The promotional aspect of provincial surveying in the 1920s points to the contradictory aspects of conservation and its rhetorical aims in the interwar period. Whereas in the fisheries the decline in salmon runs suggested the necessity to understand the 'laws' of salmon reproduction and distribution in order to enhance and rebuild stocks, in the field of hydrological survey the problem was to encourage use to promote economic growth and end the 'waste' of the water resource into the sea. In one case, waste was created by a lack of knowledge of natural cycles and the proper management of the resource; in the other it was the product of underdevelopment. As in other resource sectors, such as forestry and mining, conservation's intent was not to restrict development, but merely to place it on a basis of wise use. The keyword was use: nature had to be understood, controlled and consumed. Its irregularities were to be reformed, its ailments rehabilitated.

The one area in which provincial surveyors aimed to create new fundamental knowledge of water flows was in snow surveys. Stepping back from the edge of streams and looking up the slopes of BC's mountainous ranges, the idea was to estimate the pack of snow over the winter months in order to develop reliable annual forecasts of run off.<sup>89</sup> Such forecasts could provide flood warnings and an annual prediction of base and peak flows for whatever economic interests required them. As with Babcock's spawning ground tours, the snow surveys were oriented towards predicting natural futures.

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<sup>89</sup>RC Farrow, "Snow Surveys for the Purpose of Forecasting Streamflow," Forestry Chronicle Vol XIII (1) (February 1937): 1-15; "Snow Surveys: A New Medium for Forecasting Run-Off," Engineering Institute of Canada Transactions XXI (10) (October 1938): 451-455; and "Forecasting Run-Off from Snow Surveys," The Geographical Journal C (5-6) (November-December 1942): 204-218.

Beginning in 1934, RC Farrow of the provincial water branch designed these surveys on the example of previous investigations in Nevada and Utah conducted by James E Church.<sup>90</sup> A successor to Knewstubb in the post of Chief Hydraulic Engineer, Farrow had professional survey experience in Canada and from his military service, but also drew from a strong practical background in the US where he worked for the T. Edison Company on various hydro-electric projects in the mid-1920s.<sup>91</sup> Like river gauging, snow surveys were premised on a logic of averages: specific points would be chosen in river basins-- usually ten to fifteen-- and deemed to represent 'normal' conditions. Together these points, and their elaborated results, formed a "snow course." Surveyors would attend to the sites in the spring, sample snow using special coring devices and determine water quantities in snow packs, as opposed to simply measuring depth. Combining this data with past river flow figures, Farrow and his team would create estimates based on past relationships between snow packs and river flows, taking into consideration variables such as fluctuating spring precipitation conditions (which could melt the pack more quickly) and the character of soil absorption at given sites. All of this work--described by Farrow as laborious in the extreme--sought to produce a finer-tuned model of natural shifts on an annual basis. As opposed to recorded inventorial data on flows, based only on river gauging, the snow surveys promised to provide predictions of results, not just statements of their annual effect. They also introduced an expansion-- across space and through time-- of scientific knowledge: surveyors were coming to encompass the hydrological cycle in all its phases.

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<sup>90</sup>Bernard Mergen, "Seeking Snow: James E Church and the Beginnings of Snow Science," Nevada Historical Society Quarterly 35(2) (Summer 1992): 75-104

<sup>91</sup>G Smedley Andrews, "Major Richard Charles Farrow, B.C.L.S., P.ENG., 1892-1950," The Link 13(1) (March 1989): 3-6



The institutionalization of science, the growth of knowledge and the increased authority of scientists did not preclude a robust questioning of the project of scientization. In fields such as fisheries biology and hydrological surveying, with so many interests dependent on research outcomes, creating a privileged space for authoritative statements on nature was difficult to achieve. As we have seen, some forms of authority were based on reputation (Babcock), access to external knowledge centers and science bureaucracies, as well as scientific instruments judged to be exact and impartial. Expertise was also constructed in the language and self-representation of scientists in published reports and in the frequent acceptance of such representations in the print media. What is more difficult to establish are the complex ways in which the public audiences of science interpreted this projected authority, accepted it and sometimes subverted it. In order to hint at some of the cultural boundary problems inherent in the establishment of new scientific fields, consider the case of Henry Doyle and 'the experts' to illustrate the many levels at which authority was created and questioned.

There was perhaps no member of the cannery elite in early twentieth century BC so fascinated by the promise of science, so wishing to be a part of its project and yet so frequently rebuffed as a crank by scientists as Henry Doyle. The American son of an Irish immigrant, Doyle gained experience in the cannery business as a young man in California and became one of a number of canners to enter the BC business around the turn of the century when large supplies suggested enormous growth possibilities. One of the founding partners of the BC Packers-- a firm that merged sixty per cent of the Fraser River canners in 1902--Doyle was a respected member of the commercial fishery, and remained so after he left the Packers and set up independently on the northern fishing grounds at Namu.<sup>92</sup> Over the course of his career he wrote an unpublished treatise on

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<sup>92</sup>For biographical aspects, see: Dianne Newell, ed. The Development of the Pacific Salmon-Canning Industry: A Grown Man's Game (Montreal: McGill-Queen's, 1989), pp 21-28.

salmon, as well as a number of speculative natural history essays and in retirement a history of the Pacific salmon fishery.<sup>93</sup> At different times he engaged scientists with his own views, evaluated theirs and entered public debate attacking and bolstering science, depending on the situation.

No subject animated Henry Doyle quite like fish culture. Hatcheries, he believed, held the key to restoring salmon runs on diminished rivers and expanding nature's supply by means of science's artful hand. His enthusiasm was owing to the lucrative possibilities of expanding supplies as well as a fascination with the technical challenge of improving on nature-- an attribute he shared with many amateur hatchery tinkers on the Pacific Coast in the late nineteenth and early twentieth centuries, such as RD Hume, a prominent Columbia River canner.<sup>94</sup> However, the intellectual basis of his concern was tied to his heterodox theory of salmon populations: contrary to the idea that a certain rate of fishing could be sustained, given sufficient escapements, Doyle believed that future salmon populations would register every lost spawning fish, leading ineluctably to a collapse in supply: "The Fraser in British Columbia, as well as all the various other fresh water streams of the coast will yet learn by experience that all of the losses caused by commercial fishing requirements must be offset by artificial means of replenishment. Left to itself, nature will never build up the runs to their original proportions, anymore than she will restore the dinornis, the ichthyosaurus, the dodo, or other species of animal life that have answered the inevitable call."<sup>95</sup> Added to his zealous faith in the necessity of artificial propagation, Doyle was convinced that past attempts at hatchery production had proven insufficient and at worst harmful to existing runs. Here lay his ambivalent

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<sup>93</sup>University of Washington Manuscripts and Archives, Acc 861-1, Henry Doyle Papers, "The Pacific Salmon: A History of the Fish and the Commercial Fishing Industry" 1905; UBC Special Collections and Archives, Henry Doyle, *The Rise and Decline of the Pacific Salmon Fisheries* 2 vols (unpublished MS, 1957?); UBC Special Collections and Archives, Henry Doyle Papers, Box 5, File 5-7, Doyle, "The Deep Sea Life of the Pacific Salmon".

<sup>94</sup>Taylor, "Making Salmon," p.239

<sup>95</sup>Doyle, 1905, p 29-30

attitude to science: while he wished to join the magnificent project to build hatcheries and tinker with nature's machinery, he had doubts about the direction and execution of hatchery work to date.<sup>96</sup> He thus confronted science as an avid enthusiast with criticisms based on practical experience. "[A]lthough admitting a lack of scientific training," he wrote characteristically to one US Bureau of Fisheries scientist in 1922, "I have nevertheless acquired some knowledge from the school of experience. To that school can be traced most of the notable achievements of mankind and while my case may be 'the exception which proves the rule' I think in view of the lack of results obtained in past methods of artificial propagation my conclusions may not be wholly lacking in merit."<sup>97</sup>

It was in such a vein-- bold, pugnacious and irritable-- that Doyle corresponded with most of his scientific acquaintances. His most congenial relationships were formed with technical employees, willing to trade data and ideas with his own. Doyle also seems to have maintained a civil relationship with Babcock. Apart from any personal connection between the two, Babcock was generous in supporting Doyle's hatchery crusade and also depended on the confidence of men like Doyle for his own public legitimacy. While the two men held different views on subjects such as the home stream theory (Doyle for, Babcock against), they maintained open communication about these differences, without letting disagreements turn bitter. Doyle's connections with federal scientists were slight and he was highly critical of their past work. To the Chief Inspector of Fisheries in BC, he complained in 1921 "of the bare and inaccurate statistics" produced in the Department's annual reports and judged that the research station near Nanaimo "has not added one iota to our knowledge."<sup>98</sup>

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<sup>96</sup>See Doyle's views in CSB, "Propagation of Sockeye Can Be Made Successful," Province, August 30, 1919.

<sup>97</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 2, File 2-11, Doyle to Dr HM Smith, Bureau of Fisheries, Washington, DC, January 2, 1920 (copy)

<sup>98</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 2, File 2-12, Doyle to WA Found, October 20, 1921

Other scientists, more distant from the web of interests in the BC industry, were less willing to endure Doyle's criticisms and questions with a semblance of politeness amongst colleagues. In one such instance, Doyle upbraided Charles Gilbert the distinguished Stanford zoologist when he believed he had discovered a flaw in Gilbert's theories of racial distinctions based on scale evaluation. In short, drawing on his study of fish at Namu, his consultation with native fishers and his own variety of theorizing, Doyle believed he had established that transplanted runs of salmon at Namu were reverting to the patterns of native fish. Scales, presumably, would thus not correspond to some kind of inherited traits as Gilbert argued, but would be environmentally malleable. He cited Charles Darwin to Gilbert for effect.<sup>99</sup> Gilbert was not above corresponding with canners-- they provided him with data-- but he did believe that scientists held a distinct authority over amateurs based on their methodology. Speaking to a group of Canadian and American canners in 1918, he stated that

For a number of years I have been trying to express myself to the effect that the scientific standpoint is precisely the same as the standpoint of those who are engaged in the industry. The only difference in them is that the scientific men use tools for the purpose of acquiring their information which are especially tempered for the purpose, and they may in that way, and do, perhaps, in that way obtain information which is more readily verified, for the reason that it stands on a better foundation than that which comes from those who observe but do not attempt to closely verify either their facts or their conclusions.<sup>100</sup>

Due to Gilbert's strong sense of superior knowledge, based on "tools for the purpose," he was not pleased with Doyle's challenge. "I have smiled-- rather grimly-- over your recent letter," Gilbert replied. "Such apparent waste of energy, such misdirected effort, as we have displayed these last years. Had we only consulted you in the first place concerning the complex history of the salmon, and accepted your a priori conclusions, years of futile

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<sup>99</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 2, File 2-10, Doyle to Gilbert, September 9, 1919, and November 4, 1919.

<sup>100</sup>BCARS GR 1378 BC Commercial Fisheries Branch, Box 2, File 1, "Minutes of Meeting of Canadian and Puget Sound Conference, Seattle March 21, 1918," p5

investigation would have been spared us."<sup>101</sup> Exasperated and sarcastic, Gilbert, a devotee of empirical verification found Doyle's theoretical flights of fancy disturbing and his presumptions not worthy of the slightest attention.

The example might be dismissed as one row between difficult personalities, but it is revealing of a more general problem: how amateurs and scientific experts related on the terrain of authority. Gilbert did not simply dismiss the episode as an aberrant bit of mail, but copied the correspondence in full and forwarded it to Babcock for his personal amusement.<sup>102</sup> Amongst the experts, the put-down of the amateur became a parlor game - a subtle operation in policing the boundary of insider and outsider. For his part, Doyle reacted to such condescension with characteristic pluck: he tried to clarify his position, thanked Gilbert for his time and then referred him to his own forthcoming article in the Pacific Fisherman that disputed Gilbert's criticisms of over fishing.<sup>103</sup> In keeping with the triangular relationship between the Californian, the canner and the Commissioner, Doyle also wrote to Babcock, sending a copy of his reply to Gilbert.<sup>104</sup> Doyle thus did not accept the distinction between his own knowledge and that of Gilbert based merely on authority, though it did creep into his thinking: his reply was polite, and in an act of silent sublimation he scrawled hostile, but unsent replies in the margins of much of his 'expert' correspondence.

Doyle's ideas on salmon biology never did create much of a dent in official scientific discourse. His studies at Namu were highly idiosyncratic and he had a tendency to veer off in one direction after a certain new enthusiasm: stressing the

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<sup>101</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 1, File 1-8, Gilbert to Doyle, December 18, 1919. The two had corresponded previously on the problems of scale identification: Gilbert to Doyle, November 11, 1919, and November 12, 1919.

<sup>102</sup>BCARS GR 435 BC Department of Fisheries, Box 57, File S25, Babcock to Gilbert, Nov 15, 1919 (copy) responds to Gilbert's letter to Doyle.

<sup>103</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 2, File 2-10, Doyle to Gilbert, December 9, 1919 (copy)

<sup>104</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 2, File 2-10, Doyle to Babcock, December 10, 1919 (copy)

importance of stream rearing for certain salmon species in hatcheries at one stage, and then holding up the Oregon 'pond method' at a later date and importing American experts to demonstrate its efficiencies.<sup>105</sup> The sum total of his theorizing introduces his unpublished history of the Pacific Salmon fishery, and it is a curious mixture of ideas. When Doyle tried to publish it in the early 1950s with an academic press, it was rejected everywhere, owing to his peculiar theories of salmon life history rather than his shortcomings as a historian.<sup>106</sup> With a fittingly repressed form of revenge, Doyle railed against the 'experts' in the margins of rejection letters, explaining dutifully for future historians the arbitrariness of expert as opposed to practical knowledge.

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Was nature improved upon as Babcock hoped?

Over the course of the early twentieth century a new scientific vision of nature developed in British Columbia. Salmon and water were transformed into objects of knowledge. This transformation depended upon the marshaling of new institutions, the attraction of expert personnel; it required an engagement with local ideas and a connection with metropolitan theories. Over two decades, an early descriptive period of research gave way to more extended research programs that were problem-based and ambitious. Pioneer institutions of science lost their leadership status to parallel institutions: the Biological Board succeeded the provincial fisheries commission; provincial water research surpassed federal hydrographic surveys and the Commission of Conservation.

But the improvement of nature was about more than institutions and personnel. From 1900 scientists and surveyors attempted to understand Nature's irregularities, iron

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<sup>105</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 2, File 2-12. Doyle to HS McGowan, January 2, 1920

<sup>106</sup>For correspondence on publication, see: UBC Special Collections and Archives, Henry Doyle Papers, Box 1, File 1-14.

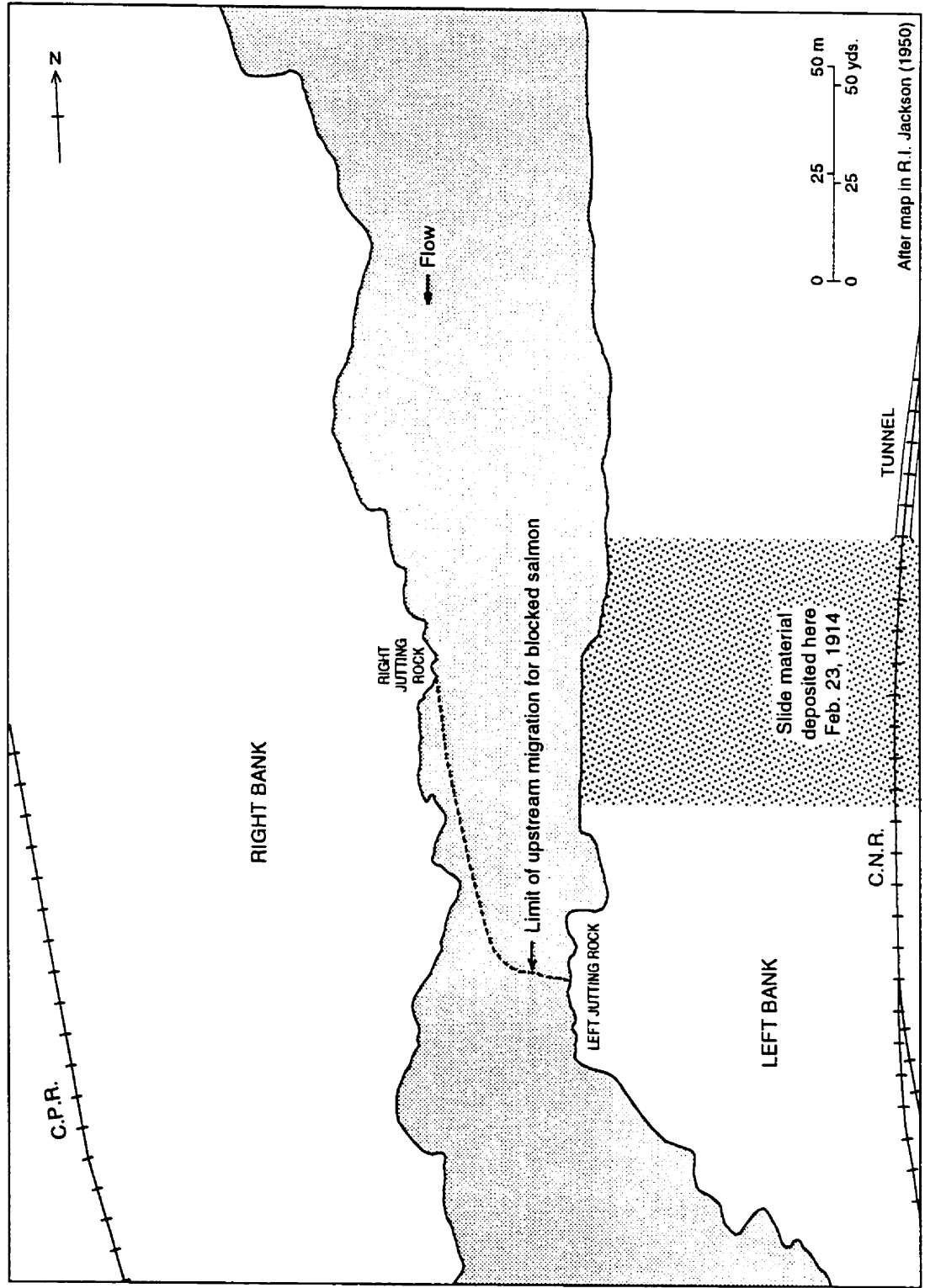
out its faults and explain why, unlike a factory, Nature did not produce commodities on time and in shape. The hatchery crusade, more than any other case, demonstrates the desire to transcend Nature's limits. The failure to do so suggests the hubris of the scientific impulse-- among the new class of state scientists and the canners as well.

But then science was supposed to fulfill so many goals, protect and promote so many interests, that to speak of any unified scientific program is to obscure the diversity of science-- in conception and practice, as social ideal and as messy regulatory reality. Henry Doyle and Charles Gilbert had different ideas about the meaning and purpose of science, just as George William Taylor, Frederick Knewstubb and John Pease Babcock approached their tasks from utterly different backgrounds. The contrasting histories of hydrological survey and salmon science underline the point further: science was practiced using widely different techniques, some relying on metrological foundations others on a mixture of observation and a translation of local ideas.

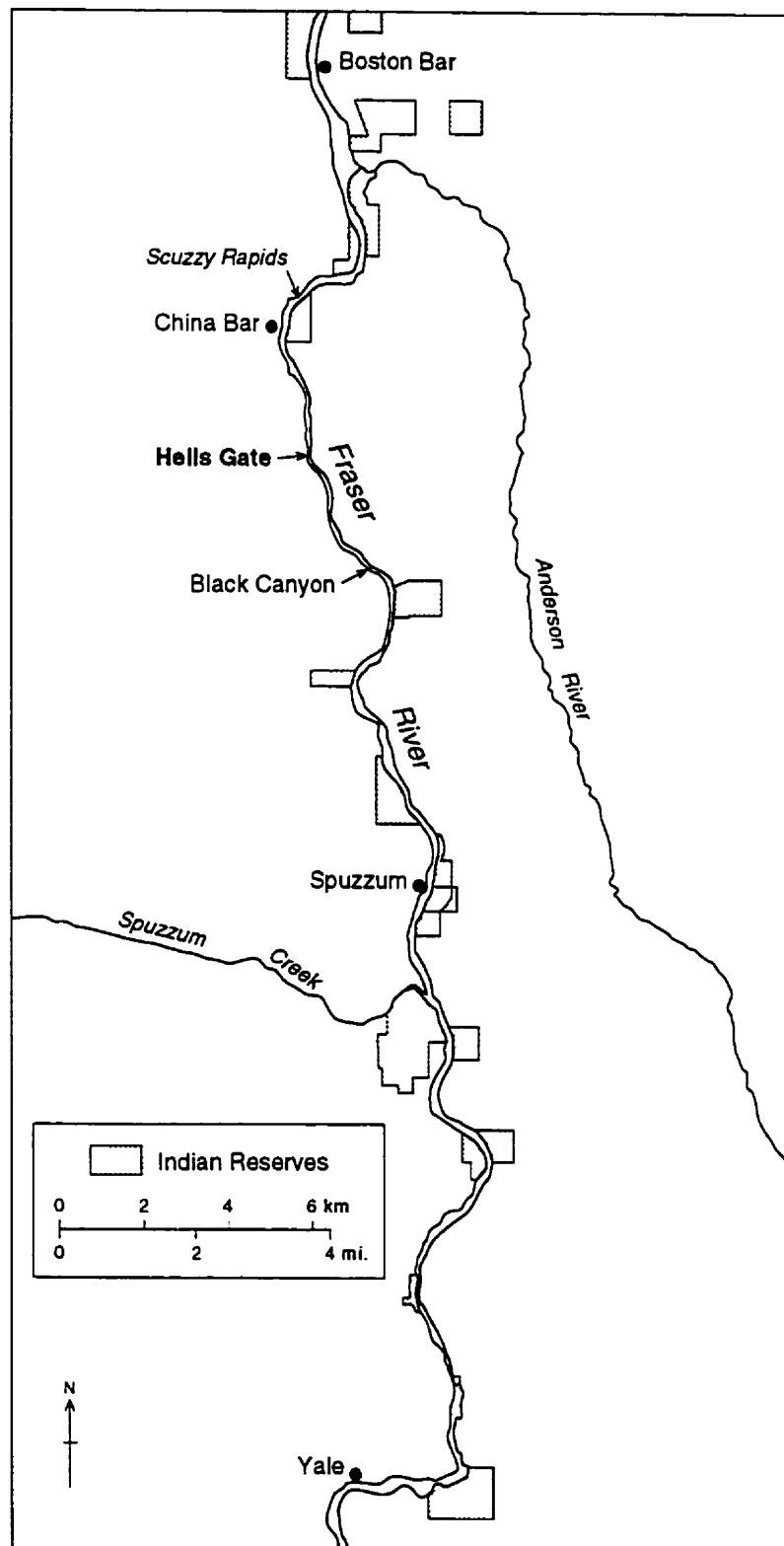
The nature of British Columbia was nevertheless re-drawn. Its makers had insinuated science in all of its diversity into the economic and political discourses of the day. By the mid-1930s it was inconceivable for a hydroelectric project to be sited without first receiving authoritative state measurements of water flows. And it was impossible to set fisheries regulations without appeal to scientific ideas about salmon life history. In the next chapter the analysis turns to consider what happened to these new scientific ideas when an episode of environmental destruction forced scientists into prominent positions of environmental and social regulation. Having demonstrated how society can impact science, in the next chapter we will examine, in part, how society and environment can impact science.

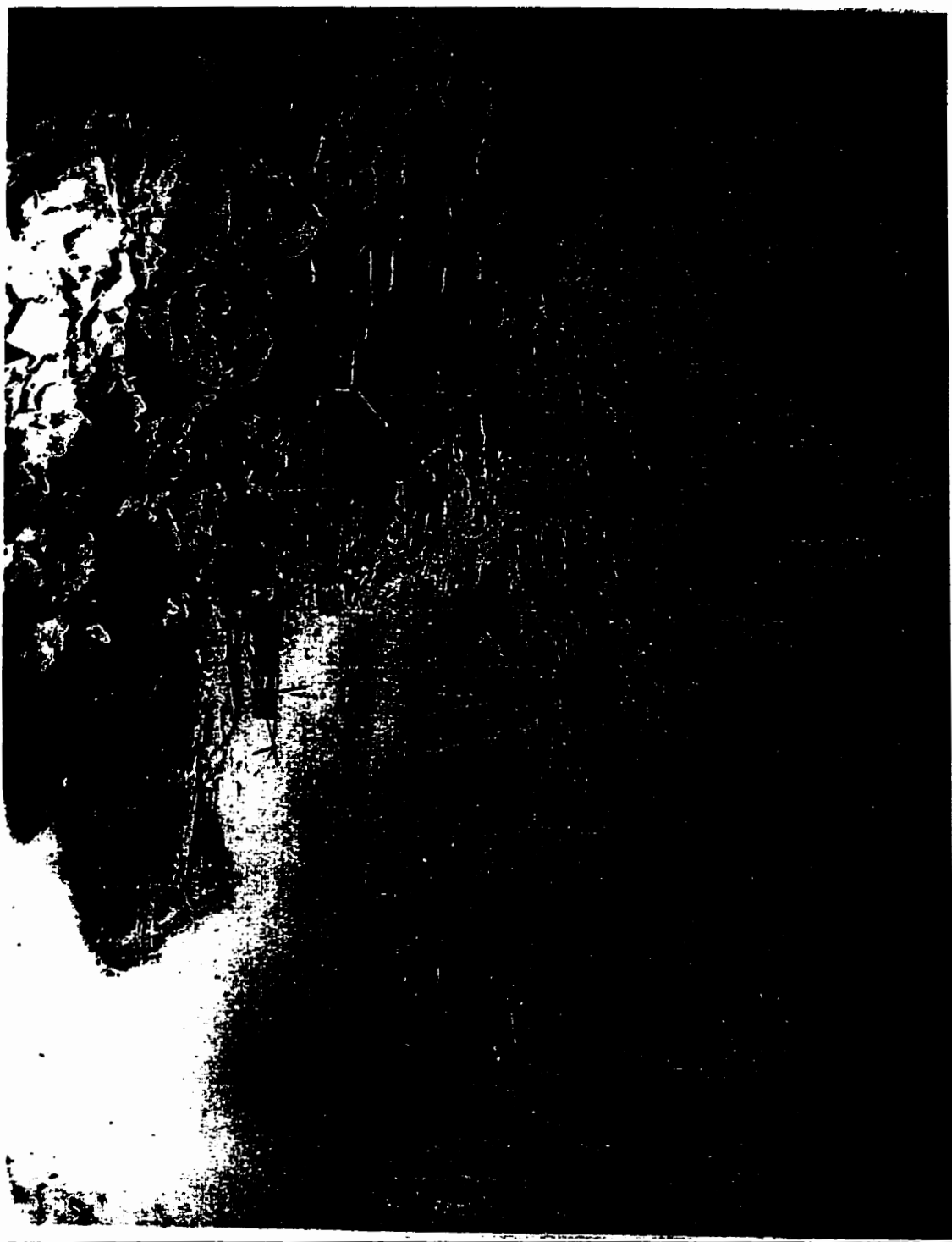
**Chapter 2:****Land *Sliding* at Hells Gate**





Map 2: Hells Gate and the slides





Photograph #1: Hell's Gate c. 1867. "Hell's Gate Canyon or the Great Canyon, 23 miles above Yale." Photo taken by Frederick Dally (1838-1914). BCARS # A-03874



Photograph #2:

"Rockslide, Fraser  
River at Hell's Gate,"  
March 2, 1914.  
Photographer  
undetermined. BCARS  
# A- 04680

In the summer of 1913, migrating salmon encountered barriers to their passage in the Fraser Canyon. A series of landslides had changed the river's course, filled pools and eddies and created impassable falls. At the river's narrowest point, in a gorge named Hells Gate, the slides had exacted the worst damage.<sup>1</sup> The gate had turned into a dam. Observers reported scenes of milling throngs of sockeye, backed up for ten miles. It was," said John Pease Babcock, BC's Assistant Commissioner of Fisheries, "a wonderful sight."<sup>2</sup> From 1911 to 1913, railway construction crews had triggered these slides while laying track on the river's east bank. For two years following, government construction crews attempted to remove the debris. At Hells Gate, the slope continued to slide.

The Hells Gate slides contributed to the precipitous decline of salmon runs in the Fraser basin after 1913. By delaying the passage of salmon, and at times, blocking them, the gate became a population leveler. The first 'big year' cycle affected by the slides in 1917 registered a drop to one-fifth the catch in 1913; four years later, the catch fell to one-thirtieth the 1913 level.<sup>3</sup> In combination with fishing pressure, habitat destruction and changing oceanic conditions, the slides decimated the Fraser fishery.<sup>4</sup> In 1921, John Pease Babcock declared, "the Fraser is fished out of sockeye. The big run has been destroyed."<sup>5</sup>

The remaking of the Hells Gate site impacted the social relations of the Fraser fisheries. Regulators imposed new restrictions on native fishing in the canyon and beyond. Declining stocks undercut the supplies of the commercial fishery in the US and

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<sup>1</sup>I have followed the BC gazetteer's spelling of Hells Gate, despite the widespread use of an apostrophe— as in Hell's Gate. The original spelling distinguishes Hells Gate from Hell's Canyon.

<sup>2</sup> John Pease Babcock, "Conditions Above the Fishing Limits," Report of the BC Commissioner of Fisheries 1913 (1914): 22

<sup>3</sup> George A. Rounsfall and George B. Kelez, "The Salmon and Salmon Fisheries of Swiftsure Bank, Puget Sound, and the Fraser River," Bulletin No 27, Bulletin of the Bureau of Fisheries Vol XLIX (Washington DC: US Department of Commerce, 1938), p 762

<sup>4</sup> For a nuanced discussion of the many aspects of fisheries depletion, see: Joseph E Taylor III, Making Salmon: An Environmental History of the Northwest Fisheries Crisis (Seattle: University of Washington Press, 1999), chapter 2 "Historicizing Overfishing," pp 39-67

<sup>5</sup>BC, Annual Report of the Commissioner of Fisheries for 1921 (Victoria, 1922), p 6

Canada. Fisheries officials and scientists experienced new challenges to their authority as experts capable of restoring a broken nature. The landslides had cascading political and economic effects linked to the physical and the biological events.

Historians tend to describe and analyze this environmental episode as a tale of fortuitous destruction with clear causes, consequences and social meanings.<sup>6</sup> Biologists have been more circumspect about their judgments of the natural effects.<sup>7</sup> Tourism promoters and popular historians have created a Hells Gate mythology.<sup>8</sup> Few have tried to examine how contemporaries viewed the event or constructed meanings around it. A retrospective certainty has erased the record of questions and doubts.

Yet, if we are to understand the impact of the slides, it is important to consider what WH New calls "land *sliding*," as well as land slides.<sup>9</sup> In a brilliant reading of languages of the land in Canadian letters, New analyzes the disparate functions of land-based metaphors in articulating relationships of social power. The land "slides" in our language, he argues; shifting visions make new social landscapes. Complementing an emerging body of literature in environmental historiography that examines the social meanings of environmental change as well as environmental and economic ramifications, New's approach provides a suggestive starting point. How did the land slide in perception as well as fact?

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<sup>6</sup>See as examples: Cicely Lyons, Salmon Our Heritage: The Story of a Province and an Industry (Vancouver: BC Packers, 1969); Geoff Meggs, Salmon: The Decline of the British Columbia Fishery (Vancouver: Douglas & McIntyre, 1991).

<sup>7</sup>The key analysis was published in 1945 by WF Thompson and will be treated in a later chapter: WF Thompson, Effect of the Obstruction at Hells Gate on the sockeye salmon of the Fraser River (International Pacific Salmon Fisheries Commission Bulletin I, 1945); see also, John F Roos, Restoring Fraser River Salmon: A History of the International Pacific Salmon Fisheries Commission, 1937-1985 (Vancouver: Pacific Salmon Commission, 1991), and Derek Ellis, "Construction-- Hell's Gate (Canada)," in his Environments at Risk: Case Histories of Impact Assessment (Berlin: Springer-Verlag, 1989), pp.17-36; ES Pretious, "Salmon Catastrophe at Hell's Gate," BC Professional Engineer (February 1976).

<sup>8</sup><http://www.hellsgate.bc.ca/history2.htm>; Derek Pethic, British Columbia Disasters (Langley, BC: Stagecoach Publishing Co., 1978), pp 161-172; Bruce Hutchison, The Fraser (Toronto: Holt Rinehart, 1950). For an amusing reflection on the conversion of the site into a tourism attraction, see: Mac Parry, "The Legitimization of Hell's Gate," Affairs 2(24) (July-August 1972): 24-29.

<sup>9</sup>WH New, Land Sliding: Imagining Space, Presence, and Power in Canadian Writing (Toronto: University of Toronto Press, 1997)

This reading of the event thus seeks to reflect upon the social construction of the slides in the historical record, as well as analyze their ecological, economic and political consequences. After opening with a reconstruction of Hells Gate's long term natural and cultural history, the chapter considers the different vantage points of the salmon's many claimants: it seeks to view the slides from the perspective of the fisheries officials who observed and wrote about them; it establishes contexts for interpreting the perspectives and interventions of native peoples and commercial canners; it demonstrates the continuing confusion about the slides' impacts by examining the scientific studies of the canyon in the 1920s. Different perspectives do not produce a composite image, however; they serve rather to underline how ideas and perceptions of this event slid between different groups and within them.

The Hells Gate slides were important in their own right, but they also held consequences for later river politics. The event was never forgotten. The havoc created by an earth dam modeled the potential dangers of power dams. In the 1940s, scientists with the International Pacific Salmon Fisheries Commission again studied the site and sought to reconstruct it physically. At the same time, water developers considered the location for dam development. As different interests sought to gain control of Hells Gate, the weight of past experience affected debate about future development. The land stopped sliding, but perceptions of its meaning did not.

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Hells Gate consists of two large granodiorite walls. They narrow the river, raise its velocity and make upstream salmon passage difficult. This has occurred for thousands of years.<sup>10</sup>

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<sup>10</sup>J Lewis Robinson, "Fraser River," and "Fraser River Canyon," in Canadian Encyclopedia 2nd ed (Edmonton: Hurtig Publishers, 1988), p 841; Michael Church, "A River in Time: The Natural History of the Fraser River," Vancouver Institute Lecture, February 28, 1998; TG Northcote and PA Larkin, "The Fraser River: A Major Salmonine Production System," in DP Dodge, ed. Proceedings of the International

Located in the Fraser Canyon, Hells Gate is 260 kilometers from the river's mouth. It was created during the Miocene (23.7-5.3 million years ago), when the river carved deep into the Interior plateau in its search for a route to the sea between the coast and interior mountains. At Hells Gate, the canyon's walls rise 1000 m above the river. The slopes are sheer and imposing. Between the winter low and summer high, flows rise and fall in the gate as much as thirty-five meters. The river at this place is a variable element, recording with its movements the shifts of climate and flow.

Salmon began to pass Hells Gate after the last de-glaciation, colonizing the basin from four to six thousand years ago.<sup>11</sup> Long tongues of ice formed wedges and dams in the upper basin, creating large interior reservoirs and lakes. As these tongues melted and disappeared, the upper basin opened to salmon; the lakes became spawning habitat. As with other falls and rough sections on the river, salmon encountered difficulty at Hells Gate; while passing, they hugged its margins and rested in back eddies.

Ever since the retreat of the last ice sheets, native peoples have lived with the river and the canyon.<sup>12</sup> Archaeologists find evidence in the southern interior of nomadic occupation by deer and elk hunters around 7000 years ago, and then note a transition to cultural groups that bear markings of coastal influences (the Pebble Tool Tradition) over the next two thousand years. These human migrations into the interior followed on those of salmon. Around 4000 years ago, winter pit houses began to appear on the Fraser, as they did on the upper Columbia, marking increased cultural complexity built on an elaborated salmon economy. Isotopic studies of human skeletal remains in the interior

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Large River Symposium Canadian Special Publication of Fisheries and Aquatic Sciences 106 (1989): 172-204; WH Mathews, "From Glaciers to the Present," in The Fraser's History (Burnaby: Burnaby Historical Society, 1977), pp 9-18.

<sup>11</sup> C Groot and L Margolis, eds. Pacific Salmon Life Histories (Vancouver, UBC Press, 1991); and JD McPhail, "The Origin and Speciation of *Oncorhynchus* Revisited," in Deanna J Stouder, Peter A Bisson and Robert J Naiman, eds. Pacific Salmon and Their Ecosystems: Status and Future Options (New York: Chapman and Hall and ITP, 1997), pp.29-38.

<sup>12</sup>This summary of prehistory draws on Roy L Carlson, "The Later Prehistory of British Columbia," in Roy L Carlson and Luke Dalla Bona, eds. Early Human Occupation in British Columbia (Vancouver: University of British Columbia Press, 1996), pp 225-226.



suggest that groups with access to the fishery obtained from half to two-thirds of their dietary protein from salmon over the past two thousand years.<sup>13</sup> Salmon was by no means the only basis of early human occupation of the canyon and Interior-- hunting and gathering were important as well-- but it was an essential staff of life.

Hells Gate was one of the many fishing stations that dotted the canyon in the pre- and post-contact period. The earliest photographs of Hells Gate show the wooden drying racks of the Nlaka'pamux (Thompson Indians), bearing loads of salmon.<sup>14</sup> This station, like other prized fishing places, afforded excellent opportunities to catch fish hugging the river's edge in their attempts to escape rough water. It also offered fish that had lost part of their fat content and could be preserved well for winter storage. Standing on wooden platforms that hung by rope from rocks and cliffs, fishers employed long dip nets that cinched their catch to a close. These stations belonged to kin groups and were inherited through the male line.<sup>15</sup> In the late nineteenth and early twentieth century Salishan groups moved up the river to fish in the lower canyon, while Nlaka'pamux from the canyon, the Nicola valley, and as one report from an Indian Agent in the 1920s makes clear, from as far away as Kamloops and Williams Lake, fished around Hells Gate and throughout the canyon and as far north as the Bridge River rapids.<sup>16</sup>

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<sup>13</sup> NC Lovell, BS Chisholm, DE Nelson, HP Shwarz, "Prehistoric Salmon Consumption in Interior British Columbia," Canadian Journal of Archaeology 10 (1986): 99-106

<sup>14</sup> BCARS, Photo # A-05620 "Indian Fishing Place, Hell's Gate River" (189-) Photographer undetermined; #A-03874, Hell's Gate c. 1867. "Hell's Gate Canyon or the Great Canyon, 23 miles above Yale." Photo taken by Frederick Dally (1838-1914).

<sup>15</sup> James Alexander Teit, The Thompson Indians of British Columbia The Jesup North Pacific Expedition Vol 2 pt 4 American Museum of Natural History Memoir 2 (New York: Knickerbocker Press, pp 249-250, 293-294; Andrea Laforet and Annie York, Spuzzum: Fraser Canyon Histories, 1808-1939 (Vancouver: UBC Press, 1998), pp 60, 69. David Waytt, "The Thompson," Deward E Walker jr ed. Handbook of North American Indians Vol 12 Plateau (Washington DC: Smithsonian, 1998). For a close study of the related fishing practices of Lillooet Indians, see: Steven Romanoff, "Fraser Lillooet Salmon Fishing," in Bryan Hayden ed. A Complex Culture of the British Columbia Plateau: Traditional St'l'at'imx Resource Use (Vancouver: UBC Press, 1992), pp.222-265; see also Michael Kew's excellent overview of the cultural implications of the resource in the same collection, "Salmon Availability, Technology, and Cultural Adaptation in the Fraser River Watershed," pp 177-221

<sup>16</sup> NAC, RG 23, Vol 679, File 713-2-2[8] H Graham Indian Agent, Lytton BC to Duncan Campbell Scott, Deputy Superintendent General of Indian Affairs, November, 7, 1925; Cole Harris, "The Fraser Canyon Encountered," in The Resettlement of British Columbia: Essays on Colonialism and Geographical Change (Vancouver: UBC Press, 1997), p 108; Laforet and York, Spuzzum, p 137.

According to the Nlaka'pamux origin tale of salmon, the transformer and trickster figure Coyote made Hells Gate and the canyon.<sup>17</sup> Recorded by ethnologist James Teit at the turn of the century, this story finds close parallels in the traditions of various culture groups of the Fraser and Columbia plateau regions.<sup>18</sup> In earlier times, the story goes, peoples who lived at the mouths of the Fraser and Columbia Rivers constructed dams and kept salmon as their prisoners. In those days, the people of the interior did not fish. Coyote decided to change this. He disguised himself as a piece of wood and drifted down the river. When he reached the river's mouth, he guided the salmon around the dams and led them to tributaries and lakes in the interior. Later he did the same on the Columbia River. Finishing his work, Coyote declared "henceforth salmon should ascend into the interior each year..."<sup>19</sup> With the remains of the broken dams, he forged rocks and made canyons on the Fraser and Columbia. Hells Gate was part of Coyote's work.

This gorge impressed the first Europeans to encounter it, not for the excellent fishing it afforded, but for the perils it created for travel. Hells Gate enters the European historical record with the account of Simon Fraser, on his journey to the Pacific in 1808. Passing down the canyon, Fraser was disturbed by the roughness of the water and decided to walk this portion of his journey. "I have been for a long period among the Rocky Mountains," he wrote, "but have never seen any thing equal to this country, for I cannot find words to describe our situation at times. We had to pass where no human being should venture. Yet in those places there is regular footpath impressed, or rather

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<sup>17</sup>"Coyote and the Introduction of Salmon," in James A Teit, The Mythology of the Thompson Indians Memoir of the American Museum of Natural History, New York, Vol VIII (New York: GE Stechert, 1912), pp.301-304.

<sup>18</sup>Laforet and York, Spuzzum, p 37. Laforet mentions that most of the work for Teit's mythology was conducted in 1898. On other tellings of the Coyote story, see Joseph E Taylor III, Making Salmon: An Environmental History of the Northwest Fisheries Crisis (Seattle: University of Washington Press, 1999), p 29; and Dorothy ID Kennedy and Randy Bouchard, "Stl'at'imx (Fraser River Lillooet) Fishing," in Hayden ed., A Complex Culture... pp 275-278. On James Teit's career and political activities, see Peter Campbell, "'Not as a White Man, Not as a Sojourner' James A Teit and the Fight for Native Rights in British Columbia, 1884-1922," left history 2(2) (Fall 1994): 37-57; Wendy Wickwire, "'We Shall Drink from the Stream and So Shall You': James A Teit and Native Resistance in British Columbia, 1908-1922," Canadian Historical Review 79(2) (June 1998): 119-236

<sup>19</sup>Ibid, p.303.

indented, by frequent traveling upon the very rocks.”<sup>20</sup> In 1859, Commander RC Mayne described his travels past Hells Gate, confessing that the territory “makes one’s nerves twitch a little at first.”<sup>21</sup> Like Fraser, Mayne depended on Native paths and rope bridges through the rough sections of the canyon. In the 1820s, Hudson's Bay Company (HBC) traders estimated the population of the canyon at around 7,500 people between Yale and just south of Boston Bar, a thirty-five kilometer distance. It is likely that this population was in a period of demographic rebound after the devastation of small pox epidemics, originating on the coast in 1782.<sup>22</sup> Over the next century, Europeans would follow Fraser and treat the canyon and Hells Gate as a point of passage, a corridor en route to the Pacific or the interior.

For the most part, the canyon route passed by, but not through Hells Gate. Water transportation, as Fraser had discovered, was virtually impossible. In 1882, the HBC sent a steamer named "The Scuzzy" through Hells Gate, and it required the force of one hundred fifty Chinese immigrant labourers, straining on the canyon walls, to pull the boat through. The feat would never be attempted again.<sup>23</sup> During the 1858 Gold Rush to the upper Fraser Basin, native and fur trade routes were transformed into a passage for miners; later the Royal Engineers turned it into the Cariboo Road. Alongside this route, across the river, the Canadian Pacific Railway marched past the gate in the 1880s, connecting the canyon with the coast and transcontinental markets. Now, not only the river carried a freight of salmon, but also railroad cars hauled stacks of chopped salmon in cans to eastern markets. With each progressive connection, space and time

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<sup>20</sup>W Kaye Lamb, ed. The Letters and Journals of Simon Fraser 1806-1808 (Toronto: Macmillan, 1960), p.96.

<sup>21</sup> Quoted in Ibid.

<sup>22</sup>Cole Harris, "The Fraser Canyon Encountered," in The Resettlement, pp.105-107; Wilson Duff offers a population figure for all Interior Salish (Thompson, Lillooet and Shuswap) at 13,500 (1835), 5,800 (1885) and 5,348 (1890). 1890 stands as the lowest point of Interior Salish population levels: Wilson Duff, The Indian History of British Columbia: The Impact of the White Man (Victoria: Royal BC Museum, Memoir No 5, 1969), p.39.

<sup>23</sup>ES Pretious, "Salmon Catastrophe at Hell's Gate," p.17

compressed, making the friction of distance less intense and introducing new agents of change to the canyon and its peoples: land surveyors, missionaries, miners and settlers. The infrastructure of white Canadian society, and waves of American, European and Asian immigrants transformed this place and its connections with the world.<sup>24</sup>

In 1911-1912, the Canadian National Railway, the second transcontinental, cut the canyon's walls. The Railway's financial difficulties at this date, Ted Regehr explains, led to "hurried construction" and a lack of "due caution" by the contracting firm, the Northern Construction Company.<sup>25</sup> Crews cleared their path with dynamite and left the carved rock and debris to fall down the bank and into the river. At Scuzzy Rapids, at China Bar and especially at Hells Gate, the land began to slide. Here the railroad not only transformed relationships of time and space, but also consumed its physical surroundings. With a cruel irony, Coyote's legacy was filled with rocks and earth. The dams he broke were remade.

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The effects of the slides on salmon migration came into view in the summer of 1913. During the 'big year' of sockeye migrations, the slides acted as an enormous dam blocking passage. The evidence at first was confusing.

In early August, John Pease Babcock, BC's Assistant Commissioner of Fisheries, approached the canyon during his annual tour of the spawning grounds. Advance reports suggested trouble ahead; obstructions were apparently blocking fish.<sup>26</sup> Babcock rushed to the scene. At Hells Gate he stood on the cliffs above the river and observed numerous fish, milling in eddies below the passage. He could also see some salmon swimming through. But water levels were high, the river a muddy brown. Activity beneath the

<sup>24</sup>On all of these themes, see: Cole Harris, "The Fraser Canyon Encountered," in The Resettlement, pp.103-136.

<sup>25</sup>TD Regehr, The Canadian Northern Railway: Pioneer Road of the Northern Prairies, 1895-1918 (Toronto: Macmillan, 1976), pp.391-392.

<sup>26</sup>My account of Babcock's journey to the canyon is based on: John Pease Babcock, "Conditions Above the Fishing Limits," in Report of the BC Commissioner of Fisheries 1913 (1914): 20-38.

water surface was difficult to see. Moving about the canyon, Babcock spoke to natives who claimed that they had caught few fish above Hells Gate since mid-July. At Seton Lake, where Babcock had established a fish hatchery a decade before, only a thousand fish had yet returned. This was well below expectations. He wondered hopefully whether fish were passing below the surface, beyond his obscured view. Four days later, accompanied by Stanford zoologist, Charles H. Gilbert, Babcock walked the banks of the river through the canyon. Above Hells Gate, every eddy before the Scuzzy Rapids was filled with a "milling mass of sockeye." Not many fish seemed to be passing Scuzzy Rapids, perhaps some pinks and a few sockeye. Returning south they found a now familiar sight at Hells Gate: "Vast numbers were seen approaching the Gate on both sides of the channel. They filled every inch of space where they could make headway against the stream, and even in the most rapid parts of the channel fish were seen struggling to advance."<sup>27</sup>

The next day Babcock began to talk with local residents to see what light they could shed on the matter. William Urquhart, a track watchman with the CPR, living in Spuzzum, said that there were more fish in the canyon than he had seen in twenty years. James Paul, Chief of the Spuzzum Band, said that salmon always massed in great numbers in August and September of the big run years. But he too could not recall a year with so many fish, except a time "many years ago." Henry James, a native of the canyon (described by Babcock as "another intelligent Indian") said, "all the old Indians remember only one other year, many many years ago, when the salmon had been so thick as this year." Edward Farr, a CPR masonry inspector, said that it was true that salmon massed in the canyon in a big year, but that the CNR's construction had thrown rocks above and below Hells Gate, filling resting bays for salmon and changing the current. Other CPR

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<sup>27</sup>Ibid, p 22

employees, D. Creighton and Thomas Flann recognized that there was a hold-up, but "believed that all would pass through in time."<sup>28</sup>

But would they? Babcock went north to investigate. Initial reports from the Chilcotin and Quesnel Rivers suggested good returns as in previous big years. But the arrival of fish in mid- and late August at these points was followed by mysterious weeks of no fish. James Moore, a BC Department of Fisheries watchman at the Quesnel dam, reported spotty results. Weeks of healthy returns were followed by weeks of low returns. Native peoples fishing on the Chilcotin similarly found fish for a time, but then reported that the returns had fallen off in early September. The patterns, if there were patterns, did not make sense. In a big year escapements to the upper basin should have been uniformly high. Babcock surmised that there must be serious problems in the canyon. He abandoned any further investigations in the upper basin and returned to Hells Gate on September 18.

What had changed? Water had dropped by about fifteen feet, but the picture of salmon milling in eddies remained. With the water lower, the full extent of the rock debris was becoming more visible, and, it appeared, more difficult for fish to surmount. Babcock abandoned his earlier hope of sub-surface passage. He began to formulate emergency restoration plans. Rock would have to be cleared at Scuzzy Rapids and at Hells Gate, and quickly. Babcock did not yet realize that problems existed at China Bar and White's Creek, as well. As the water dropped, these problems would rear up visibly against the flow. But for now he decided explosives were the thing: clear the debris with some well placed dynamite at the two worst points and hope for an easier passage. To this point working independently of any federal officials, Babcock passed on word to Victoria of the problems and the Department of Marine and Fisheries in Ottawa was contacted for support. By September 28, a degree of passage was opened, and the matter

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<sup>28</sup>Ibid, pp 23-24

seemed in hand. Work ceased and officials of the federal and provincial governments departed. Babcock returned on October 10, only to find that the water level had dropped and the former artificial channels lay dry. Blaming the problem on a native employee he had left in charge of the site, Babcock made pains to disassociate himself from the difficulty in a subsequent report. The situation was as bad as it had been at any point in the season. Babcock secured men from the CPR, wired for help, and then set clearance activities in motion again. Later in the month one federal official would write to his superiors of their labours at "that hated place Hells Gate."<sup>29</sup>

To this point, the clearing of the obstructions had been haphazard, and the effects of the rockslides unclear. Now, with a sense of urgency and official support, clearing of the rock debris began in earnest. For two months, GP Napier of the Provincial Public Works Department oversaw operations, but was replaced in December by JH McHugh an engineer of the federal department of marine and fisheries.<sup>30</sup> Work began at Hells Gate and Scuzzy Rapids and entailed the planting of sticks of dynamite (usually forty at a time) in wedges between the boulders. As the rocks blew apart, masses of rotting flesh and fish bones flew into the air. Some provincial fisheries staff collected exhausted fish below the blockade, slit them open and took their spawn to provincial hatcheries.<sup>31</sup> Crews were sent into the woods to hew timber to produce towers on either side of the river to support a crossing of cables, carrying a shovel to dig out the mess from above. Through the winter, progress seemed steady. The water had dropped. Conditions were

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<sup>29</sup>NAC, Pacific Region Office, RG 23, Vol 2307, File 1-11, H Walter Doak to AP Halliday, Assistant Inspector of Fisheries, Oct 22, 1913

<sup>30</sup>Napier wrote a short account of the clearing conditions: GP Napier, "Report on the Obstructed Conditions of the Fraser River at Scuzzy Rapids, China Bar, Hell's Gate, and White's Creek," Report of the BC Commissioner of Fisheries 1914 (1915): 39-42. McHugh's detailed discussion of the clearing activities is contained in: JH McHugh, "Report on the Work of Removal of Obstructions to the Ascent of Salmon on the Fraser River at Hell's Gate, Skuzzy [sic] Rapids, China Bar and White's Creek during the Year 1914, and the early portion of the year 1915," in Annual Report, Fisheries Branch, Department of Naval Service 1914-15 (1915): 263-275.

<sup>31</sup>UBC Special Collections and Archives, International Pacific Salmon Fisheries Commission Papers, Cannery Scrapbooks (hereafter CSB), "Clear Blockade in River Canyon," Province January 23, 1914

easier, if colder. Sometimes up to ninety men dug, cleared, and passed the rock above the river and across the channel.

And then all the work was destroyed. On February 10, 1914, local CPR workers felt a steady shower of small rocks during the day; that night, around 10 pm, a huge section of the cliff, and a fifty-foot section of the CNR railway bed fell into the passage at Hells Gate. Railway ties lay by the water's edge "twisted into all shapes."<sup>32</sup> The river was again remade.

When McHugh assessed the damage the next day, he tried to gain a sense of the width of Hells Gate under the press of the new material. He tossed a rock across the passage, attached to a line and measured it at around seventy-five feet. Fifteen of those feet were consumed by barely covered debris underwater. Before the slides, it is estimated that the passage measured one hundred ten feet in width. The velocity of the current passing the gate was now intense; McHugh and his assistants lost their gauges when trying to measure it. The slides had "practically formed a dam," wrote the federal chief inspector FH Cunningham. And the problems, he continued, were new: "[T]hese rocks will change the currents, and will, of course, obliterate the eddies which existed, and which assisted these fish in their ascent of the river. In fact, one might say that the whole character of the river at this point is changed, and this slide has created an entirely new problem for consideration."<sup>33</sup>

Standing on top of the ruins of the railroad, examining the scene, McHugh understood well enough the difficulties ahead, particularly in view of the fact that the salmon migrations would be upon them again by July. After the CNR's reluctant response to the federal department's demands for assistance, the Pacific Coast Dredging Company was engaged to assist McHugh at cost plus ten per cent profit. What had worked before

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<sup>32</sup>NAC, Pacific Region Office, RG 23, 2311, File 5-2 Cunningham to WA Found, Superintendent of Fisheries, February 18, 1914

<sup>33</sup>Ibid.



was tried again. Explosives were employed, the shovel was used, and as material loosened underwater, the force of the current carried material away. Similar methods were used at Scuzzy Rapids. By March the water level began a steady creep up the gate's wall, one foot a day, in McHugh's estimation. Ninety men cleared and fought against the rising current at the busiest times of the season, trying to ensure as much clearance as possible before the arrival of salmon.

And then they came. On July 3, salmon were observed trying to pass Hells Gate. McHugh recalled, "the most interesting part of the work was at hand."<sup>34</sup> For over a week, there was no sign of fish passing Hells Gate. On July 15, three were caught above the gate. But the massing of bodies below the rough water was becoming ever more noticeable, and when contrasted with the meager numbers above the gate, called for attention. Three natives were employed for a number of days, dressed in oil slicks and souwesters, and instructed to catch fish in the rough water and eddies using dip nets.<sup>35</sup> Cinching the fish, they would turn and place them in wooden flumes to swim up and around the obstruction. They assisted perhaps up to twenty thousand fish in this manner. Other flumes, jutting into the rough water, were set up by men hanging from ropes, "drenched in icy spray" in order to steer the fish through a three hundred foot diversion.<sup>36</sup> Some fish entered, most did not. Below the crews, the fish danced in a circle: some climbed up along the bank on the CPR (west) side of the river and passed through; many others followed the west bank and then tried to cross the river and pass on the east side, facing an intense current. Most of these fish were swept back down the river, hit an eddy and were brushed yet again into the throngs of salmon attempting passage on the west side. "I can testify," wrote one CPR employee who viewed this struggle, "that the fish were doing their best, throwing themselves out of the water in their eagerness and

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<sup>34</sup>McHugh, "Report," p 270

<sup>35</sup>NAC, Pacific Region Office, RG 23, Vol 2307, File 1-18, McHugh to Cunningham, August 23, 1914

<sup>36</sup>CSB, "Work on Hells Gate Described," Province April 16, 1914

wounding themselves against the rocks or the side to get a purchase against the current."<sup>37</sup> By mid-August, it appeared that most of the fish trying to do so had passed. But then, many had probably floated down river, unspawned, as they had the year before. Babcock judged at the end of the season that few had reached the spawning grounds. "I ran up to Adams Lake," he wrote to Charles Gilbert, the Stanford zoologist, "and the Indians there tell me they had taken but six fish this year. I could find none in the Adams River. At Seton Lake we have about 150 fish. You will admit that the prospect is a poor one."<sup>38</sup> By December after the last fish had arrived much of the clearing work was complete, and with the water lower, the site could be inspected at the different points of difficulty.

The results were reassuring. The force of the river seemed to have carried away many of the large boulders at China Bar and Scuzzy Rapids, previously weakened by explosives. The fall at Hells Gate, measuring five feet before the slides was now at about nine feet. It had stood at fifteen feet at the worst moments before the clean up, and six feet of progress seemed like a lot to McHugh, though it would mean four extra feet for passing salmon. Only one man had died. Only four men were injured. This seemed like a good result to the engineer in charge. The cost of all the work totaled \$110,212.70. It would later be paid by the CNR by means of a reduction in a government grant to the company, after the railway balked at the expense and an outright payment. At last it could be said that the matter was finished.

Encountering an environment without fixed meanings, Babcock and McHugh explained their experiences in narratives of discovery. They ordered their subjects through measurement: Babcock tried to account for salmon numbers, McHugh assessed distances and gauged velocities. They gathered local knowledge and interwove it with

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<sup>37</sup>NAC, RG 23, Vol 678, File 713-2-2[2], William P Anderson to Deputy Minister of Marine and Fisheries, September 26, 1914

<sup>38</sup>BCARS, GR 435 BC Department of Fisheries, Box 56, File 510, Babcock to Gilbert, August 29, 1914 (copy). Babcock continued his dismal assessment in a series of letters to Gilbert in this file.

established principles of biology and engineering: Babcock interpreted interviews with locals to produce meaningful signs of change and discord, McHugh adopted native fishing methods in order to help fish pass around the slides. Like discoverers, they took possession: both Babcock and McHugh ordered the landscape and assumed to know how to correct it; they held the authority to control space and resources and used it. Although the event and immediate aftermath of the Hells Gate slides occurred under a cloud of confusion, the authors of the accounts, which provide the backbone of the preceding narrative, imposed sets of meanings that can only be considered tentative and partial. From a certain perspective, their emphasis on the unknown served to excuse their inability to identify and correct the problems sooner: the accounts contain an embedded rhetoric. Unfortunately, it is difficult to balance their descriptions and judgments against others; they are the only authors of substantial accounts of the slides and clearing activities. To begin to understand the flow of meanings through Hells Gate in 1913-14, and then the continuing stream of questions and arguments that followed in their path, it is necessary to establish contexts for understanding the significance of the slides for native peoples, the commercial fishery, regulators and scientists.

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The slides at Hells Gate and the restoration attempts that followed them changed the conditions of the native fishery and impinged on native access to the resource. During the clearing episode new fishery regulations imposed drastic cuts on the native catch and set a precedent for future restrictions. As in other regions of BC in this period, the native fishery was displaced in the name of conservation and as a means to preserve the supply of the commercial fishery. Attempts by the Department of Indian Affairs, the state overseer of native rights, failed to protect native access to the resource. In an atmosphere of rising political unrest at the conditions of native land and resource rights, native

peoples of the canyon waged an organized defense of their fishing rights and attempted to alter restoration efforts at the Hells Gate site.

In the midst of clearing the Hells Gate slides, JH McHugh was irritated by the arrival of native peoples, preparing to conduct their traditional fishery. While McHugh and his teams laboured to excavate debris and blow up portions of the passage, pony trains ambled down the hillside in July 1914, some from as far away as the Nicola Valley. The fishery of the Nlaka'pamux was about to commence. McHugh understood that the fishery at Hells Gate dated to "time immemorial," but as the natives unpacked their gear and readied themselves for the arrival of the salmon, he became convinced that a "wholesale slaughter" was about to commence. He reasoned that all the restoration work would be for naught, if the fishery were allowed to proceed. In the face of "strong and organized objection," McHugh ordered restrictions placed on the natives and their fishery, and assigned special guardians to police the area and enforce the informal order. Why were the natives so agitated? McHugh stated that it was possibly "the first time this ancestral privilege had been in any degree interfered with." He felt sure, nevertheless, that in the moments when fishing was allowed that season, the natives "doubtless received all the fish they required." It was a self-serving judgment and natives of the canyon disagreed.<sup>39</sup>

After the slides and the imposition of a new regulatory presence, natives organized their defense. By the end of July, after having missed almost a week of prime fishing, a number of chiefs in the canyon made common cause to publicize their predicament and force the Department of Indian Affairs to correct the matter. While the local Indian agent attempted to broker a solution with the Assistant Chief Inspector AP Halladay of the Department of Marine and Fisheries on July 25, natives developed

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<sup>39</sup> McHugh, "Report on the Work of Removal of Obstructions..." p 271

another strategy.<sup>40</sup> Bypassing their state guardian, Chiefs James of Yale, Michael of Maria Island, Paul of Spuzzum, and Jimmy of Ohamil wrote the department:

We the representative of the tribes of Indians between Hope and Lytton wish to notify you that the fishery department of New Westminster have stopped us from catching salmon in the Fraser River, for our own use. This we refuse to do. There is no sense of justice in this order, as all the fish we Indians would catch in the year would not equal the number caught in one day by the white men at the mouth of the river. We Indians wish to tell you that the way to save the fish is to stop the white men from setting traps and nets, so blocking the mouth of the river that the fish cannot get up. The white men are to blame for the scarcity of fish, and yet they would take away from us Indians the only means of making a living after taking everything back from us. This we positively refuse to submit to, and look to you for justice. We have now been stopped six days and we expect damages for this delay.

"[W]e are the original owners of the land," they continued, "and we know more on the fish than any individual or government."<sup>41</sup> After three days without reply, the chiefs telegraphed again on July 29, demanding action.<sup>42</sup> The following day the department responded that it had contacted the Department of Marine and Fisheries about the matter and that this department would send an official to investigate and report. No action would be taken until the said report was received. The chiefs, obviously irritated at this treatment, promptly leaked the correspondence to the press; it was reprinted in full in the Vancouver Sun. It was not until the end of the month, after the federal fisheries officer FH Cunningham had surveyed the scene, that it was decided to change the restriction to a four day per week fishery.<sup>43</sup> Cunningham admitted on his return to Vancouver that natives were indeed "aggrieved" by this decision but that they were sticking to it.<sup>44</sup> After investigating their legal options, and engaging the firm of Harris, Bull, Harrington and Mason to press their claims with the Department of Marine and Fisheries in Ottawa, natives were faced with little choice but to accept the new restrictions or face arrest.<sup>45</sup>

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<sup>40</sup>CSB, "Indians Resent Fish Embargo," Columbian, July 25, 1914. In private correspondence, Halliday wrote that H Graham, the local Indian Agent was agreed that Indian fishing should be restricted: NAC, Pacific Region Office, Vol 2311, File 5-7, Halliday to Cunningham, July 28, 1914

<sup>41</sup>CSB, "Indians Determined to Get Fish Supply," Vancouver Sun August 4, 1914

<sup>42</sup>Ibid.

<sup>43</sup>NAC, Pacific Region Office, RG 23, Vol 2307, File 1-18, Cunningham to Found, August 13, 1914

<sup>44</sup>CSB, "Much Debris Still to Move," Columbian August 24, 1914

<sup>45</sup>NAC, Pacific Region, RG 23, Vol 2307, File 1-18, Harris, Bull, Harrington and Mason to Halliday, August 18, 1914

The crisis of Hells Gate and its restoration served as the initial trigger for changing the practice of native fishing rights in the canyon. But it paralleled a more general shift in the regulation of the native fishery in BC that involved increasing restrictions and a decreasing native catch. In the pioneer period of the commercial fishery natives worked in and fished for canneries and maintained their own food fishery without significant interference. Their right to fish uninhibited was established in the original Douglas treaties on Vancouver Island and outlined in the Fisheries Act proclaimed in BC in 1878. Such measures recognized the long-standing importance of salmon in native economy and culture and as a commercial product in native-white trade in the fur trade era and after. But with the sharp expansion of canneries around the turn of the century, native involvement in the commercial industry declined (they were frequently displaced by immigrant Japanese fishers), while commercial pressure on the government to restrict the native food fishery grew.<sup>46</sup> In an environment of decreasing supply and an expanding commercial fishery, native uses of salmon were equated with waste. Natives became portrayed as depraved animal killers, destroying a resource that could be profitably put to use. Some commentators suggested that a ration system for natives would be better than preserving their access to fish.<sup>47</sup>

Across the province a series of confrontations after 1900 introduced the new regulatory regime. Using previously ignored sections of the Fisheries Act outlawing obstructions on rivers and streams, fisheries officials cracked down on native fishing traps and weirs across the province, at the behest of local canners. At Babine Lake, on the upper Skeena, a major stand-off in 1906 over the right of natives to employ fishing weirs led to a series of arrests and prosecutions, sensational metropolitan newspaper

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<sup>46</sup> Arthur J Ray, *I Have Lived Here Since the World Began* (Toronto: Lester Publishing and Key Porter Books, 1996), pp.296-298, 302. In 1888 the native fishery was defined in the revised Fisheries Act and restrictions were placed on gear that could be used.

<sup>47</sup>CSB, *Vancouver News-Advertiser*, September 23, 1906, no title.

coverage (the event was dubbed the Babine 'uprising'), and finally a trip by chiefs and a local Oblate missionary to Ottawa to meet with Prime Minister Laurier in order to resolve the dispute. Other similar incidents occurred on the Cowichan River in 1897, 1908 and 1912, and on Clayquot Sound in 1906.<sup>48</sup> In another case over the use of fishing traps near Salmon Arm, two arrested chiefs were sprung from court by a group of fifty native supporters.<sup>49</sup> The shift in the regulatory regime produced resistance.

Conflicts over fishing rights were part of a more general struggle over the land question in BC. After 1900 increasing settlement and the expanding white resource economy placed intense pressures on native societies. As Dianne Newell argues, fishing rights held a special position within the debate over resource rights, since they underpinned such a significant aspect of native economy.<sup>50</sup> Spurred on by conflicts like those discussed above, native peoples created local groups to defend their interests, such as the Nisga'a Land Committee, and the Interior Tribes, and also forged a pan-regional organization, the Indian Rights Association. These groups introduced white society to a new generation of mission-educated leadership with the political skills to engage the settler society and the practical concerns to maintain aspects of traditional livelihood.<sup>51</sup> At the time of the Hells Gate slides, natives in the canyon were involved in the broader political debate and were part of a lobby to press for a resolution of resource concerns.

One forum for this struggle, in part created in response to native pressure, was the joint provincial-federal McKenna-McBride Royal Commission of 1913.<sup>52</sup> Intended to vent native frustrations and reassess previous reservation allotments, the Commission

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<sup>48</sup>CSB, "Indians Barricade Cowichan River," *Province* May 30, 1908; Dianne Newell, *Tangled Webs*, p.90

<sup>49</sup>CSB, "Indians are Troublesome," *Vancouver News Advertiser* August 18, 1908

<sup>50</sup>Dianne Newell, *Tangled Webs of History: Indians and the Law in Canada's Pacific Coast Fisheries* (Toronto: University of Toronto Press, 1993), p.3

<sup>51</sup>RM Galois, "The Indian Rights Association, Native Protest Activity and the 'Land Question' in British Columbia, 1903-1916," *Native Studies Review* 8(2) (1992): 1-34; Paul Tennant, *Aboriginal People and Politics: The Indian Land Question in British Columbia, 1849-1989* (Vancouver: UBC Press, 1990), pp 84-95

<sup>52</sup>On the role of native pressure in forcing some form of response, see: RM Galois, pp 16-19.

toured the province in 1913-14, interviewing natives and Indian agents and surveying native communities. Narrowly conceived in the view of many native protesters, the commission was boycotted by some groups for excluding more fundamental questions of land title. In the fall of 1914, a few months after the dispute between native groups and the Department of Marine and Fisheries, the Commission toured the Fraser canyon. Not surprisingly, the commissioners heard more than they might have expected to about fish. Representatives of the Boothroyd, Cisco, Spuzzum, North Bend and Yale bands all raised the problem. The question put to the commissioners by Chief Paul Heena of the Spuzzum band aptly summarizes the concern: "Whose fault was it that I hadn't sufficient food to eat this year? Who was the cause of our poverty? It was not my fault that today we are poor. I was stopped from providing myself with food. No one should be stopped from providing themselves with food. When they came to stop me they told me that if I did not obey I would be put in gaol." One of the commissioners pointed out in reply that the slides originated from a variety of causes and that fish needed protection. Heena countered, "The reason of this slide was caused by the white man." Commissioner McKenna observed that the slide "was not an act of man—it might have happened if the white man had never come to this country." Another speaker, Patrick of Boston Bar insisted that "God Almighty put me here..." and suggested that it was not God's will to impose restrictions on native uses of the lands and rivers. "...I don't want to be stopped from fishing salmon in the River. God made those for our use, and it is from salmon that I make my living. Therefore I wish everything to be set free."<sup>53</sup> In a world of increasingly circumscribed economic roles, limited lands and new forms of regulation, the slides at Hells Gate and the fishing restrictions devised to help correct them appeared to native residents of the canyon as consequences meted out upon innocent bystanders.

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<sup>53</sup>Commission testimony may be found in NA, GR 123, Canada Department of Indian Affairs, BC Records, Vol 11025, File A-H-7; quotations are from pp 127 and 275. Cole Harris considers this testimony within the broader context of encounter in, "The Fraser Canyon Encountered," in The Resettlement, p.134.



Nor did natives find much to admire in the specific measures chosen to restore the fishery. As a previous quotation makes clear, there was a strong sense amongst native peoples that "we know more on the fish than any individual or government." Such sentiments were not new. Seven years previously, local Lillooet Indian chiefs had criticized the Seton Lake hatchery as a destroyer of salmon populations. After marshaling their case in the Vancouver World, they asked rhetorically: "And now is there anybody who dares to say that we the Indians are the cause of the disappearing of the salmon?"<sup>54</sup> Disregarding the authority of salmon experts they identified the instruments of scientific salmon production as harmful. Subsequent analyses would confirm this view.<sup>55</sup>

At Hells Gate, following the slides and their supposed correction, native inhabitants of the canyon again cast a jaundiced eye on the practical abilities and knowledge of fisheries officials. In the fall of 1916 as McHugh oversaw some continuing work on Hells Gate, he was confronted by what he called a "deputation" of Indians from the Lytton and Nicola Districts, eager to discuss the department's previous work and suggest improvements.<sup>56</sup> In particular, they believed that the removal of a key rock in the gate would help passage significantly. McHugh was prone to dismiss the idea, believing it would intensify the flow and remove certain resting pools, but the natives were adamant. "They are inclined to criticize the improvement work already done by this Department at Hells Gate, and suggest that the CPR are standing in the way of improvement work at Hells Gate because of the likelihood of destroying the scenic beauty of this place should they be allowed to work out their own ideas. This suggestion

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<sup>54</sup>CSB "Chiefs Write Letter to the World," The World October 12, 1906

<sup>55</sup>CSB "Seaton [sic] Lake Hatchery a Miserable Failure" The World n.d., but probably October, 1906; Geoff Meggs, Salmon: The Decline of the British Columbia Fishery (Vancouver: Douglas & McIntyre, 1991), pp 82-83; Joanne Drake-Terry, The Same as Yesterday: The Lillooet Chronicle the Theft of Their Lands and Resources (Lillooet Tribal Council, 1989), pp 215 and 224; William F Thompson, Effect of the Obstruction at Hell's Gate on the Sockeye Salmon of the Fraser River Bulletin 1 (International Pacific Salmon Fisheries Commission, 1945), pp 59-61

<sup>56</sup>NAC RG 23, Vol 678, File 713-2-2[6], JH McHugh to FH Cunningham, 16 October, 1916

was, of course, dismissed as being ridiculous."<sup>57</sup> The comment is revealing of a strong suspicion that matters of environmental regulation were not set simply by fisheries officials, but related to a complex industrial and aesthetic politics. Despite McHugh's dismissal, the practical aspects of the natives' proposal were taken with a degree of seriousness, or at least according to procedure. FH Cunningham forwarded a photograph to department officials in Ottawa showing a group of Natives by the rocks they wished to remove, accompanied by a letter from Chief Benedict of the Boothroyd Band.<sup>58</sup> On reflection, the department turned the suggestion down.<sup>59</sup> The local Indian agent, admitting that he had been under pressure to gain permission for the rock removal for some time, stated that the band would be deeply disappointed; he noted that it was "doubly difficult for the Indians to get their winter supply as of old."<sup>60</sup> Whether or not the specific measures proposed by members of the Boothroyd band would have improved the situation, they were keenly aware, by their own experience fishing, that all was not right with the gate.

In the years and then decades after the Hells Gate slides, fishing decreased as a contributor to native economy on the Fraser. In the canyon continuing fishing regulations and the decreased runs reduced catches to the point where one band allegedly offered to sell its fishing rights to the Department of Marine and Fisheries.<sup>61</sup> Such an event was exceptional, but it points to the disastrous effects of the slides. At certain points during World War One, native peoples in the canyon had to rely on rations to survive. Altered fishing regulations in the 1920s made native access increasingly difficult throughout the

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<sup>57</sup>*Ibid.*

<sup>58</sup>NAC RG 23, Vol 678, File 713-2-2[6], FH Cunningham to WA Found, 20 October, 1916. I have been unable to locate this photograph.

<sup>59</sup>*Ibid.* Found to Cunningham, 27 October, 1916

<sup>60</sup>*Ibid.* S Stewart, Acting Superintendent General to GJ Desbarats, Deputy Minister of Marine and Naval Service, 27 October, 1916, containing enclosure: H Graham [Indian agent] to Department of Indians Affairs, 21 October, 1916

<sup>61</sup>Department of Fisheries, Annual Report, 1918 (1919), p.12, cited in Dianne Newell, Tangled Webs, p.117.

Fraser basin.<sup>62</sup> “The salmon question,” protested Chief James Paul of Spuzzum in 1922, “is the most important of all things for us. We must have free access to the salmon for our food.”<sup>63</sup> At Spuzzum, some natives like Willie Bobb responded to the new state of affairs by finding waged work on the railroad, gardening, fishing and working at a mining claim; still others retreated into the mountains, hunting “in the old ways as long as they were able...”<sup>64</sup> North of the canyon on the Nechako plateau, Carrier groups reoriented their livelihood, hunting more intensively for moose than previously, turning to the Skeena system for fish and exploiting a rise in fur prices to respond to changing environmental conditions.<sup>65</sup> The slides produced long-term effects for native economy and society in the river basin.

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Operators in the commercial fishery had a more oblique connection to the Hells Gate slides than native peoples in the canyon and were less affected by its immediate consequences. At the commanding heights of the industry, there was little knowledge of the incident until the story was carried in the metropolitan press in the fall of 1913, and even then there was precious little outpouring of anxiety or confusion.<sup>66</sup> What record exists of industry attitudes, however, is revealing. In the fall of 1914, a gathering occurred of the BC Cannery Association-- made up of all of BC's important fish processing firms-- with two fisheries officials, the federal Chief Inspector FH

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<sup>62</sup>The Department of Indian Affairs objected to the increased restrictions: NAC RG 23 Box 679, File 713-2-2[8] H Graham, Indian Agent, Lytton BC to Duncan Campbell Scott, Deputy Superintendent General of Indian Affairs, Nov 7, 1925. Scott forwarded this correspondence to the Department of Fisheries, but the department would not change the regulations.

<sup>63</sup>Quoted in Laforet and York, *Spuzzum*, p 190. This protest recorded the views of Paul and “seven others” as reported by James Teit in a 1922 report for the Department of Indian on the economic affairs of natives of the Fraser.

<sup>64</sup> Laforet and York, *Spuzzum*, p 106

<sup>65</sup>Douglas R Hudson, “Internal Colonialism and Industrial Capitalism,” in *SA TS'E: Historical Perspectives on Northern British Columbia* ed. Thomas Thorner (College of New Caledonia, 1989), pp.178-181. This is a chapter from Hudson's PhD thesis on the Carrier Indians of northern BC.

<sup>66</sup>One exception to this generalization was HB Bell-Irving. See his account of the slides recorded in 1913 quoted in: HB Bell-Irving, “Conditions in the Fraser Canyon-- A Canadian View,” *Pacific Fisherman* 28(8) (July 1930): 16-17.

Cunningham and the Provincial Deputy Commissioner, McIntyre. Discussing a number of important issues for the fishing industry, the meeting ended with a series of concluding motions. One of them referred to Hells Gate:

That this meeting heartily endorses the efforts made by the Government for removing slides and other obstructions which prevented salmon from reaching the spawning grounds, and also in preventing Indians and others from taking out fish which were temporarily barred from ascending until such obstructions were removed.<sup>67</sup>

With a bluntness appropriate to the genre, the cannery representatives established their approval for state actions in protecting their interests against environmental obstructions and native claims. It was characteristic of canner-state relations in the early twentieth century that issues of habitat restoration could provide grounds for agreement and acceptance. Although over-fishing might logically have been implicated in the poor returns to spawning grounds in 1913, it was easier to focus attention elsewhere.

Well before the fish struggled at Hells Gate in 1913, they had passed a gauntlet of nets. Returning from the ocean by the west coast of Vancouver Island, the majority of fish approached the mainland via Juan de Fuca Strait. Crossing invisible human boundaries, sketched on parchment, they entered American waters and were caught in fish traps and purse seine nets, in high numbers. When fisheries officials tabulated the pack at the end of the season, it would be shown that Americans, fishing for Puget Sound canners, had reaped about sixty per cent of the total catch.<sup>68</sup> Once back into Canadian waters, fish proceeded to the Fraser estuary, where again gillnets appeared, hanging from the hulls of boats sporting sails and oars, and staffed by natives, whites, and Japanese fishers. They would be canned in one of thirty-five canneries in the Vancouver region, and handled in these places by a predominantly native and Japanese female labour force. 1913 was an exceptional year, one of the famous big years of the sockeye runs, and the canneries overflowed; well over two million cases were produced. Reports of the season

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<sup>67</sup>UBC Special Collections and Archives, BC Salmon Cannery Association Minute book (March 13, 1914–October 9, 1920), entry Nov 25, 1914, p.21

<sup>68</sup>See actual figures of the catch as reported in the Report of the BC Commissioner of Fisheries below.

told of fishers throwing fish overboard because the canneries were ill prepared for the cornucopia.<sup>69</sup>

The force of this fishery-- international, competitive, and largely open-- was barely restrained by the state. Despite some notable attempts, no international agreement bound the US and Canada's catch levels; with more efficient (and destructive) technology like fish traps, and fewer regulations than in Canada, American fishers reaped large returns without concern for conservation. Canadian fishers were only slightly more constrained. Ever since the reception of Canadian fishery legislation after Confederation, the emphasis of federal policy had been to allow the industry to grow, while supporting measures to increase supply.<sup>70</sup> Experiments with limited cannery licenses, weekly closed periods and gear restrictions helped to impose certain limits, but were frequently ignored by the industry and poorly enforced.<sup>71</sup> The state was more effective when collecting statistics, or, as occurred increasingly in the 1920s, excluding Japanese fishers on racist grounds with support of white and native fishers and canners.<sup>72</sup> Conservation, such as it existed, operated in the limited field of habitat restoration and hatchery production. Supported by canners in their quest to improve upon nature, the federal and provincial departments sponsored hatchery programs and became ever more vigilant in their quest to remove native fishing traps, decrepit mining dams, landslides and logging slash in smaller streams.<sup>73</sup> Rather than contend with the boiler politics of fishing regulation, fisheries officials used the field of habitat restoration as a regulatory release valve.

Although the state imposed a light regulatory hand, the industry created its own forms of control on the rapacious growth of the late nineteenth and early twentieth

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<sup>69</sup>Meggs, *Salmon*, p 95

<sup>70</sup>Anthony Scott and Philip A Neher, "The Evolution of Fisheries Management Policy," in Scott and Neher eds., *The Public Regulation of Commercial Fisheries in Canada* (Ottawa: Economic Council of Canada, 1981), p 11

<sup>71</sup>Newell, *Tangled Webs*, pp 70-71; Scott and Neher, p 11

<sup>72</sup>Newell, *Tangled Webs*, p 85; Arthur Ray, *I Have Lived Here*, p.305

<sup>73</sup>Lyons, *Salmon*, "Appendix 17 Salmon Hatcheries operated in British Columbia by the Dominion Government, 1884-1935", p 668; Newell, *Tangled Webs*, p 52

century. Since the first canneries had been planted on Lulu Island in 1871, the industry had grown to include sixteen canneries in 1890 and forty-two by 1900.<sup>74</sup> In the pioneer fishery, until the late 1880s, these canneries were locally controlled and small in scale. As the fishery developed, and new markets for canned salmon of different varieties opened in Britain, the commonwealth and parts of Europe, outside capital from the US and Britain provided the basis for expansion.<sup>75</sup> In an attempt to scale back competition and benefit from economies of scale, BC Packers was formed in 1902, merging twenty-two previous firms and absorbing control of over fifty per cent of the Fraser catch.<sup>76</sup> In terms of regulating the size of the catch, attempts were made at different times to agree on closed periods to allow for fish escapement to the spawning grounds.<sup>77</sup> In a few extreme periods when catches declined sharply, some canners proposed the total cessation of fishing for a four year period to allow runs to rebuild; with all of the different interests involved, however, and uncertainty as to the practical results of such an undertaking, a closure of this kind never occurred. Less drastically, certain firms sponsored their own hatcheries as a means to supplement their 'capital stock'.<sup>78</sup> Members of the canning interest were thus highly conscious of the potential volatility of the industry imposed by changing conditions and unchecked growth in catch capacity. But in a resource economy of lightly controlled access, such concerns, even when backed by powerful cannery interests, could not begin to establish boundaries of conduct.

In a peculiar sense the Hells Gate episode of 1913-14 bore out the concerns of industry and state about the health of inland waters, while diverting attention yet again

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<sup>74</sup>Lyons, p 706. Note that the number of canneries operating fluctuated from year to year, depending on expectations of a big run, or a low year. After 1902 and the merger into BC Packers certain canneries were closed. The number on the Fraser fell to 21 in 1910, 15 in 1911, 14 in 1912, but then expanded again to 35 in 1913 in expectation of a big run.

<sup>75</sup>David J Reid, "Company Mergers in the Fraser River Salmon Canning Industry, 1885-1902," Canadian Historical Review 58(3) (September 1975): 282

<sup>76</sup>Reid, "Company Mergers"

<sup>77</sup>Newell, Tangled Webs, p72

<sup>78</sup>Newell, Tangled Webs, p 52

from questions about the fishery. Its results were slow to arrive, as the sockeye spawning cycle operates on a four-year basis. Whereas native fishers felt the slides' effects immediately because of increased regulations and declining returns above the canyon, the commercial fishery experienced a four-year delay. But in 1917, at last, the full effects of the slides reached the cannery interests downstream and with crushing force. Whereas the 1913 catch stood at 2,401,488 cases (Fraser canners took 736, 661; Puget Sound canners, 1,664,827), in 1917 it was a paltry 559,732 (148,164 for Fraser Cannery, 411,538 for Puget Sound Cannery).<sup>79</sup> Although John Pease Babcock assured the public that the slides had been cleared and returned to their original condition, the big year cycle of sockeye appeared to have been destroyed, or at the very least diminished substantially. The Industrial Progress and Commercial Record, an optimistic booster of BC business as its title suggests, announced "The Decline of the Sockeye" in August 1917. The Hells Gate disaster was fingered as the major cause.<sup>80</sup> Henry Bell-Irving, a pioneer canner and a prescient observer of the industry, stated before a Royal Commission investigating the fishery in 1916 that the Fraser fishery was "practically a thing of the past." He hoped the same fate would not befall the northern rivers.<sup>81</sup>

**Table 1: Fraser River Sockeye Catches on the 'Big Year' Cycle 1901-1933<sup>82</sup>**

Year	Total Catch
1901	25,760,031
1905	20,681,236
1909	20,936,474
1913	31,343,039
1917	6,883,401
1921	1,686,241
1925	1,828,716

<sup>79</sup>Report of the Commissioner of Fisheries (BC) 1917 (1918), p.19. This report revised earlier figures for 1913 that were slightly higher.

<sup>80</sup>"The Decline of the Sockeye," Industrial Progress and Commercial Record Vol V(4) (August 1917): 385-390

<sup>81</sup>Ibid.

<sup>82</sup>These statistics are taken from the calculation of the combined Canadian and American catch in George A Rounsfall and George B Kelez, The Salmon and Salmon Fisheries of Swiftsure Bank, Puget Sound, and the Fraser River Bulletin 27 of the US Bureau of Fisheries Vol. XLIX (Washington: US Department of Commerce, 1938): 761-762

1929	2,059,178
1933	2,450,436

The Hells Gate disaster helped to reinforce a spatial and species shift in the organization of the BC commercial fishery. Already, before the slides, growth in the industry was occurring on new fishing grounds in the north, on the Skeena, the Nass and at Rivers Inlet. After 1913, expansion to these new fields only increased, as Fraser stocks declined.<sup>83</sup> The remaining fishery on the Fraser responded to new conditions by expanding the breadth of its reach: reacting to new markets for pink salmon and other fish species, canneries diversified their product lines. Following a pattern of industrial fisheries worldwide, the Fraser canners responded to species collapse by bottom feeding: fishing less lucrative species more intensively, and traveling down the food chain in search of new products.

The 1913 big year catch was the last of its kind. From the vantage point of the coastal metropolis in 1917, the Hells Gate slides appeared like a mysterious interior force, destroying an industry built on the myth of inexhaustible supplies. The cannery interest failed to take the opportunity to examine seriously its own role in the downturn, but instead reinforced pressure on government to improve conditions, and allow industry a free hand to reorganize its fishing effort. Responding to market factors and the environmental conditions created in part by the Hells Gate slides, the industry expanded its spatial focus and plumbed the ocean's depths.

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The decline in the commercial catch placed new pressures on state regulators to respond to concerns over habitat restoration and to monitor the Hells Gate site for further problems. After 1914, an on-site guardian reported on conditions at Hells Gate for the federal department, and John Pease Babcock continued his annual inspection. At

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<sup>83</sup>Dianne Newell, "Dispersal and Concentration: the Slowly Changing Spatial Pattern of the British Columbia Salmon Canning Industry," *Journal of Historical Geography* 14(1) (1988): 22-36



different times, American authorities, encouraged by an increasingly skeptical Puget Sound cannery lobby, toured the scene and offered more critical assessments suggesting that problems might still exist at Hells Gate.<sup>84</sup> Pressure on fisheries officials rose as Fraser River canners, starved of their former supply, began to criticize governmental efforts as well. Two exposés written by Paul M Smith and published in The Province [on August 15 and September 4, 1926,] focused the department's attention by charging that Hells Gate was a menace to salmon and that former clearing efforts had failed.<sup>85</sup>

In a move aimed to stem criticism, restore official legitimacy and sincerely approach the basis of the concern, a board of engineers was appointed in 1926 under the auspices of the Department of Marine and Fisheries. Was Hells Gate restored to its former condition, or could it be improved? Those were the questions put to the board consisting of JH McHugh (Fisheries Engineer, Department of Marine and Fisheries), CE Webb (District Chief Engineer, Dominion Water Power and Reclamation Survey), PE Doncaster (District Engineer, Public Works Canada), and HW Hunt (Assistant Engineer, Department of Marine and Fisheries). To answer the criticisms, the engineers conducted tests in hydraulics. They pursued a series of investigations at the Hells Gate site on stream flow, velocity levels, and turbidity over different points of the year; they constructed contour maps, painted a new gauge on the gate's granite walls and managed to develop a more finely tuned model of water movement than had existed previously. They found that at low water the surface width of the channel was eighty-five feet, but could attain a width of one hundred eighty feet at high stages. The remarkable variability of the gate was etched in sharp relief.<sup>86</sup>

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<sup>84</sup>NAC, RG 23, Vol 679, File 713-2-2[12], Arthur S Einarsen, Washington Division of Fisheries, "A Report on an Inspection Trip to the Fraser River Watershed," June 29, 1929 [Look at Doyle paper notes for other instances]

<sup>85</sup>NAC, RG 23, Vol 679, File 713-2-2[8], J McHugh, "Interim Report of the Engineers Enquiring into the Fraser River Conditions at Hell's Gate and Bridge River Canyon," nd. McHugh mentions the Province articles in spurring the first meeting of the Board.

<sup>86</sup>NAC, RG 23, Vol 679, File 713-2-2[9], CA Webb, "Interim Report on Hydraulic Investigations, carried out by Dominion Water Power and Reclamation Service on Hell's Gate, July 1927" [dated July 9, 1927]

The engineers also sought the aid of fisheries officials and recorded their views. TE Scott the federal guardian at the site believed fish did not encounter unusual obstacles at Hells Gate. As the direct observer of the site since 1913, his views held considerable weight. Furthermore, Babcock, the provincial assistant commissioner, concurred. He believed that previous work was satisfactory and that further intervention might harm rather than improve current conditions. In confidence, he told one canner that he believed that negative reports emanated "from men who are desirous of getting contracts."<sup>87</sup> However, AP Halladay, the federal inspector of fisheries for district number one, disagreed. He felt that Hells Gate was still a problem and that more work was required. He hoped the engineers could propose solutions.<sup>88</sup>

The Final Report of the Board of Engineers released in 1928 provided an ambivalent answer. The Engineers weighed their evidence and suggested that turbulence was probably the greatest problem for fish. Turbulence was created by the "conflicting currents set up by the great irregularities on both river banks as well as on the stream bed." To counteract this condition, the river could be straightened. This might not reduce velocity (it might increase it), but it could well reduce turbidity.<sup>89</sup> Although it is impossible to know, it would be interesting to discover how close this rock removal recommendation came to that suggested by members of the Boothroyd Band in 1916. At any rate, conscious of the limits of their knowledge, the engineers suggested a cautious response.

The stumbling block of the report was that it could not answer enough questions for the Department of Marine and Fisheries about how all of this would affect fish. The

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<sup>87</sup>BCARS, GR 435, BC Department of Fisheries, Box 108, File 1069, Babcock to Bell-Irving, Anglo-British Columbia Packing Company, May 22, 1928 (copy)

<sup>88</sup>McHugh, "Interim Report..." and NAC, RG 23, Vol 679, File 713-2-2[9], JA Motherwell, Chief Inspector of Fisheries to WA Found, Director of Fisheries, Department of Marine and Fisheries, March 15, 1927.

<sup>89</sup>NAC, RG 23, Box 679, File 713-2-2[1] JH McHugh, CE Webb, PE Doncaster, RM Taylor and HW Hunt, "Final Report of the Engineers Enquiring into Fraser River Conditions at Hell's Gate, 1926-1928," July 27, 1928

omission of trained fishery experts from the investigation is striking and it points to the inability of the department to raise a team competent for the task at this date, and the implicit assumption that problems of construction and river training should involve engineers, and only engineers. At one point WA Clemens of the Biological Board in Nanaimo suggested that tagging experiments be conducted to measure the rate of fish passage, but his idea was not taken up either by the Board of Engineers or the station at Nanaimo.<sup>90</sup> As a later chapter will suggest, this omission was tragic. Faced with a report on physical conditions, senior fisheries officials asked biological questions.

"Unfortunately," wrote JA Motherwell, the federal chief inspector in the province, in response to the report, "there is evidently no one who can say just what a salmon is capable of doing under the several phases of fluctuating conditions experienced at points where rapid or broken water occurs."<sup>91</sup> Consequently, Motherwell judged, the report failed on the crucial lack of knowledge of salmon, and therefore, could not be implemented without serious risk of harming fish. No changes were made. Members of the fishing industry, fully briefed on the investigation and the department's conclusions, accepted that the state had responded to their request for a re-examination and thanked them for their efforts.<sup>92</sup> Here was the Board's only success: in revising the public perception of the department's legitimacy.<sup>93</sup>

The focused scientific investigation of Hells Gate from 1926 to 1928 demonstrated that scientists and fisheries officials were also challenged by the longer-

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<sup>90</sup>NAC, RG 23, Box 679, File 713-2-2[9], JA Motherwell to WA Found, April 19, 1928. Why it was not taken up is unknown.

<sup>91</sup>NAC, RG 23, Box 679, File 713-2-2[11] JA Motherwell to WA Found, October 9, 1928

<sup>92</sup>NAC, RG 23, Vol 679, File 713-2-2[11], "Conference re Hell's Gate Conditions Fraser River," Nov 21, 1928

<sup>93</sup>Fisheries officials were highly conscious of the public perception of their decisions. When reports of low fish returns gained wide attention in 1927, CW Harrison, the federal district inspector of fisheries advised his superiors not to engage in dip net assistance as this would merely set a precedent and "it would be acknowledgement that the Department considered the fish were unable to make their way through the canyon." BCARS, GR 435, BC Department of Fisheries, Box 107, File 1064, CW Harrison to Motherwell, September 29, 1927 (copy).

term consequences of the slides. After over ten years since the slide clean up of 1913-1914, officials were still responding to doubts and attempting to shore up their legitimacy in the face of industry criticism. The flow of meaning through Hells Gate was as much a political problem for the department as a strictly physical question of flow and turbidity. Its response, privileging hydraulic research over the biological, and then jettisoning recommendations for the lack of salmon knowledge, suggests the confused understanding of the problem and the perception of the dangers of any attempt to tamper with the flow--either in its physical or symbolic aspects.

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The Hells Gate slides remade the Fraser River, the salmon and their claimants. Moving earth, rock and debris changed the river's flow, threw up an obstacle to salmon and transformed the way that water and salmon confronted the gate. Throughout its history Hells Gate has been a focusing point of ecological and social power. Along its banks complex systems of social regulation emerged in native societies to control access. After the slides, fisheries officials annexed social authority at Hells Gate; native resource rights were ignored and overridden. Pressed by a commercial fishery with an expanding appetite for product, fisheries officials attempted to repair the difficulty and later restore confidence in the soundness of conditions.

The natural and social changes stemming from the slides were experienced within shifting spatial realms. At Hells Gate, native access was limited; fisheries officials incorporated the canyon as a zone of control and concern; the fishing industry gained influence in the regulation of salmon spawning habitat. By restricting salmon migration, the slides created new natural spatial limits: above the canyon salmon became more rare, and in the ocean less numerous. The salmon's claimants, native peoples and the commercial fishery, re-directed their activities in space: native peoples shifted their economies towards more hunting, gathering, agricultural and wage labour activities; the

commercial fishery altered its emphasis to different species and re-directed the bulk of fishing effort to northern rivers. A slide, triggered by a technology aiming to compress time and space, produced a cascading set of effects that reordered the natural and social spaces of British Columbia. Fraser's legacy collided with Coyote's world.

**Chapter 3:****Building Dams and Protecting Salmon: The First Stage**

One year before the discovery of the Hells Gate slides, a Vancouver firm with the modest title of The International Railway and Development Company (IRDC) announced plans to build a hydroelectric dam. There was nothing startling in that. Dams of this sort had been erected in the city's hinterland since 1903; plans for other dams were on the drawing board. But this dam seemed different; it inspired superlatives in those who described it, and their adjectives were always synonyms for bigness. A breathless reporter suggested that the firm, backed by English capital, had five million dollars immediately available, and twenty million in the offing. It intended to create a system of electric railways throughout the Lower Mainland-- no matter that the market was already served by competitors. Most spectacular of all, the company's dam-- the cornerstone of the venture-- would span the mighty Fraser, "the father of British Columbia waters", crossing the river "two miles and a half above Yale, right where the whole torrent of the erratic and hitherto regarded as unconfinable river pours its glacial flood between the narrow walls of a deep canyon that has taken countless ages to wear."<sup>1</sup> The dam's location, in other words, would be just below Hells Gate.

A spectacular promotion, no doubt: but was this anything more than a speculative venture aiming to unsettle the already fractious local utilities market? Perhaps not, but the proposal was more than superficial. On the syndicate sat the MP HH Stevens and a local insurance agent, EW Leeson; the firm had a credible engineer, Daniel MacDuff. In a few months they would present detailed plans to the provincial government, drawn on blue oil paper, accompanied by a persuasive document suggesting that a dam like this one would bring great economic growth. The IRDC applied for water rights and a storage area of 5000 acres stretching up the canyon.<sup>2</sup>

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<sup>1</sup>UBC Special Collections and Archives, International Pacific Salmon Fisheries Commission Papers, Cannery Scrapbooks (hereafter CSB), "Will Halt River and Erect Huge Power Plant," The World, June 24, 1912

<sup>2</sup>Ibid

The fisheries interest sat up and took notice. The day following the announcement, cannery operators interviewed by the press expressed concern that harm might be done to the salmon fishery. "Canners state that while small dams have at times been erected in streams tributary to the Fraser River, they have always been a menace to the fishermen even though equipped with fishways up which salmon theoretically could climb." The canners promised to protest the scheme to the provincial and dominion governments.<sup>3</sup>

The company's application to the provincial government attempted to deflect the fisheries argument. The plans for the dam portrayed a river cut in two: a power channel, protected by fish screens ran parallel to a free conduit, the reputed fish passage. In narrow spots, fish ladders would be installed. "We absolutely guarantee to keep fish out of our proposed Power Canal, and we shall not consider the cost in accomplishing that feat, to the entire satisfaction of the Department of Fisheries," wrote company directors with much self-confidence but probably little sense of costs.<sup>4</sup>

Accommodation, however, was not the only game. With a rhetoric that set a fine standard for later power developers, the company appealed to the government's sense of economy and progress. "The economic importance of the Fraser River fisheries is unquestioned. The economic importance, however, of the vast amount of electric energy which the Fraser River is capable of generating, and the still greater economic importance of the electric railways, new farms, new towns, and new industries, -- all of which are possible, and probable, with an ample supply of Power, must not be lost sight of, for the point at issue not only affects the use of the Fraser, but also every other similar fish

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<sup>3</sup>CSB, "Salmon Canners May Oppose Dam," *The World*, June 25, 1912

<sup>4</sup>BCARS, GR435, Department of Fisheries, Box 61, File 565, Daniel MacDuff to Babcock, December 11, 1912; and "Information for the Department of Fisheries, Victoria, BC in Connection with the Application of the International Railway and Development Company, Ltd, Vancouver BC for Water Power Rights on the Fraser River." [nd]



stream in the Province." Would it be, the company asked, fish or progress for British Columbia?<sup>5</sup>

Before provincial politicians could muster an answer, the whole venture fell apart. The reasons why are unknown. Did the Comptroller of Water Rights turn down the idea? He had certainly received an unenthusiastic review of the proposal from the provincial fisheries commissioner.<sup>6</sup> Had the company caught wind of the fact that the federal Department of Fisheries intended to block the scheme? It was within the realm of possibility. Or had that magical financial backing melted like the snows that fed the mighty river, after a winter of chilling promise? The reasons hardly matter, for in place of this dam of destiny, another more infamous dam would fill the void. Hells Gate would slide into the canyon where the IRDC proposed to build. A celebrated scheme would be surpassed by an infamous disaster.

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Whereas Hells Gate slid, without design or malice, the IRDC dam was planned, met with critics, faced a governmental process of regulation and failed on the shoals of financial inability. Although the IRDC dam was never built and-- put in its proper context—never posed a threat to the Fraser, or to other electrical utilities in the Vancouver region, its momentary rise and fall provides a parable of the beginnings of fish-power conflicts in the early twentieth century. The questions posed and incompletely answered about this dam would be raised in a variety of disputes from the turn of the century to the 1930s: What is the public interest? How it is to be decided? What happens when public interests collide?

In attempting to understand how these questions framed different disputes, this chapter considers a variety of dam cases involving a wide cast of characters. The

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<sup>5</sup>Ibid

<sup>6</sup>BCARS, GR 435, Department of Fisheries, Box 61, File 570, Deputy Commission of Fisheries to JF Armstrong, Acting Comptroller of Water Rights, December 5, 1912 (copy).

approach is chronological and follows a spatial trajectory from the upper basin, to the lower basin to Vancouver Island. Disputes over resource extraction dams at Quesnel Lake and on the Adams River around the turn of the century suggest the problems of regulating hinterland facilities; the accounts of the rise of hydro-electric dams from 1903 to the 1920s introduce the political and economic forces driving and constraining dam development in the lower basin; and dam fights over Buttle Lake and the Nimpkish River on Vancouver Island in the late 1920s focus attention on looming conflicts over jurisdiction and policy at both the provincial and federal levels. Each case is introduced with necessary detail to allow for consideration of the connecting question of the chapter: how were dams regulated by the state?

Students of the regulatory process have considered most of the industries that constructed dams in the Fraser basin and beyond in the early twentieth century. Mining, forestry and utility development in BC have all been well served by historians asking how the state sought to control private capital in the public interest.<sup>7</sup> For the most part, however, historians have considered regulation as primarily a political and economic problem. By inserting an externality-- the environment-- within this established framework of analysis, this chapter attempts to approach some old questions with some new evidence and a modified approach.

The problem of designing dams to accommodate salmon migration was a minor concern of dam developers and most provincial and federal officials before the 1920s. Compared to electricity rates, closed seasons in the fishery, or timber lease policies, the problem of fish passage was a relatively trivial matter. Only in events of major

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<sup>7</sup>Christopher Armstrong and HV Nelles, Monopoly's Moment: The Organization and Regulation of Canadian Utilities, 1830-1930 (Philadelphia: Temple University Press, 1986); Patricia Roy, "The British Columbia Electric Railway Company, 1897-1928: A British Company in British Columbia," PhD Thesis, University of British Columbia, 1970; Jeremy Mouat, The Business of Power: Hydro-Electricity in Southeastern British Columbia 1897-1997 (Victoria: Sono Nis, 1997). One study that does consider inter-connections between environmental change and regulation is: Richard Rajala, Clearcutting the Pacific Rain Forest: Production, Science and Regulation (Vancouver: UBC Press, 1998).

environmental impact and organized protest from the cannery interest did state regulation of dams for the fishery amount to much. And even in such events, the exercise of state authority sometimes did not occur effectively because of technical inability, jurisdictional confusion or the accommodating practice of the federal department. Only in the late 1920s did a concerted discussion of policy between federal and provincial officials occur in the light of a dam dispute on the Nimpkish River and in the shadow of American developments on the Columbia. With such a haphazard state response to the dangers of dams, it is remarkable that more damage-- and what occurred was considerable-- did not befall salmon runs in the Fraser basin. Two tentative contextual reasons may be offered to explain the limits of damage: first, the (largely) monopolistic character of power development in the Vancouver region encouraged a conservative development schedule and the intensification of existing sites rather than rapid growth into new watersheds; second, because of the collapse of resource export markets in the 1930s, a number of power schemes in important salmon streams were canceled. Salmon, arguably, were more likely to be protected in the early twentieth century by serendipity than any formal regulatory process.

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The state could control or modify dam development in a number of ways in the early twentieth century. Jurisdiction, as in so many matters, was split between the federal and provincial government. Leaving aside for the moment the complicating factor of railway belt jurisdiction (discussed in Chapter One), authority over water development fell within the provincial field and fisheries the federal. Questions of navigation and boundary waters were also assigned to the federal power, but in the cases under discussion, these factors did not play a significant part.

As alluded to earlier, provincial control of water development projects in the early twentieth century underwent a major re-organization to rein in an unwieldy system. At

the turn of the century, the relevant legislation found its core in the original Gold Field Acts of 1859; water licensing occurred on a local basis with no overall system articulation. The problem of water rights conflicts and the looming possibility of large water development projects led to change by the end of the century's first decade. In 1909 revisions to the Water Act, proposed and designed by American water experts hired for the purpose, overhauled the legislation to provide a centralized form of control that coordinated water surveys and rights, and imposed limitations of beneficial use. Overseen by a central administrator-- the Comptroller of Water Rights-- the system of granting rights became more public and judicial in character. Projects required public advertisement in advance and objections could be raised by outside parties in formal hearings overseen by the Comptroller. Premised on the virtues of centralization, rationalization and expertise, the Water Act of 1909 established a new conservation-minded system that paralleled reformist water legislation in various North American jurisdictions, as well as legislation in BC's other resource fields.<sup>8</sup> The relationship between water development and the fisheries, however, was not explicitly broached until the 1914 revision of the water act. It stated "proper provision shall be made by every licensee to the satisfaction of the Comptroller...for the erection and maintenance by the licensee of a durable and efficient fishway in the stream or other waterway affected by the works."<sup>9</sup> By virtue of the change, the provincial Comptroller could-- in theory-- control or halt water projects in order to protect the fisheries. This rarely occurred in practice.

The federal government, by contrast, could only react to dams, not halt them. In the Canadian Fisheries Act (1868), the federal department was granted the authority to demand fish passage by the owners of water projects. Section 12 of the Act stated that

Every dam, slide, or other obstruction across or in any stream where the Minister may determine it to be necessary for the public interest that a fish passage should exist, shall be provided by the owner or occupier

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<sup>8</sup>Such as the US Reclamation Act and the BC Forestry Act.

<sup>9</sup>Quoted in Arthur White, p.12

with a durable and efficient fishway, to be maintained in practical and effective condition, in whatever place and of whatever form and capacity will admit of the passage of fish through the same...<sup>10</sup>

A vestige of earlier fisheries legislation in the Canadas, the state's power to adjust dams for fish passage found precedents in various eighteenth century British and American statutes, from which the Canadian Act probably drew.<sup>11</sup> The original intention of the legislation likely referred to mill dam obstructions, but the general purpose of accommodating development to pre-existing resource rights held in the public interest, remained consistent. A formal authority, however, whether stated in the BC Water Act (1914) or the Canadian Fisheries Act (1868), was not the same thing as actual application and enforcement. As the following cases will suggest, the state's power was frequently compromised from within and without.

Apart from the legal and constitutional questions relating to regulating dams, there were technical problems. What could be done to domesticate a dam, to make it passable for fish? The answer to this problem was specific to each individual case and changed over the period under discussion. But in some variant the answer was a fishway: a device to carry salmon past dams. In the early years of the century, fishways were uniformly undependable and experimental. Not until the Devlin design of 1909 (which featured a graduated slope with riffles to allow fish to rest) did fishway designs approach a standard that took fish biology as well as engineering principles into account.<sup>12</sup> Contemporaneous with the Devlin design, fishways in Canada included a wide assortment of approaches: EE Prince invented a "fish elevator" for use in New

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<sup>10</sup>Dominion of Canada, The Fisheries Acts (1868) (Ottawa: Department of Marine and Fisheries, 1873), Vic. Reg. CAP. LX, Section 12, p 7.

<sup>11</sup>Neil Forkey, "Maintaining a Great Lakes Fishery: The State, Science, and the Case of Ontario's Bay of Quinte, 1870-1920," Ontario History 87(1) (Spring 1995): 54. On earlier British and American statutes relative to fish-dam problems, see: Gary Kulik, "Dams, Fish, and Farmers: Defense of Public Rights in Eighteenth-Century Rhode Island," in The Countryside in the Age of Capitalist Transformation: Essays in the Social History of Rural America eds. Steven Hahn and Jonathan Prude (Chapel Hill: University of North Carolina Press, 1985), pp 28-29.

<sup>12</sup>CH Clay, Design of Fishways and Other Fish Facilities (Ottawa: Department of Fisheries, 1961), pp 14-15

Brunswick dams in 1913; JP Babcock carved a trench around a rock obstruction on the Mezidian Falls the year before; and wooden sluiceways were used to pass the Hells Gate slides in 1913.<sup>13</sup> But despite the creativity of such designs fishways remained in a rudimentary condition. The Stanford zoologist Charles Gilbert once joked to his colleague Babcock that he would not spend fourteen cents for most of the devices he had seen.<sup>14</sup> In any event, fishways could only work on smaller dams. Anything above twenty-five or thirty feet judged Arthur White in a Commission of Conservation publication would be too difficult to surmount.<sup>15</sup> Thus, whatever the legal possibilities for installing fishways, it should be remembered that this legal solution to the problem of two conflicting resource interests was not always, if ever, an environmental panacea.

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The nineteenth century search for gold in the Fraser basin left a legacy of landscape artifacts grafted on to the river and its tributaries. Broken sluice boxes hung from hillsides (some of which remain), placer slides ran into rivers, filling them with mud and gravel, and wooden diversion dams interrupted natural courses before being washed out and reclaimed. In this respect, the Fraser was no different than other streams of the Pacific slope that witnessed the rapid onslaught and then departure of placer mining development in the nineteenth century. In California, in particular, the damage wrought by hydraulic methods of mining and diversion dams was legion. By the late nineteenth century, Congress initiated the California Debris Commission to remove derelict mining structures and debris.<sup>16</sup> While California moved towards restoration, however, a new

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<sup>13</sup>CSB, "Elevators Now Carry Fish up Waterfalls," Province, December 2, 1913; "Fish Elevators on the Fraser River," Daily News, December 11, 1913; CSB, "Blasting Out Fish Ladders," Province, October 18, 1912

<sup>14</sup>BCARS, GR 435, Department of Fisheries, Box 56, File 508, Gilbert to Babcock, November 14, 1913

<sup>15</sup>Arthur V White, Fishways in the Inland Waters of British Columbia (Ottawa: Commission of Conservation Canada, 1918), p 9

<sup>16</sup>In correspondence, John McNab, the federal Inspector of Fisheries compared the Quesnel dam to similar ones found on the Sacramento: Pacific Salmon Commission Archives (hereafter PSCA), File 1180.1-17 "Quesnel Dam" McNab to Deputy Minister of Marine and Fisheries, May 4, 1899. On the problem of mining and rivers in California in the nineteenth century, see: Arthur F. McEvoy, The Fisherman's

mining diversion dam rose in the Fraser basin that would make earlier structures, thrown up in the boom of the 1858 rush, pale in comparison. The dam built on Quesnel Lake in 1898 was larger and had more potential to change the river than any of its predecessors.

Quesnel Lake is located in the northeast section of the Fraser's upper basin. It sits at the base of an elaborate system of tributary lakes and streams, including the Horsefly River. Represented on a map, these tributaries look like a set of fingers pointing east, with Quesnel Lake as the connecting palm. Through this palm, and into the tributary fingers, passed a significant proportion of the Fraser's sockeye salmon population at the turn of the century.<sup>17</sup> It was at the outlet of Quesnel Lake, where the lake turned into the Quesnel River, that the mining diversion dam was sited. It was stuck, so to speak, at the base of the palm, cutting off salmon circulation.

John Pease Babcock provided a vivid description of the dam in 1902 on the second of his annual tours of the basin.<sup>18</sup> Brimming with confidence, yet still green with inexperience of BC conditions, Babcock judged the dam to be an unmitigated disaster for the commercial salmon fishery. "No other condition affecting the spawning grounds of the province is of such pressing moment," he stressed.<sup>19</sup> When Babcock first encountered the dam it must have appeared like a high fence, blocking the precious spawning beds beyond it. The dam measured eighteen feet high and had a length, from end to end, of 763 feet. A curved structure, built of wood and rock, it wrapped around the lake in an arc with a radius of 460 feet. At one end a one hundred foot wide raceway, equipped with a series of gates, allowed the lake water to re-enter the natural river course. Babcock

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Problem: Ecology and the Law in the California Fisheries, 1850-1980 (Cambridge: CUP, 1986), pp 83-84; Jeffrey F Mount, California Rivers and Streams: The Conflict Between Fluvial Process and Land Use (Berkeley: University of California Press, 1995), pp 202-226; and Carolyn Merchant, ed. Green Versus Gold: Sources in California Environmental History (Washington, DC: Island Press, 1998), Chapter 4 "The Environmental Impacts of the Gold Rush," pp101-139.

<sup>17</sup>Babcock, Report of the Fisheries Commissioner of British Columbia, 1902, p 11; Richard Bocking writes that in the nineteenth century, dominant runs to Quesnel lake could number as high as ten million: Richard Bocking, Mighty River: A Portrait of the Fraser (Vancouver: Douglas & McIntyre, 1997), p 81.

<sup>18</sup>Babcock, Report of the Fisheries Commissioner of British Columbia, 1902, p 11

<sup>19</sup>Ibid.

gauged it flushing past at between twelve and fourteen feet per second. Through one of these gates a four foot wide structure jutted into the water at a gentle incline: this was the fishway.

If size alone were not enough to explain the dam's dangers, Babcock painted a landscape of degradation and decline. Standing on the bank, he described the pointless effort of the milling sockeye, fighting to climb up the raceway. Apparently unaware of the fishway, these salmon flew back against the force of the current. At the base of the dam a lone "Chinaman" collected the discharge and cured his winter's supply at the river's edge. Walking around the site of the dam, Babcock came across the remains of a native village, deserted, he supposed because the fishery had declined.<sup>20</sup> No sign of progress could be read in the dam's legacy: it symbolized in Babcock's description, a rogue intrusion into nature's spawning factory.

Part of the effectiveness of Babcock's literary despair was that the dam could hardly be called a necessary cost of progress. It was an unqualified failure. The dam's purpose was to hold back the lake's fall freshet so that miners might scour the bed for precious nuggets of gold. The provincial government had granted the original water license to construct the structure in 1881 and this was amended three times (though for what reason is unclear, besides a possible extension). Finally in 1898 the dam was complete and ready for use. Despite its hopeful name, the original owner and builder of the dam, the Golden River Quesnel Company, found that the riverbed was more sand than gold. By the time of Babcock's visit the firm was bankrupt and the dam had passed into the hands of English debenture holders.<sup>21</sup> Later the Cariboo Hydraulic Mining Company purchased the rights, but it too would abandon the dam without discovering any gold.

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<sup>20</sup>Ibid.

<sup>21</sup>Ibid., p 13



Protest against the dam long preceded Babcock's encounter with the structure. In the year of its completion and then again the year following, the Fraser River Canner's Association wrote to the federal department of marine and fisheries to protest the threat it posed to the spawning grounds. Members of the Association "earnestly prayed that the Department" would install a fishway to allow the salmon passage.<sup>22</sup> A fishway-- entirely inadequate to the task-- did exist at the time of Babcock's visit, though it is unclear when it was installed or by whom. The Province newspaper claimed that it was installed by a federal fisheries officer who was incompetent; Babcock believed it was added by the original dam designer Joseph Hunter, CE; and Raymond Prefontaine, the federal minister of marine and fisheries, claimed in 1903 that his department had recommended against a fishway and advocated a more ambitious cut in the dam.<sup>23</sup> The thoroughly confused story surrounding the dam's regulation is evident in the record of the fishway's origin.

Damaging though the dam was, no public agency seemed ready or willing to bring its owners to heel. The decentralized provincial water licensing system in 1899 provided no practical avenue to rein in destructive ventures, had the provincial government been willing to do so-- and it showed no intentions. The federal Department of Fisheries, on the other hand, with statutory authority to force remedial work on the dam, delayed and may or may not have demanded a fishway, depending on different reports. This feeble regulatory response is understandable to a degree: the extent of the salmon resource was not well known at the time and so too the possible damage from the dam may have been unclear; further, fishway design in 1899 was not well advanced and any installation was likely to be experimental; and lastly, the federal department's regulatory focus remained the fishery and not the spawning habitat in the late nineteenth

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<sup>22</sup>PSCA, File 1180.1-17 "Quesnel Dam," WD Hardie to Gordeau, Deputy Minister of Fisheries, May 20, 1899

<sup>23</sup>CSB, Province May 17, 1901; Babcock, Report of the Fisheries Commissioner of British Columbia, 1902, p 13; PSCA, File 1180.1-17 "Quesnel Dam," R Prefontaine to RF Green, November 20, 1903 (copy).

century, no matter what its legal authority. Yet, bearing this in mind, it does seem odd that the federal department would expend considerable effort in removing native fishing weirs and so-called natural obstructions in the same years, when a dam like that on Quesnel Lake proved so much more of a threat to fisheries reproduction.<sup>24</sup> Without any hard evidence, it is tempting to suggest that the federal department preferred to earn public plaudits by 'improving' on nature and attacking native fishing, while ignoring the messy process of regulating private capital and appearing to restrict progress.

The first serious government effort to alter the dam came after Babcock's intervention in 1902, though he was by no means the prime mover. In February 1904, following the release of Babcock's report, a group of canners, representing all the major firms operating on the Fraser, arranged a conference in Victoria with the newly elected Premier Richard McBride.<sup>25</sup> Although the question of regulating dams for the fishery was a federal responsibility, the canners had tried that route in 1898 and 1899 and found it wanting. The still new provincial fisheries commission-- created because of lobbying by the cannery interest-- provided a new political opportunity to by-pass federal authority. The deputy commissioner, Babcock, was keen to prove his usefulness to the industry. And fortunately and fortuitously, the minister who had guided the creation of the commission through the legislature in 1901 was now sitting as Premier. The canners met with Babcock and McBride at the Parliament buildings and demanded the installation of a satisfactory fishway, to be overseen by Babcock. Apparently without concern for jurisdictional complications, McBride approved the idea. Shortly after the meeting, the canners sent a telegram to a Mr. Hobson, a representative of the dam's current owner, the

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<sup>24</sup>See chapter on Hells Gate, re: native fishing weirs.

<sup>25</sup>Prior to the meeting the position of the canners was made public in a call for the dam's removal: CSB, News Advertiser September 9, 1903. The issue was later taken up in the federal parliament, yet without the government taking any firm position: CSB, Colonist September 29, 1903. An account of the meeting is contained in: UBC Special Collections and Archives, IPSFC Collection, Minutes of Committee Meetings of the Fraser River Canners' Association, Vancouver, BC (1900-1904), p 294, re: meeting, February 4, 1904.

Cariboo Hydraulic Mining Co.: "Delegation Victoria Vancouver Cannery interviewed Provincial Government re Quesnelle [sic] Dam. Government agreeable to install fish ladder as recommended by Babcock. Kindly wire Babcock your consent, so necessary work can be commenced quickly insure completion this year."<sup>26</sup> The consent was apparently received for by the time of the 1904 spawning season, Babcock had installed a much wider fishway that, by all reports, was a great improvement.

The federal department raised no objection to the provincial role; in fact, it encouraged it. The federal minister, Raymond Prefontaine instructed the provincial minister of mines RF Green in 1903 that although the dam was illegal and the responsibility of the federal department, the province's original approval of the dam suggested that it too bore some responsibility.<sup>27</sup> Although this claim was without any statutory basis, it did provide the political reasoning behind the federal department's quiet acceptance of an expanded provincial role. Using the provincial fisheries commission-- even corresponding on its behalf-- the cannery interest had forced provincial action and by-passed federal jurisdiction entirely. The role of the provincial government showed it to be a client, rather than as an impartial regulator, of the cannery interest-- a reputation that the government earned in a variety of resource fields.<sup>28</sup> The federal department, on the other hand, appeared not pliant, but inattentive and possibly incompetent.

The debacle of the Quesnel Lake case may have had some limited effect in focusing federal attention on the problem of dams. In 1909, following reports of problems with a dam on the Adams River, used for flushing logs down river to the town of Chase, federal officials took an active role in cooperating with the provincial deputy commissioner, Babcock, to establish satisfactory fish passage. Although the fishway

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<sup>26</sup>Quoted in *Ibid.*

<sup>27</sup>PSCA, File 1180.1-17 "Quesnel Dam," Prefontaine to Green, November 20, 1903 (copy).

<sup>28</sup>On the McBride government's generous version of forestry policy, see: Richard Rajala, Clearcutting the Pacific Rain Forest: Production, Science and Regulation (Vancouver: UBC Press, 1998), p 99-100.

proved to be somewhat deficient, according to later fisheries scientists, there was, at least, an attempt made to force the company to comply with the federal Fisheries Act. The failure in this case was not due to federal inattention in the first instance, but to the rudimentary state of fishway technology and the lack of sustained observation.<sup>29</sup> As in the Quesnel case, the hinterland location had a detrimental effect on the ability of fisheries officials to assess problems on an on-going basis.

The Quesnel dam was finally dismantled in 1921.<sup>30</sup> The dream of gold had faded and the danger of a dam break provided the excuse for its wholesale removal. But this was not before the dam had done considerable damage to an important upper basin spawning habitat. In its early years, depending on water levels at the entrance to the dam's first fishway, the dam played havoc with runs. Although runs allegedly passed the dam in 1898 and the fishway in 1901, in 1899 they did not pass at all; in 1900 the runs were delayed three weeks; and in 1902 they stayed below the dam for nine weeks, many dying unspawned.<sup>31</sup> The success of spawners after the installation of a new fishway in 1904 was much better according to observers, but how much better is difficult to say. Of all the dams constructed in the Fraser basin before the 1940s, the Quesnel dam was arguably the most destructive.<sup>32</sup> It blocked passage to spawning areas in Quesnel Lake and the Horsefly River that provided the largest single site of spawning habitat in the basin. Babcock estimated that this region accounted for one quarter of the Fraser's

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<sup>29</sup>PSCA, File 1180.1-14, "Adams River Dam," Inspector of Fisheries to Department of Marine and Fisheries, February 24, 1909 (copy); Inspector of Fisheries to WA Found, September 26, 1911 (copy); Chief Inspector of Fisheries to WF Richardson, September 12, 1911 (copy); Inspector of Fisheries to Department of Marine and Fisheries, June 27, 1910 (copy).

<sup>30</sup>NA, RG 23, Box 829, File 719-9-26[1], "The Removal of an Historical Landmark," Canadian Fisherman, January 29, 1919; CSB, "Great Dam is Destroyed at Quesnel," Province, June 9, 1921

<sup>31</sup> PSCA, File 1180.1-87a AC Cooper, "The Causes of Decline of the Quesnel River Sockeye Runs," 1951

<sup>32</sup>EE Prince, for example, listed the Quesnel dam as the second most important destructive force on the fisheries after over-fishing in Puget Sound, and before the Hells Gate slides, in a submission to the Royal Commission of 1917 investigating the fisheries: CSB, "Streams Once Fairly Choked with Salmon," World, July 11, 1917; William F Thompson, Effect of Obstructions at Hell's Gate on the Sockeye Salmon of the Fraser River Bulletin 1 (New Westminster: IPSFC, 1945); John Roos, Restoring Fraser River Salmon: A History of the International Pacific Salmon Fisheries Commission 1937-1985 p 16.

productivity.<sup>33</sup> Retrospective reconstructions of salmon populations suggest that along with over-fishing, the Quesnel dam accounted for major swings in salmon population numbers before 1904.<sup>34</sup> After that time, the populations did rebound, only to be hindered once again when the slides in the Fraser canyon affected all upper basin areas. Besides the Adams River dam-- a notable rival in an ignoble competition-- the Quesnel Lake dam made a far greater impact on Fraser River salmon than any other dam in the basin before the 1940s.<sup>35</sup>

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In the same year that canners met with Premier McBride in Victoria to plead for fishways at Quesnel Lake, another dam rose in the lower basin, in the vicinity of Vancouver. The first hydroelectric facility in the basin, the Coquitlam-Buntzen project would be the cornerstone of supply for the BC Electric Railway Company (BCER), the dominant firm in the local utilities market. Sited at Lake Coquitlam on the upper end of the Coquitlam River, the dam diverted water through a pipeline to a powerhouse at Lake Beautiful (renamed Lake Buntzen) on the north end of Burrard Inlet. Although initially provided with fishways, after an expansion in 1909 the dam destroyed the runs. While the BCER fought competitors and played governments off against one another, it transformed the river from a place where salmon reproduced, and from which domestic water could be safely procured, to primarily a power river.

The Coquitlam-Buntzen project remade the course of flowing water. The dam hemmed in Lake Coquitlam, changing it from a headwaters to a storage basin. The reservoir held the seasonal coastal precipitation, creating a constant source of flow for the system's turbine generators. A two and one quarter mile pipeline diverted the water into

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<sup>33</sup>Babcock, Report of the Fisheries Commissioner of British Columbia, 1902, p11

<sup>34</sup>Thompson, Effect of Obstructions

<sup>35</sup> On the environmental effects of the Adams River dam, see: Mark Hume, Adam's River: The Mystery of the Adams River Sockeye (Vancouver: New Star Books, 1994), pp83-84; Roos, Restoring Fraser River Salmon, pp 16-17.

Lake Buntzen, from which it flowed into Burrard Inlet. The water was channeled through a powerhouse where turbines transformed the gravity bestowed by the flow into electrical power, ready for transmission to the urban market. Two formerly separate lakes were joined to make one source of power.

Hailed as a talisman of progress when first erected in 1903, the Coquitlam-Buntzen project represented a new level of electrical development in the Vancouver region in the early twentieth century. Although hydroelectric projects had been in operation in the Victoria region and the central interior for nearly a decade, Vancouver's electrical system remained tied to central stations deriving their main power from steam generation.<sup>36</sup> Now the Coquitlam-Buntzen facility promised to surpass that earlier stage of development and create more hydropower than any other installation in BC. Rising nineteen feet from the riverbed, the diversion dam and the powerhouse produced 1500 KWs.<sup>37</sup> The new project not only marked a technological advance for the BCER, but also demonstrated the rise of Vancouver as a regional metropolis, with the infrastructure to match its ambitions and sense of self-importance.

As in most regions of North America, electricity arrived in BC first in the form of outdoor lighting and then-- following quickly behind-- in the seat of an electric street railway car.<sup>38</sup> In Victoria incandescent street lighting arrived as early as 1883 and gained a firm footing six years later when the Victoria Illuminating Company expanded the capacity of the local generating plant; in Vancouver similar lighting did not appear until

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<sup>36</sup>On electrical development in the southeast, see: Jeremy Mouat, The Business of Power: Hydro-Electricity in Southeastern British Columbia 1897-1997; on Victoria: Patricia Roy, "The Illumination of Victoria: Late Nineteenth Century Technology and Municipal Enterprise," BC Studies 32 (Winter 1972-73): 3-24.

<sup>37</sup>PSCA, File 1180 1-15 "Obstructions-- History-- Dams-- Lower Fraser," p 1; UBC, BCER CF, "Vancouver's Power Sources Cost Many Million Dollars," Sun, May 30, 1927. The latter was a retrospective article describing hydro projects supplying Vancouver to date.

<sup>38</sup>Christopher Armstrong and HV Nelles, Monopoly's Moment: The Organization and Regulation of Canadian Utilities, 1830-1930 (Philadelphia: Temple University Press, 1986), chapters 2 and 4; David E Nye, Electrifying America: Social Meanings of a New Technology, 1880-1940 (Cambridge: MIT Press, 1990), chapters 1-3

after the fire of 1886. By 1889, electric streetcars ran in Victoria and one year later in Vancouver. Organized and financed by local businessmen who were supplied through continental networks of technological transfer, these systems remained small in scale. During the 1890s, they faced declining profits and volatile demand; one firm tried to sell its operation to the city of Vancouver without success. Seriously undercapitalized, they were ripe for plucking by interests that could envision system expansion and-- most critically-- finance it.<sup>39</sup>

The end of what George Green called the pioneering phase of light and power in BC came with the arrival of British capital and organizational expertise under the umbrella firm, the BC Electric Railway Company in 1895. In that year, RM Horne-Payne, on behalf of a group of British investors, took control of the skeletal street railway systems in Victoria and Vancouver, collected the different illuminating firms and tried to put this rag-tag collection onto a sure footing as one integrated venture. After a number of years of problems-- punctuated with a bankruptcy in Vancouver-- the provincial and municipal governments proved only too willing to accommodate. In 1895, the company obtained a charter from the provincial government that rolled over statutory rights of the pre-existing firms and provided the BCER with a mandate for further expansion through mergers and new utility fields, such as telephones. The company also obtained a 'protective clause' to insulate it from municipal competition. Six years later, the BCER negotiated a consolidated agreement with the city of Vancouver on favourable terms that tied together its different holdings.<sup>40</sup> Added to these formal agreements, over the next two decades the BCER cultivated relations with the provincial Conservative party under

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<sup>39</sup>George Green, "Some Pioneers of Light and Power," British Columbia Historical Quarterly II(3) (1938): 145-162; Roy, "Illuminating Victoria..."

<sup>40</sup>Armstrong and Nelles, Monopoly's Moment, pp 97-98

Richard McBride, reminding him when necessary of the BCER's power to disrupt the province's credit in London markets, should regulation become too onerous.<sup>41</sup>

Before 1903 a steam plant in Vancouver fulfilled all of the BCER's mainland requirements. Although the BCER began investigations of hydroelectric prospects in 1898, the directors of the firm did not rush into an early investment. Developed under a subsidiary, the Vancouver Power Company beginning in 1902, the Coquitlam-Buntzen project delivered power to the city for the first time in December 1903.

Two bookends marked 'competition' framed the development of the Coquitlam-Buntzen project from its start in 1903 to its expansion six years later. A rival in the local energy market, the Vancouver Gas Company, provided the first bout of competition. Just as the Vancouver Power Company broke ground on the new scheme, the gas company began a price war to unsettle its growing rival.<sup>42</sup> As it turned out, the challenge was not fundamental; strangely the gas company's eastern owner, William Mackenzie, pursued it as a form of revenge against the BCER's generous wage rates.<sup>43</sup> Having weathered this first storm, the BCER decided to avert future ones and bought out the gas company in 1904. With the Coquitlam-Buntzen project complete, the BCER dropped its electricity rates and watched rising demand take up its vast new supply. Competition had suggested a lesson in power marketing: lower rates expanded demand and created new markets.<sup>44</sup> From 1906 to 1912, the number of commercial customers for BCER electricity rose from 246 to 2,555.<sup>45</sup>

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<sup>41</sup>Patricia Roy, "The Fine Arts of Lobbying and Persuading: The Case of the BC Electric Railway," in David S Macmillan, ed Canadian Business History: Selected Studies, 1497-1971 (Toronto: McClelland and Stewart, 1972), pp 244-245

<sup>42</sup>Armstrong and Nelles, Monopoly's Moment, p 99

<sup>43</sup>Ibid.

<sup>44</sup>Ibid.

<sup>45</sup>Patricia Roy, "The British Columbia Electric Railway Company, 1897-1928: A British Company in British Columbia," PhD thesis, University of British Columbia, 1970, p 175



The rapid expansion of electrical use in the Vancouver region led to a further expansion of the Coquitlam-Buntzen facility beginning in 1909. At this time a new rival appeared in the hydroelectric market, the Stave Lake Power Company. The company controlled Stave Lake a possible counterweight to the Coquitlam-Buntzen site in the local geography of power, located some fifty miles east of New Westminster, north of the Fraser River. Surveyed in 1897, a year before similar investigations at Lake Coquitlam, the Stave site promised great potential power possibilities through the combination of storage in Stave Lake and a substantial head, created by an eighty foot high set of falls.<sup>46</sup> The Columbian newspaper later waxed poetic that the site made "one wonder if an All Wise Providence did not have an electric power plant in mind when fashioning this part of the face of the earth."<sup>47</sup> Organized by a local group of businessmen in 1901, the Stave Lake Power Company sought to displace the BCER from the industrial electricity market. But despite its early promise, the Stave Lake Company no sooner appeared than it dropped from the scene.<sup>48</sup> The BCER's hold on the market and its move to drop rates in 1903-1904 probably discouraged the Stave Company's immediate plans.<sup>49</sup> Yet, the company did not simply dissolve. Holding the water rights for a fine power site, it is probable that shareholders were waiting coyly for an offer from the BCER. By 1909, with no offer in sight the company was re-organized by the Bank of Montreal and re-christened, the Western Canada Power Company. With renewed financial backing, the firm plunged into the Stave Lake project, racing the BCER to completion. Both the Coquitlam-Buntzen expansion and the Stave Lake dam were completed in 1912.

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<sup>46</sup>An original letter of appraisal of the site for the Consolidated Mining Company is contained in the BCER papers: UBC, BC Electric Railway Company Papers, Box 121, File 7, James T Garden to FS Barnard, Consolidated Mining Company, April 7, 1897.

<sup>47</sup>UBC, BCER CF, Columbian, August 13, 1910.

<sup>48</sup>Roy, "The British Columbia Electric Railway Company," p 157

<sup>49</sup>Armstrong and Nelles, Monopoly's Moment, p 100

The competition could not help but be a little unsettling for the BCER's management. BCER manager Johannes Buntzen, for example, felt the threat keenly. It required the self-confidence of the director Horne-Payne-- assuming he could control the spending habits of the City-- to convince Buntzen that no rival would stand a chance of raising the necessary funds in the London bond market to wage a serious challenge.<sup>50</sup> When a doubtful shareholder wrote the company in 1909 to ask how the Stave threat could be held off, he was soothed by one BCER manger with the statement, "Our attitude in regard to Stave Lake is that there are water powers within fifty miles of Vancouver, mounting up to 500,000 HP on which we hold engineers' reports, we need not be in the least disturbed by an occasional development."<sup>51</sup> Although the BCER did not crush its competitor, it managed to arrange a marketing agreement with the WCPC in 1913 that saved both competitors from a price war: the BCER held on to lighting and heating contracts, as well as those with a load of less than 120 kws, while the WCPC gained industrial customers with a load of over 150 kws. Contracts in between these two categories would be fair game for both.<sup>52</sup> Added to the marketing agreement, the BCER promised to purchase from the WCPC at least five thousand kws and expand that load over twenty years. In a growing market, this collusion--and it was that-- provided the BCER with a flexible supply should its demands grow.<sup>53</sup> It stands to reason that the BCER did not purchase the WCPC outright in 1912, but waited until 1920 when a growing market suggested the need for further expansion.<sup>54</sup> Without having to turn a

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<sup>50</sup>Armstrong and Nelles, *Monopoly's Moment*, p 100

<sup>51</sup>UBC, BC Electric Railway Company Papers, Box 6, File 6-B 180e, RH (Manager) to FC Wade, August 16, 1909 (copy)

<sup>52</sup>Roy, "The British Columbia Electric Railway Company," p 174

<sup>53</sup>*Ibid.*

<sup>54</sup>And shoulder it they did: in 1916, the WCPC was "financially embarrassed" as the official BCER history delicately puts it, when it was unable to meet its bond interest: City of Vancouver Archives, Ad Mss 321 BCER Co. Ltd., Vol 1, File 1, BC Electric Railway Company General History," p 18. Another relevant factor in the timing of the purchase was the BCER's desire to remove a possible take over scheme of the city of Vancouver.

shovel, the firm had displaced the risk of another hydroelectric development onto another competitive concern, yet stood to reap a number of significant benefits.

Apart from competitors, the BCER's Buntzen-Coquitlam project gained some spirited critics in its first decade of development, but as with the competition, the company turned the criticism to its advantage. As in the Quesnel case, the Fraser River Cannery Association raised a number of concerns about effects on local salmon runs with the development of the dam at Lake Coquitlam. Previously, the lake served as spawning grounds for an early run of Sockeye (dubbed "bastard sockeye" by local fishery authorities); and the Coquitlam River provided spawning habitat for Coho and "Dog Salmon" (probably Chum).<sup>55</sup> Guided by the federal Department of Fisheries, the Vancouver Power Company duly installed a twelve-foot wide fishway in the dam and agreed to release water over the dam in May when the Sockeye ran.<sup>56</sup> Despite these actions, complained the Fraser River Cannery Association in 1906, the fishway did not work. WD Burdis, Secretary of the Cannery Association, had information from a local observer that none of the over one thousand migrants at the base of the dam in 1905 passed through the fishway. Part of the problem was surely technical, but Burdis offered a more conspiratorial possibility: the firm was deliberately ignoring the fishway in order to fend off another set of critics entirely-- the local municipalities.<sup>57</sup>

Before becoming a power reservoir, Lake Coquitlam was not only a spawning habitat but also a domestic water supply source for the surrounding municipalities of Coquitlam and New Westminster. After the dam's construction, municipal politicians frequently raised the fear that the water supply would be made impure. Rotting salmon, no longer cleared by river circulation after spawning, posed one such possible source of

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<sup>55</sup>PSCA, File 1180.1-12 "Coquitlam Dam" CB Sword to EE Prince, Dominion Commissioner of Fisheries, April 2, 1904

<sup>56</sup>Ibid.

<sup>57</sup>PSCA, File 1180.1-12 "Coquitlam Dam" WD Burdis to CB Sword, March 19, 1906

pollution. The general flooding produced other problems as well. Pre-existing vegetation in the riparian zone and the surrounding forest decomposed in the reservoir and affected water quality. From the beginning, the municipalities challenged the BCER's dam on the grounds of possible pollution, and renewed calls for changes in water treatment in 1907 and later in 1913, following a series of studies on water chemistry.<sup>58</sup> It is not unimaginable that the fishways-- one potential source of pollution-- were made inoperative in order to allay a controversy over water purity. At the very least, the fishway once found to be ineffective was not improved. One form of dam criticism may have been employed to quash another.

Yet, the BCER by no means submitted to the concerns of the municipalities. Its manager simply bided his time until an opening appeared to turn the criticism to advantage. After the municipalities complained in 1907 about the possible threats to water purity and dam safety as a result of a rise in the water level, the BCER used the criticism as an argument in favour of expansion. A bigger dam, the BCER manager Johannes Buntzen stated innocently to the press during his visit to the coast in 1907, would surely be safer.<sup>59</sup> Calling on political debts and creating some of their own, the BCER secured provincial support then federal approval to build on lands surrounding the lake. After most of the real decisions were made, and the appropriate donations to party coffers pledged, the provincial government granted the BCER the desired license to expand the project following a series of hearings in 1909 with BCER, municipal and federal representatives present.<sup>60</sup> The license allowed for a new dam, an expanded pipeline and a larger powerhouse, on the condition that the foundation was secured and

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<sup>58</sup>UBC, BC Electric Railway Company Papers, Box 74, File 1474, "Coquitlam Dam". This file contains much contextual material around the water quality controversy, and copies of the chemical analyses from 1913.

<sup>59</sup>CSB, "Coquitlam and the Dam," Columbian, May 18, 1907

<sup>60</sup>Patricia Roy, "The Fine Arts of Lobbying," pp 241-243

that a provincial engineer could monitor water quality.<sup>61</sup> In a time-honored tradition of backroom lobbying and taking advantage of jurisdictional rivalry, the BCER utterly outflanked the local municipalities.

In the background, the fishway, neglected and forgotten, was swept aside in the expansion. The new dam planned for Lake Coquitlam was to be substantially higher than the original, standing seventy feet at its tallest point from the riverbed. If the fishway in the first dam was unsuccessful, how was this new dam to be modified to allow fish passage? The problem seemed insoluble to the federal Department of Fisheries. N Venning, the Dominion Superintendent of Fisheries wrote to CB Sword, the BC Inspector of Fisheries in the fall of 1909 to ask whether the fishway question should be put to rest. He had received representations, Venning wrote, that the fishway did not work and that whatever fish had passed needed to be removed after spawning because of the risk to the purity of the municipal water supply. Given the height of the dam and these other calls on "the general interest," he asked whether any further action was prudent.<sup>62</sup> Sword, the fisheries man on the spot, believed not. Although he thought that the past performance of the fishway was better than generally supposed, he did not think that its future held much point or that the dam should be held up to accommodate fisheries concerns. The run was minor in the grand scheme of things, while the dam was important. And in any event, he wrote, Coho salmon "are apparently not very particular where they spawn." Perhaps they would simply migrate elsewhere.<sup>63</sup> It was a disingenuous hope. But the views of Sword were probably not out of line with local canners. No record of protest exists surrounding the expansion and removal of fishways. And John Pease Babcock, so conspicuous a presence in the Quesnel Lake controversy, made no entrance at Lake Coquitlam. Either

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<sup>61</sup>CSB, "BC Electric Power Scheme," News-Advertiser, February 12, 1909; "Dam at Coquitlam is Sanctioned," Province, April 23, 1909.

<sup>62</sup>PSCA, File 1180.1-12 "Coquitlam Dam," Venning to Sword, September 3, 1909.

<sup>63</sup>PSCA, File 1180.1-12 "Coquitlam Dam," Sword to Venning, October 7, 1909

the threat was too small or the power politics too over determined to attract these other players.

After the completion of the new dam in 1912, it was only a matter of time before the runs were depleted. In the fall of 1913 when the cycle of Sockeye that had left Lake Coquitlam in 1909 returned, Coquitlam natives appealed for a special fishery, fearing that this would be the last. Gathering signatures from local commercial fisheries operators in Vancouver, the natives petitioned the federal department of marine and fisheries for fishing access and the right to sell their catch commercially.<sup>64</sup> As this was deemed to be the last run, the department permitted the request.<sup>65</sup> In the early fall of 1913, at the time of the discovery of the Hells Gate slides, natives stood below the Coquitlam dam, gaffing the last sockeye of a soon-to-be extinguished local stock. Remembering these two episodes in 1919, one resident of New Westminster named Parnell Keary wrote a letter to the editor of the Sun stating that native fishing had not diminished the Fraser's salmon: the white man's barricades were to blame.<sup>66</sup> It was an unusual point of view in its day, a clever inversion of rhetoric. Yet, the BCER, the builder of the Coquitlam barricade had no concern for such carping: the municipalities were in their place, the fisheries department was entirely cooperative, and the cannery interest or local natives posed no threat. Against the progressive rise of the Lake Coquitlam dam, the native concerns were lost sight of, if even imagined by the BCER. Natives were just one other interest whose pre-existing relationship with Lake Coquitlam had to be ended. This was now a power lake, materially and politically.

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Not until the 1920s did the BCER need to expand the power supply created through the Coquitlam-Buntzen project and the 1913 purchasing agreement with the WCPC.

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<sup>64</sup>CSB, "Permission Sought by Indians to Fish," Sun, April 23, 1913

<sup>65</sup>CSB, "Indians May Catch Salmon," Columbian, May 8, 1913

<sup>66</sup>CSB, "Salmon Horde Perish In Effort to Pass White Man's Barricades," Sun, October 12, 1919

Following a recession after the First World War, rapid growth in manufacturing and resource export industries drove a steady increase in power consumption in the city and beyond. The opening of the Panama Canal, and the Crow's Nest Pass Agreement fueled new export possibilities for BC's forestry and mining industries and re-directed portions of the prairie wheat trade through Vancouver.<sup>67</sup> Manufacturing concerns in the city increased their numbers by fifty percent from 441 in 1921 to 681 in 1931.<sup>68</sup> "Industrial customers," writes Patricia Roy, "were, by far, the largest individual consumers of power [during the 1920s]. Although the street railway remained the major user of electrical energy, the sawmills, the sugar refinery, the oil refineries, the department stores and the new grain elevators provided the backbone of the company's power business on the mainland."<sup>69</sup> Domestic consumers drew more power over the decade as well, as the BCER began to market its electricity more vigorously to households by selling electrical appliances, and extended transmission-- however grudgingly-- to the municipalities of Agassiz, Maple Ridge and West Vancouver.<sup>70</sup> Most importantly, the city's population more than doubled over the decade to 246,593 by the time of the 1931 census.<sup>71</sup> In the province as a whole, Mary Doreen Taylor reports, the number of domestic power customers doubled from 69,909 in 1920 to 125, 171 in 1930.<sup>72</sup>

The BCER met the challenge of the growing market of the 1920s by expanding its supply network. After having survived a threat of municipal take-over in Vancouver in 1917, and provincial regulatory threats for the next three years, the firm set about firmly staking its monopoly status in the 1920s, cannibalizing rivals and small concerns and

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<sup>67</sup>Jean Barman, The West Beyond the West: A History of British Columbia (Toronto: University of Toronto Press, 1991), pp 237-239

<sup>68</sup>Canadian Census, 1931 figures cited in Roy, Vancouver: An Illustrated History (Toronto: Lorimer, 1980), appendix section.

<sup>69</sup>Roy, "British Columbia Electric Railway Company," p 305-306

<sup>70</sup>Ibid.

<sup>71</sup>Canadian Census, 1931 figures cited in Roy, Vancouver, appendix section.

<sup>72</sup>Mary Doreen Taylor, "Development of the Electricity Industry in British Columbia," MA Thesis (Geography), University of British Columbia, 1965, p 45

setting in motion an ambitious building program.<sup>73</sup> It purchased the Western Canada Power Company in 1920, and conducted a substantial re-fit of the Stave Lake dam and its powerhouse in 1924. Then it developed the Alouette site, taken over in the purchase of the Burrard Power Company in 1917, in order to divert water into Stave Lake to enhance the generation potential of the existing facility. And later, with steady increases in demand, the BCER investigated both the Ruskin dam, sited on the Stave River, below the original Stave Lake dam, and the Bridge River project, purchased from a firm by the same name in 1925. The BCER added new territory to its empire as well. The company purchased local electrical systems on the north end of Vancouver Island and at Kamloops in 1929.<sup>74</sup> The second purchase included the dams formerly owned by the city of Kamloops on the Barriere River, a tributary of the Thompson.<sup>75</sup>

By the late 1920s it seemed as if the growth would never end, and the BCER found itself racing to meet production targets. In 1927, a BCER engineer estimated that the firm would experience an annual increase of ten per cent in its total electrical load, which would require a doubling of output in seven or eight years. Mainland plants produced a total of 123,325 kv.a at the time. To double this capacity by 1934, around \$25,000,000 would need to be expended in new hydroelectric projects, transmission and related facilities.<sup>76</sup> In the same year company official considered two large projects: one at Bridge River and the other on the lower Stave. The first promised a considerable increase in potential load, and despite a relatively long transmission distance from the

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<sup>73</sup>On the threats to the BCER in the late 1910s, see: Armstrong and Nelles, Monopoly's Moment, pp 261-262.

<sup>74</sup>UBC, BCER CF, "BCER Buys Island Plants," Province, June 24, 1929. The purchase on the island secured systems in Port Alberni and Alberni. The article notes that the only remaining hydro projects outside of the BCER system on the Island were the Canadian utilities plant at Nanaimo and Duncan and the Canadian Collieries facility on the Puntledge River. Of course, this ignored a number of smaller concerns.

<sup>75</sup>For a brief description of the Barriere dam, see: Shirley Wittner, "Barriere: Powerhouse of the Thompson," in Reflections: Thompson Valley Histories eds. Wayne Norton and Wilf Schmidt (Kamloops: Plateau Press, 1994), pp 152-157.

<sup>76</sup>EE Carpenter, "The Water Developments of the Alouette-Stave-Ruskin Group of the British Columbia Electric Railway Company, Limited," Engineering Journal X(1) (January 1927): 17



upper Fraser canyon, company engineers believed that a short cut via the Capilano River on Vancouver's North Shore could keep it affordable.<sup>77</sup> The second was a smaller project but held the advantage of tying into existing BCER facilities: it would be sited below the existing Stave Lake dam, putting falling water through another turnstile, so to speak, and its power could be delivered through established transmission lines. Ultimately, both projects would be announced, but only the Ruskin project would move forward in 1928. The growth of power demand at the time required an almost immediate addition to the BCER's load and all resources were focused on getting the Ruskin project running before turning to the larger project at Bridge River.<sup>78</sup>

Even with this strategy, BCER managers worried that the firm might not be able to keep pace with demand. BCER manager, WG Murrin wrote to Vice-President AT Goward in May of 1929 without disguising his concern: "It is impossible for me to over-rate the seriousness of this matter. Unless the Ruskin plant is in operation by October of next year, Vancouver will be short of power and her industries on part time, and the time schedule is a very close one and does not allow for any unseen delays. Only by continuous work can we get this plant through in time and I shall be glad if you will explain the seriousness of this matter to the Attorney-General when you are asking for the necessary permission."<sup>79</sup> The problem would turn out to be worse than that: below average rainfall in the Summer and Fall of 1929 left the BCER's mainland storage capacity below target.<sup>80</sup> Nature's vagaries were combining with market fluctuations to push the BCER to the wall. Beyond appealing to the Attorney General, the BCER pleaded with suppliers for expeditious service. Canadian Westinghouse, for example,

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<sup>77</sup>UBC, BCER CF, "Choose Route of Power Line," Province, May 26, 1928

<sup>78</sup>UBC, BC Electric Railway Company Papers, Box 158, File 6, AC Clogher, Hydraulic Engineer to CE Calder, President American and foreign Power Co., NY, January 16, 1929 (copy); Murrin Diary, December 15, 1928, "Interview with Clogher".

<sup>79</sup>UBC, BC Electric Railway Company, Box 158, File 6, Murrin to Goward, May 3, 1929 (copy)

<sup>80</sup>UBC Electric Railway Company Papers, Box 158, File 6, Murrin to NS Braden, November 25, 1929 (copy)

was warned of the impending "catastrophe" should its generator not arrive on time.<sup>81</sup>

During the summer of 1929 workers for the Stuart Cameron and Co contractors worked double shifts: four hundred and seventy-nine men installed the powerhouse and dam in a year at a cost in the range of six million dollars.<sup>82</sup> The looming catastrophe was averted.

The expansion program of the 1920s, as the Ruskin example suggests, did not allow for much reflection or public consultation about other consequences of dam building. But whereas the Coquitlam-Buntzen project had been delayed and hampered by municipal criticism and jurisdictional battles as well as complaints from fisheries officials and canners, the expansion program centered at Stave Lake proceeded almost without objections.<sup>83</sup> The placid waters of the reservoir mirrored the quiet, and non-existent protests of traditional critics. Why was this so? The lack of municipal criticism is easily accounted for: the Stave Lake site was further from the city; there was no pre-existing domestic water connection and hence no conflict of interest. The absence of significant fisheries concern is more difficult to explain.

One relevant factor was that the Stave River projects posed fewer environmental threats to salmon habitat than might have been expected. Stave Lake sat, originally, above an eighty-foot high set of falls, beyond the reach of migratory salmon species.<sup>84</sup> Thus the two projects on the Stave River at Stave Lake and lower on the river at the Ruskin site did not directly block a migration route. They may well have disturbed

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<sup>81</sup>UBC, BC Electric Railway Company Papers, Box 158, File 6, Murrin to NS Braden, Vice President, Canadian Westinghouse Co., August 17, 1929 (copy)

<sup>82</sup>UBC, BC Electric Railway Company Papers, Box 158, File 6, Mr. Carpenter to Murrin, July 24, 1929. Another report, dating from 1940, pegged the cost of the first Ruskin development at \$6,470,468.65: file as above, EE Carpenter, Construction Department to Murrin and Adams, March 6, 1940

<sup>83</sup>I have found evidence of two complainants: a Mr. Stoltze of Stoltze Manufacturing complained that if hydraulicking occurred in the construction stage, the river would be silted up and make transport of his products difficult. He was assured that this would not be so: UBC, BC Electric Railway Company Papers, Box 158, File 6, HA Stoltze to Stuart Cameron and Company, April 5, 1929. Another Complaint was registered by a local conservation association, but with regard to scenic rather than fisheries concerns: file as above, Anthony S Taulbut, Mission Conservation Association, to NS Lougheed, Minister of Works, Victoria, September 20, 1930 (copy forwarded by Ministry).

<sup>84</sup>PSCA, File 1180 1-15 "Obstructions-- History-- Dams-- Lower Fraser," April 18, 1940, p 4

spawning down river by altering water discharge patterns, but they did not directly obstruct runs. The fact that the BCER created most of its expanded mainland supply from this location delayed its move into other rivers near Vancouver-- on which it held engineering reports and water rights. The intensification strategy thus incidentally preserved salmon habitat elsewhere by focusing growth in a location without significant risks to salmon.

Where damage did result from the Stave-centered program was in the diversion of the Alouette River. At the time of construction in 1923, fisheries officials established that the river was used by five species of pacific salmon.<sup>85</sup> Yet, no fishways were installed at the project and the federal Department of Fisheries, or canners organizations raised little protest. On the assumption that the dam would flood previous spawning grounds, Chief Inspector of Fisheries, JA Motherwell decided against insisting on fishways to the BCER, judging the situation hopeless. "Under the circumstances," Motherwell wrote JP Babcock in 1923, "it has been decided that no further action should be taken by this Department and that there should be no obstacle placed in the way of the proposed development."<sup>86</sup> In the subsequent decade, the salmon runs to the Alouette fell off markedly, despite fruitless attempts to relocate thousands of spawners in 1927, the year of the dam's completion.<sup>87</sup> Over the next half-century spawners in the lower river survived in diminished numbers, facing the erratic schedule of water releases based on waterpower principles, not natural run-off. The inaction of the federal department built on established precedents, but why did the cannery interest, or the provincial fisheries commission raise no protest?

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<sup>85</sup>Ibid. p 5

<sup>86</sup>BCARS, GR 435, BC Department of Fisheries, Box 63, File 590, Motherwell to Babcock, November 5, 1923

<sup>87</sup>PSCA, File 1180 15 "Obstructions-- History-- Dams-- Lower Fraser," p 5

Part of the answer is that the importance of the Alouette River as a salmon stream paled when compared to other possible sites of development being proposed in BC during the late 1920s. Two projects in particular gained wide public attention and initiated an important round of policy discussions between the provincial and federal governments on the looming conflict of fish vs. power: the Campbell River scheme, announced by Crown Willamette Paper in 1927 and the Nimpkish River project initiated in 1928 by Canadian Forest Products.

An editorial published in the Province in March 1927 stated a truism that would only be underlined with the announcement of the Campbell River and Nimpkish projects in the months ahead: "Our forests," it read, "and our power streams are indissolubly joined together by the physical facts of nature, and they are almost as closely joined in the economy of industry."<sup>88</sup> What the editorial meant was that the ability to add value to forest products, to process them and turn wood into pulp and paper, depended on access to cheap water power; thermal plants or extensions from existing transmission systems were prohibitively expensive.<sup>89</sup> As continental markets for pulp and paper boomed in the 1920s, waterpower sites on coastal inlets near to centers of timber supply became highly sought after. On the northern half of Vancouver Island-- a region rich in timber resources-- the Campbell River and the Nimpkish represented two of the largest hydropower sites on the Island.

The Campbell River project, announced in the fall of 1927, was immediately complicated, not by protests from the cannery interest, but by park preservationists.<sup>90</sup> Buttle Lake, the headwaters of the river, was located within Strathcona Provincial Park, established in 1911. During the 1920s, a number of battles were fought over the park.

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<sup>88</sup>CSB, Province, May 6, 1928

<sup>89</sup>Mary Doreen Taylor, "Development of the Electricity Industry," pp 47-48

<sup>90</sup>A fine study of the controversies surrounding the park is: Paula Louise Eng, "Parks for the People? Strathcona Park 1905-1933," MA thesis, University of Victoria, 1996.

TD Pattullo, the Minister of Lands and future Premier, first allowed holders of timber leases in the park to develop them in 1926, thereby dispensing with an earlier tacit understanding that timber leases antedating the park's establishment would not be exercised. The announcement of the Crown Willamette's plans to dam the river superseded an earlier claim on the river by the Campbell River Power Company. Pattullo canceled this in 1927-- presumably for lack of development-- and Crown Willamette was granted the right to proceed. Pattullo also introduced revisions to the Strathcona Park Act allowing for changes in the lake level. A storm of critical press coverage followed, led by the Province, and various interests rose to denounce the scheme, including the Victoria Chamber of Commerce and various park preservation groups.<sup>91</sup> Crown Willamette was not quick to exercise its right to develop the site and in the election of 1928, the Buttle Lake development became a partisan issue, with the Liberals for and the Conservatives against. The Conservative victory under Tolmie did not lead to an immediate rescinding of the license-- it held for another year. But the province did purchase timber leases on the edge of the lake, threatening to sue Crown Willamette for damages, should the lake be flooded.<sup>92</sup> This holding tactic worked. When the water license expired in 1929, the province revoked Crown Willamette's right and invited other bids. The BCER obtained the same in 1931-1932, though with no immediate development plans.<sup>93</sup> The politics of scenery and park preservation undermined the Buttle development, without once involving the cannery interest or the federal Department of Fisheries. The dispute was over a lake, aesthetics and tourism, not fish; yet it did focus public attention in an unprecedented fashion on the need to consider hydro development's destructive capabilities.

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<sup>91</sup>Ibid., pp 66-68

<sup>92</sup>Ibid., pp 75-76; UBC, BCER CF, "Repudiation of Contract is Alleged," Province, March 8, 1929; "Minister Defends Cancellation of Power Agreement," March 9, 1929

<sup>93</sup>Eng, "Parks for the People?" p 82

In the year after its blunt treatment of the Cowichan River situation, the provincial ministry of lands, now under a Conservative government, granted a water license on the Nimpkish River to Canadian Forest Products in order to erect a two hundred foot high dam for waterpower development. The dam threatened to destroy a significant fishery and harm other interests besides.<sup>94</sup> During the water licensing hearings, JC MacDonald, the provincial Comptroller of Water Rights, heard from lawyers representing rival forestry firms with timber leases in the area and another representing the Canadian Fishing Company; representatives of the federal Department of Indian Affairs made submissions, as did JA Motherwell of the Department of Fisheries and Lindley Crease of the Anglican Mission at Alert Bay, representing a group of native fisherman.<sup>95</sup> Concerns were raised that the dam would end an important fishery, flood valuable timber lands and inundate sections of Indian reserves as well as destroy the native food fishery. Nevertheless, no substantial changes were made to the license originally granted by the provincial ministry of lands. One new stipulation called on the developers to satisfy the federal Department of Fisheries should a fishway be called for-- in other words, the provincial ministry simply instructed the company to obey the law as contained in the Fisheries Act. The Company for its part also pledged to compensate natives for lost lands, through the Department of Indian Affairs, although it was the fishery rather than the land base that natives were more concerned about.<sup>96</sup> In this instance the provincial ministry of lands decided in favour of the importance of water development over the fishery or other interests. Perhaps after the Campbell River debacle, and after a decade of spending on provincial water surveys, the Water Comptroller JC MacDonald and the provincial Conservatives felt that an initiative of this kind was overdue.

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<sup>94</sup>UBC, BCER CF, "Power Dams Worry Fish Interests," Province, May 6, 1928.

<sup>95</sup>UBC, BCER CF, "Power Project Seen as Menace to Salmon Run," Province, June 20, 1928

<sup>96</sup>UBC, BCER CF, "BC Approves Plans for Big Power Plant Near Nimpkish River," Province, March 28, 1928

At any rate, the scope of the project entirely re-cast the nature of the fish-power problem in the province and led to an important re-consideration of the limits and obligations of provincial and federal policy. Having identified the federal Department of Fisheries as a central player in a possible dam development-- a fact reported widely in the press-- the provincial Comptroller of Water Rights placed an unprecedented public focus on the federal department's legal authority to regulate dams. Without much practice in exercising this authority, the federal department found itself suddenly under pressure from the cannery interest and others to see that a functional fishway be added to the project. The federal department referred the matter to the department of justice for guidance as to its legal authority and tried to brief the cannery interest, through the BC Cannery Association, as to the difficulties that might be encountered, both legally and technically.<sup>97</sup> Given the height of the dam, many assumed in the press and behind closed doors, that little could be done to correct the matter.

In the year following the water hearings, before the Canadian Forest Products Company had broken any ground, a meeting of fisheries officials, salmon scientists and interested persons occurred in Vancouver under the official sponsorship of the recently created International Salmon Investigation Federation.<sup>98</sup> Much of the discussion centered on the question of hydro dams. For the problem-- as all were aware-- was not limited to the Nimpkish River. On the Columbia River dam projects were much under discussion. By the early 1930s dams would be under construction at Rock Island and Bonneville. As if the Columbia suggested the Fraser's future, JA Motherwell the federal Chief Inspector of Fisheries in BC, warned the meeting, "there [is] nothing to prevent the establishing of a hydro-electric plant at Hells Gate, which would block the Fraser and the recently signed

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<sup>97</sup>UBC, IPSFC Papers, BC Salmon Cannery Association Minute Book, December 13, 1928. At this meeting Major Motherwell briefed the cannery interest on the Nimpkish situation and responded to questions.

<sup>98</sup>UBC, BCER CF, "Effect of Hydro-Electric Projects on Salmon Streams," Province, April 8, 1929

salmon treaty of all its value."<sup>99</sup> Both American and Canadian representatives spoke of the necessity of devising ways to pass fish successfully around large dams and hoped that appropriate policies could be devised between different agencies and levels of government to make fishways and ladders an integral aspect of dam design, with the costs to be born by power interests.

This discussion and interaction between Canadian and American officials presaged an important policy discussion that occurred the same year between the provincial ministry of lands and forests and the federal Department of Fisheries. Initiated by a provocative memorandum, written by the Provincial Comptroller of Water Rights in April 1929, the discussion focused on the limits that should be placed on power interests in the protection of the fishery resource.<sup>100</sup> Drawing on the example of the Nimpkish case and another application on the Stamp River, still under consideration, JC MacDonald, the provincial Comptroller put the problem starkly: "Unless means can be found to pass fish over such dams, the development of several million horsepower must be held up or what remains of the salmon industry must be completely destroyed."<sup>101</sup> MacDonald stressed that the costs and benefits of both industries would have to be weighed with each new project. Although willing to cooperate with the federal authorities, he stressed that it was their responsibility to devise means to overcome the technical difficulties ahead. The provincial role was to weigh between competing interests and decide.

When this document reached the provincial commission of fisheries, it gained additional commentary, also forwarded to Ottawa. John Pease Babcock, the perennial deputy commissioner showed his true progressive colours and recommended the

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<sup>99</sup>UBC, BCER CF, "Our Salmon Streams," Province, April 8, 1929

<sup>100</sup>BCARS, Department of Lands and Forests, 'O' Series, File 001689, JC MacDonald, Comptroller of Water Rights memorandum to the Commissioner of Fisheries SL Howe, April 29, 1929

<sup>101</sup>Ibid.



formation of a board of experts of some kind to investigate the problem on an on-going basis.<sup>102</sup> SL Howe, the provincial commissioner, on the other hand, underscored the importance of Babcock's suggestion, in a cover letter delivering MacDonald's memorandum for discussion to federal officials, by airing the kind of reasoning that would inform provincial decision-making:

Consideration of the relative annual values of fish and of the power which can be developed indicates clearly where the greater public interest lies. At the hearings held by our Comptroller of Water Rights for the Nimpkish River, Vancouver Island, one of our minor salmon streams, the annual value of the fish caught was placed at \$60,000, and a low estimate of the yearly value of the power that is to be developed shows it to be worth \$1,200,000. Surveys made of the Fraser between Lytton and Quesnel show that at minimum flow 2,800,000 horsepower can be produced yearly, and its value is placed at \$56,000,000. The average value of the fish of the Fraser during the past five years is placed at approximately \$2,000,000. The peak year of the salmon catch in the Fraser River System produced less than \$30,000,000.<sup>103</sup>

The fish-power problem would be treated as a question of cost-benefit ratios, Howe said. Coming from a provincial commissioner charged with attending to the best interests of the fishing industry, this was blunt talk indeed.

Over the next few months, members of the federal Department of Fisheries, but most particularly the deputy minister, WA Found, attempted to respond to the provincial provocations, with some of their own.<sup>104</sup> In his first response, Found immediately dispensed with the idea of a special board of experts to investigate the matter. There was certainly the need to examine broad aspects of fish-power problems, but it was his experience that each case presented its own peculiarities that could only be met by focused investigation. More radical was his suggestion that power companies should bear the brunt of costs for fishways, even though they might be somewhat experimental. And, further, that if fishways should be found impossible to operate then the developing interest concerned should be asked to fund the establishment of an appropriate salmon

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<sup>102</sup>BCARS, Department of Lands and Forests, 'O' Series, File 001689, John Pease Babcock memorandum to Comptroller of Water Rights, May 1, 1929. The substance of Babcock's point was included in Howe's correspondence with the federal department.

<sup>103</sup>BCARS, Department of Lands and Forests, 'O' Series, File 001689 SL Howe, Provincial Commissioner of Fisheries to Pierre Cardin, Minister of Fisheries, Ottawa, April 30, 1929

<sup>104</sup>Although not quoted below, JA Motherwell, the federal Inspector of Fisheries in BC was also party to the discussion: BCARS, Ministry of Lands, 'O' series correspondence, file 0016689, Motherwell to Babcock, May 1, 1929.

hatchery in the vicinity.<sup>105</sup> This last suggestion filled JC MacDonald with frustration.<sup>106</sup> While he agreed to consider each case on its own merits, he assured the federal deputy minister that he would not adopt as a matter of general policy the suggestion that a hatchery subject to federal approval should be made a part of a provincial water license. "To give such an undertaking," wrote MacDonald, "would, in effect, give you [the federal department] power to veto any license we may issue by making requirements prohibitive."<sup>107</sup> In reply, Found tried to assure MacDonald that he intended no infringement on jurisdiction, but that this did not diminish his department's belief that "if a franchise is given to any person or concern for a water power, such person or concern should be required to bear the full cost of maintaining the fish supply in the particular stream by such means as my Department finds to be most adequate. (emphasis in original)"<sup>108</sup> Although the discussion ended here, JC MacDonald revealed in private correspondence to the provincial fish commissioner, SL Howe, the extent of his disagreement with Found's suggestion. After reiterating his belief that the industry of greater value should be allowed to survive while the other was left to hang, he broached the problem of costs in any given remedial effort to maintain fisheries. He suggested that it would be unfair to the public interest to place all the costs of fish protective works on power companies. The reason being that such works only protected a narrow commercial interest, whereas power production was consumed generally. Furthermore, he added,

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<sup>105</sup>BCARS, Department of Lands and Forests, 'O' Series, File 001689 Found to Deputy Minister of Lands, Victoria, June 18, 1929

<sup>106</sup>In correspondence with the provincial commissioner of fisheries, for example, MacDonald railed that if the federal department wanted hatcheries, they should revise the federal Fisheries Act, not depend on his department to carry out federal initiatives: BCARS, Department of Lands and Forests, 'O' Series, File 001689 MacDonald to Commissioner of Fisheries, July 16, 1929.

<sup>107</sup>BCARS, Department of Lands and Forests, 'O' Series, File 001689 MacDonald to Found, June 29, 1929 (Copy)

<sup>108</sup>BCARS, Department of Lands and Forests, 'O' Series, File 001689 Found to Howe, September 14, 1929 (copy)

power would be used locally for economic development, whereas most fish were sold abroad.<sup>109</sup> These more avowedly partisan claims were not repeated to Found.

In a twist of events that must have amused federal officials and infuriated MacDonald, the Nimpkish dam was never built. With the stock market crash of October 1929, the export based resource economy of British Columbia began to slide, as quickly and disastrously as had the rock and rubble at Hells Gate in 1913. Managers of the Canadian Forest Products Company postponed the project, but eventually it was cancelled. Power development associated with pulp and paper production, however, was not the only hydro-related concern that delayed development in response to the economic shifts. The BCER, after completing the Ruskin dam in 1929, did not proceed with its planned Bridge River development as earlier envisioned. Demand for electricity in Vancouver plateaued after a decade of steady growth. Over the 1930s the company accommodated limited rises in consumption by simply installing more powerful generators at the Stave Lake site.<sup>110</sup> Once again, the BCER did not attempt to expand its market with cheap supplies of excess power, but followed demand as closely as it dared, the better to save on its capital budget.

It was an odd turn of events after a decade of such rapid growth. Despite the controversy and acrimony in some quarters, the emergence of hydroelectricity as a major development concern in the province had inspired much adulation and praise-- not to mention loose, self-serving talk. "Power and progress are interchangeable terms," said George Kidd, the President of the BCER to a reporter in 1927. "There is no more accurate barometer of a country's growth than its consumption of hydro-electric

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<sup>109</sup>BCARS, Department of Lands and Forests, 'O' Series, File 001689 MacDonald to Howe, November 27, 1929

<sup>110</sup>PSCA, File 1180 15, "Obstructions-- History-- Dams-- Lower Fraser," April 18, 1940, p 4. This document reports that the Ruskin's capacity was expanded in 1938 by an additional 17,000 hp.

energy..."<sup>111</sup> Premier Tolmie, the following year delighted in the fact that BC was "wonderfully endowed by nature with the raw material for power development." Speaking to the Electric Club, he mused, "Until developed, water power produces nothing.... [yet] it is a resource that cannot be depleted."<sup>112</sup> Power was there for the taking-- or such was the lesson put to readers of the Vancouver Sun in 1927 by a local tinkerer who invented a free floating, portable power plant, lodged on pontoons. David McMaster, with much affection, called his new device, "Me and My Super Power."<sup>113</sup> The times were indeed electrifying. "By many signs," stated one Province editorial in 1928, the age of hydro-electricity "announces itself."<sup>114</sup> Such were the notes of confidence struck after a remarkable period of seven or eight years of growth.

It was a kind of confidence that British Columbians found difficult to shake. As the Ruskin dam came to completion in November 1930, all tried to avert their eyes from the stock pages of the newspaper and join in the celebration of yet more electricity. With symbolism of garish proportions, two hundred local businessmen and politicians-- including the Premier and the Lieutenant Governor-- assembled at the dam, November 18, 1930 to inaugurate its opening. Seated in the powerhouse for lunch, this group of men-- and they were all men-- represented a concentration of political and social power.<sup>115</sup> That they were dining next to turbines was a crude metaphor. But it was not only the elite that celebrated. Newspapers in the Vancouver region printed special editions, announcing the new power as if a sign of change. Newsreels, taken of the dam, played in cinemas across the city. Businessmen, bragged General Manager Murrin to HC

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<sup>111</sup>BCER CF, "Demand for Power Grows Year by Year," Star, February 26, 1927

<sup>112</sup>BCER CF, "Tolmie Sketches Possible Growth of Hydro in BC," Star, October 13, 1928

<sup>113</sup>BCER CF, "Makes Rivers Develop Power," Sun, May 22, 1928

<sup>114</sup>BCER CF, "Hydro-Electricity in BC," Province, July 24, 1928

<sup>115</sup>UBC, BC Electric Railway Company Papers, Box 158, File 6, Murrin to Premier Tolmie, October 23, 1930 (copy). Murrin explained the nature of the event to the premier in advance. The Premier confirmed his attendance in Tolmie to Murrin, October 29, 1930. Murrin stated that this would be an all-male event

Howard of Nesbitt Thomson and Co, could be found talking about it two weeks later.<sup>116</sup> Nor curiously, did the excitement fall off as the depression reduced power demand in the Vancouver economy. Between 1932 and 1937, the BCER recorded thirty thousand visitors taking tours at the Ruskin dam-- this on the outskirts of a city of some two hundred fifty thousand.<sup>117</sup> Perhaps as never before, the Ruskin plant provided a symbol of expansion desperately needed and desired in the Vancouver of the early 1930s. Yet despite appearances, the Ruskin dam announced not growth, but a period of decline in the booming Vancouver power market of the 1920s. The decade to come would witness no new building in the Fraser basin. The Bridge River project would be shelved until the end of the Second World War. MacDonald and Found would retire before the next major fish-power controversy arose. And John Pease Babcock would be dead.

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JC MacDonald, the pugnacious provincial water comptroller of the late 1920s, believed that power was a public good, whereas fish were a private concern. If the words of WA Found disputed this assumption then the actions of his predecessors, and of fisheries officials 'on the spot' did not. Since the turn of the century, state regulation of mining, lumber and power dams routinely favoured developmental interests over fisheries concerns. As a result, numerous salmon runs were damaged. It is only a wonder that more runs were not affected.

The formal authority of the federal Department of Fisheries to regulate dams remained an empty shell at the turn of the century. A vestige of earlier legislation from the Canadas, there was no clear sense of what restrictions could be placed on dams, or

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in Murrin to Fairburn, October 24, 1930 (copy). The Lieutenant Governor confirmed attendance in: AMD Fairbairn, Exec Sec to Lieutenant Governor to Murrin, October 21, 1930.

<sup>116</sup>UBC, BC Electric Railway Company Papers, Box 158, File 6, Murrin to Howard, December 4, 1930 (copy). Apart from the comment on the conversation of businessmen, Murrin also outlined the press and newsreel coverage.

how fish passage might be created. Unless encouraged, guided or forced by the cannery interest, the federal department took no strong interest in dam problems, but trained its attention instead on regulating the fishery. But even cannery pressure might not work. In the Quesnel case, the provincial role was inspired by cannery lobbying as a means to bypass the unexercised federal authority. On certain dams, such as on the Adams River and Lake Coquitlam, installed fishways did not work. Regulating dams involved a steep legal, political and technical learning curve in the 1910s and 1920s.

The limited impact of dam development on salmon habitat in BC before the 1940s was largely the product of circumstance rather than design. Although entrepreneurs dreamed of damming the Fraser--as they did near Hells Gate in 1912--, the development of hydro-electricity in the Vancouver region proceeded in an orderly pattern, based on the self-interest of a monopoly firm that sought to follow demand rather than bear the risks of catalyzing it. Hydro development did damage rivers in the lower basin, but the BCER's strategy of intensification at existing sites helped to concentrate development in a few watersheds, thereby protecting--incidentally-- salmon habitat. This firm's hold on the market helped to displace possible rivals before they could erect a competing concern. The one serious hydro rival of the BCER, the WCPC happened to construct its dam above salmon migration routes. The damage, in other words, was lessened for reasons utterly separate from the fisheries.

If the possible damage to fisheries from dams was not a concern of developers and inspired little interest in the federal Department of Fisheries, then it was also not an issue with much public salience either. Of all of the fish-dam conflicts recited in this chapter, only two could be described as inspiring much public debate: the Coquitlam-Buntzen dam and the Buttle Lake controversy. Revealingly, the reasons for public concern in both

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<sup>117</sup>Attendance figures are reported in: UBC, BC Electric Railway Company Papers, Box 158, File 6, A Vilstrup to Murrin, February 5, 1937.

of these cases had little to do with fish. Water purity and the threat of corporate control inspired concern in the Coquitlam-Buntzen protest; scenery and the integrity of parks drove debate in the Buttle Lake case. Fish made their entrance on to the stages of these public dramas as the source of water purity problems at Lake Coquitlam and the objects of recreation at Buttle Lake.

Cannery interests defended salmon habitat with the greatest consistency before the 1930s. The capital stock, after all, had to be preserved in the hinterland, if it were to be reaped in the fishing grounds. Their agitation had a leavening effect on government regulators in disputes at Quesnel Lake, Lake Coquitlam and the Nimpkish River. It was as a result of their lobbying that provincial officials assisted in the Quesnel Lake and Adams River cases. The federal authority only acted in such cases when the cannery interest forced it to do so.

Fish-dam conflicts took on an almost scripted, repetitive aspect before the late 1920s, with a host of reluctant actors, spurred on by one self-interested protagonist. The Nimpkish River case showed signs of introducing a new story line. Federal and provincial officials took a new interest in the limits and extent of their powers. They foresaw, as the Columbia River showed only too well, that such problems would only occur more frequently in the future, and that it would be best to establish a coherent framework for adjudicating between different interests. But to do so, as JC MacDonald understood so well, was to define one economic activity as in the public interest over another. They could develop no understanding of how that might be done, and because of the crash of export markets in the 1930s, they were not forced to do so. When the problem reemerged in the 1940s and 1950s, the context, the nature of the questions, the actors and the environment would all be different.

**Chapter 4:****Remaking Hells Gate: Salmon, Science and the Fraser River, 1938-1948**



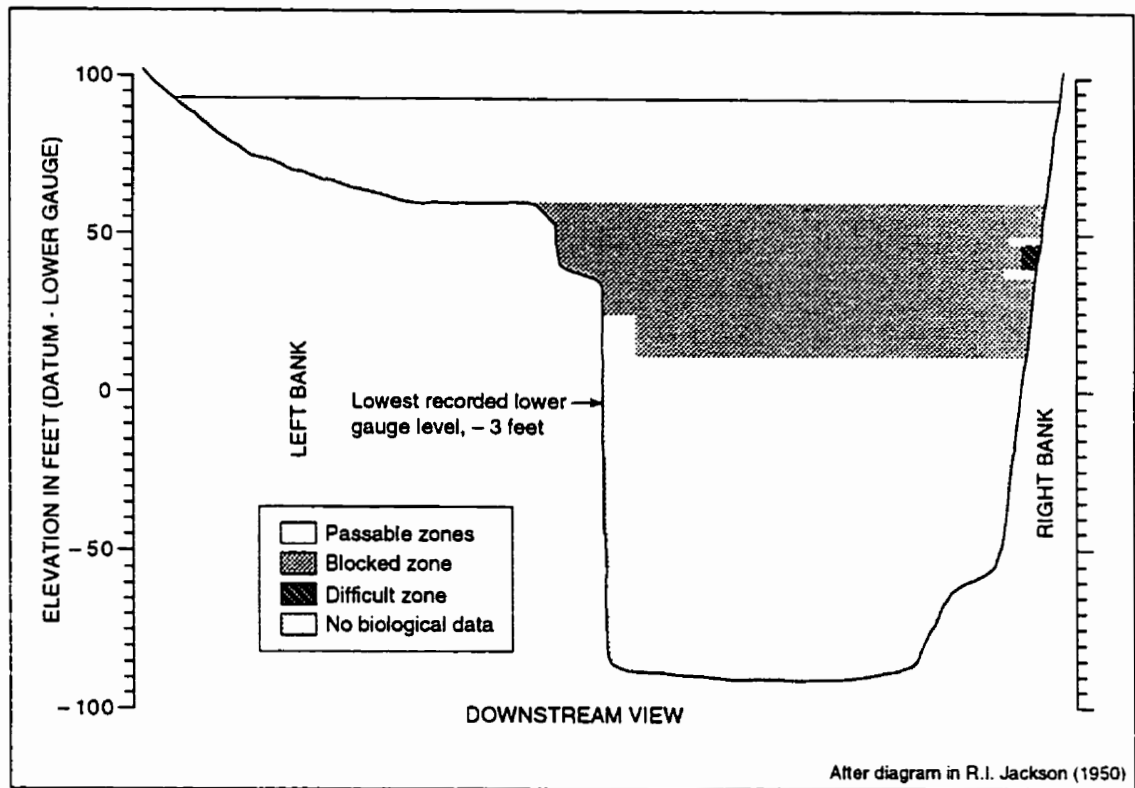


Diagram 1: Hells Gate in cross section: passable and blocked zones.



Photograph #3:  
Dr. William Ricker at Hells Gate, August 19, 1938 Photo taken by AJ Tubb. In  
University of Washington Archives, William F Thompson Papers, Acc. 2597-3-83-21,  
Box 9, File Photos

To such men who would criticize the failure to correct the blockade in past years, there is a very good answer. It would be no more reasonable to indulge in such criticism than it would be to attack this Commission ten years hence for not knowing today what it will know then.<sup>1</sup> -William F Thompson, 1944

The photograph provides a view over the young man's shoulder and catches the salmon in mid-air.<sup>2</sup> The rough water is Hells Gate. Perched on the rocks on August 19, 1938, William Ricker, a scientist with the International Pacific Salmon Fisheries Commission, investigates the causes of the precipitous decline of Fraser sockeye over the past two decades.

A copy of the photograph may now be found in the papers of William Thompson, who in 1938 had recently assumed the directorship of the salmon commission's scientific investigations after a distinguished career with the North Pacific Halibut Commission and as chairman of the University of Washington's College of Fisheries. Unlike Ricker, who would leave after this first year of study, Thompson would devote the better part of a decade to Hells Gate; his ideas about its role in obstructing salmon migrations would provide the rationale for the construction of fishways at this point in the mid-1940s as one prong of a major effort to restore the salmon runs. After the completion of the fishways, when Thompson set down his ideas about salmon and the gate for scientific scrutiny, his early charge, William Ricker, would criticize them strongly, and engage in a prolonged controversy with Thompson that would come to involve the reputations of their respective scientific institutions and national fisheries science communities. But in the summer of 1938, none of these later controversies could be imagined. Ricker leaned over the edge, photographing salmon, and the lens captured him too.

The Hells Gate research program found its origins in the international politics of the Pacific salmon fishery. Formed in 1937 by diplomatic convention between Canada

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<sup>1</sup>University of Washington Archives (UWA), William F Thompson Papers, Acc. 2597-3-83-21, Box 9, File "Biological Report" Thompson to BM Brennan, January 1, 1944

and the United States, the International Pacific Salmon Fisheries Commission aimed to restore the Fraser sockeye fishery and develop the basis for international regulations. In the course of general surveys of the Fraser sockeye in 1938, Commission scientists discovered blockage conditions at Hells Gate. From the late 1930s through 1942, scientists intensified their investigations at the gate, using fish tagging studies to determine the ability of sockeye to pass up river. This work drew the scientists into close contact and sometimes conflict with native fishers in the canyon who were paid to return the fish tags. On the basis of this research, and after unusual blockage conditions in 1941, commission scientists determined that fish passage devices would be needed to restore the site. After a period of study fishways cut the gate's walls in 1943. It was at this point that William Ricker returned to the problems of Hells Gate, questioned the Commission's approach and challenged William Thompson to defend his research program.

Political, social and natural factors conditioned scientific knowledge of Hells Gate. Scientists' views were developed in the context of the national and institutional politics of the Pacific fishery and the salmon commission; their research practices involved a complex cultural and natural selection through interaction with native fishers and tagging methods; and their justification and criticism of the fishways subjected research to personal, institutional and national divisions. How scientists remade Hells Gate, how they tried to understand this place and argued over its meaning are the subjects of this chapter.

Although the Hells Gate slides have been treated in a number of studies, the remaking of this site in the late 1930s and 1940s has attracted less attention.<sup>3</sup> Fisheries

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<sup>2</sup>UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 9, File Photos, Dr. William Ricker at Hells Gate, August 19, 1938. Photo taken by AJ Tubb.

<sup>3</sup> Derek Ellis, "Construction— Hell's Gate (Canada)," in his Environments at Risk: Case Histories of Impact Assessment (Berlin: Springer-Verlag, 1989), pp.17-36; ES Pretious, "Salmon Catastrophe at Hell's Gate,"

scientist and historian John Roos provides a thoughtful record of the Hells Gate investigations in his history of the salmon commission, and fisheries scientist Tim Smith treats the Thompson-Ricker controversy as an opportunity to examine shifting ideas in the field of scaling fisheries.<sup>4</sup> Drawing on a number of recent studies in the environmental history of fisheries and the history of fisheries science, this chapter examines the making of scientific knowledge under conditions of political controversy in an arena of shifting natural conditions.<sup>5</sup>

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Years before the slides at Hells Gate signaled a new era of decreased catches in the Fraser River fishery, Canada and the United States had attempted to broker cooperative agreements to foster joint regulation of the sockeye salmon resource. This was a result of a significant political geographical aspect of the fishery: the major migration route for returning sockeye salmon passed the Strait of Juan de Fuca and thus through both Canadian and American-controlled waters. First in 1892 and later in 1908 and 1919 joint management agreements were signed between the two federal governments, only to be later defeated or withdrawn at various stages of the ratification process in the United States. In Kurkpatrick Dorsey's close examination of the politics of the 1908 agreement, he argues that its eventual demise resulted from a complicated set of sectoral and

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BC Professional Engineer (February 1976); Cicely Lyons, Salmon Our Heritage: The Story of a Province and an Industry (Vancouver: BC Packers, 1969); Geoff Meggs, Salmon: The Decline of the British Columbia Fishery (Vancouver: Douglas & McIntyre, 1991); Derek Pethic, British Columbia Disasters (Langley, BC: Stagecoach Publishing Co., 1978), pp 161-172; Bruce Hutchison, The Fraser (Toronto: Holt Rinehart, 1950). For an amusing reflection on the conversion of the site into a tourism attraction, see: Mac Parry, "The Legitimization of Hell's Gate," Affairs 2(24) (July-August 1972): 24-29

<sup>4</sup> John F Roos, Restoring Fraser River Salmon: A History of the Pacific Salmon Fisheries Commission 1937-1985 (Vancouver: Pacific Salmon Commission, 1991); Tim Smith, Scaling Fisheries: The Science of Measuring the Effects of Fishing, 1855-1955 (Cambridge: Cambridge University Press, 1994).

<sup>5</sup> Stephen Bocking, "Fishing the Inland Seas: Great Lakes Research, Fisheries Management, and Environmental Policy in Ontario," Environmental History 2(1): 52-73; Bocking, Ecologists and Environmental Politics: A History of Contemporary Ecology (New Haven: Yale University Press, 1997); Arthur F McEvoy, The Fisherman's Problem: Ecology and Law In the California Fisheries, 1850-1980 (Cambridge: Cambridge University Press, 1986); Joseph E. Taylor III, Making Salmon: An Environmental History of the Northwest Fisheries Crisis (Seattle: University of Washington Press, 1999); Richard White, The Organic Machine: The Remaking of the Columbia River (New York: Hill and Wang, 1995)

constitutional conflicts: fishers within Washington State fearing external regulation and limits on growth pressured state politicians and members of the US Senate to protect their interests.<sup>6</sup> At the federal level, these concerns intersected with constitutional debates about the appropriate balance of federal and states' rights. As the state of Washington controlled the fisheries and the federal government controlled international negotiations, various opportunities arose to sacrifice the agreement on the altar of the division of powers. Without strong executive direction-- of which there was little in 1908-- the agreement was sacrificed to state power and the fisheries' lobby. With some small differences the pattern of defeat established in 1908 was repeated in 1919.<sup>7</sup>

Lacking formal avenues to pursue joint management, some limited forms of cooperation were nevertheless created between state agencies and amongst industry groups. Besides the routine sharing of resource intelligence between Canadian and American officials, joint conferences were held, American officials were invited to tour the Fraser basin and trans-boundary tagging experiments were conducted in order to study salmon migration.<sup>8</sup> The Pacific Salmon Federation, an association of scientists and fisheries officials from both countries, helped to coordinate complementary research projects between different jurisdictions starting in 1925.<sup>9</sup> At an industry level a number

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<sup>6</sup>Kurkpatrick Dorsey, The Dawn of Conservation Diplomacy: US- Canadian Wildlife Protection Treaties in the Progressive Era (Seattle: University of Washington Press, 1998), chapter 3, pp 76-104

<sup>7</sup>Jozo Tomasevich, International Agreements on Conservation of Marine Resources with Special Reference to the North Pacific (Stanford: Food Research Institute, 1943), pp 254-256

<sup>8</sup> On advocacy for international cooperation, see the comments of Canadian fisheries scientist AG Huntsman and Washington State fisheries official, LH Darwin: UBC Special Collections and Archives, International Pacific Salmon Fisheries Commission Papers, Cannery Scrapbooks (hereafter CSB), "Asks Fisheries Convention to Support Movement for International Commission," Vancouver Sun June 4, 1920; "Conserving Fish Discussed," World June 5, 1920. On American tours of the Fraser: NA, RG 23, Vol 679, File 713-2-2[12], Arthur S Einarsen, Washington Division of Fisheries, "A Report on an Inspection Trip to the Fraser River Watershed," June 29, 1929.

<sup>9</sup>On the coordination of tagging experiments to analyze migration on the Pacific coast, see: BCARS, BC Department of Fisheries Papers, GR 435, Box 58, File 536, Babcock to JA Motherwell, Chief Inspector of Fisheries (federal), March 6, 1925 (copy), and File 538, "Salmon Tagging on the Pacific Coast," [1925]. On the importance of this level of bureaucratic and scientific cooperation, see: Joseph E Taylor III, "The Historical Roots of Canadian-American Salmon Wars," in On Brotherly Terms: Canadian-American Relations West of the Rockies ed. John Findlay and Ken Coates (Seattle: University of Washington Press, in press), pp 12-13.

of ultimately unsuccessful attempts were made by Washington state canners and fisheries officials to help fund hatchery development on the Fraser.<sup>10</sup> And the Pacific Fisherman, the major trade journal of the pacific coast, continually trumpeted the importance of international cooperation and conservation in the first half of the century. Even if these early attempts lacked formal state sanction, they nevertheless laid the groundwork for the creation of a bi-national coalition that would help to lobby for the passage of the ultimately successful Salmon Convention concluded in 1930.

The road to this agreement, however, was blocked by fundamental conflicts along the way that would have to be surmounted. The American constitutional dispute that continually prevented international agreement at the Congressional level masked other forms of division within the fishery. A basic problem in forming agreement between the two national parties arose from the fact that Americans captured more fish than Canadians. John Pease Babcock, BC's Assistant Commissioner of Fisheries, calculated in 1929 that for over a decade American fishers had captured in the range of seventy per cent of the total catch.<sup>11</sup> This contrasted with the balance before 1901 when Canadians harvested about seventy per cent of the total. The American advantage after the 1920s was geographical and technical: American waters sliced north into the Strait of Juan de Fuca and cut close to the Fraser delta at Point Roberts, providing American fishers with the first catch of returning spawners; furthermore, using fish trap technology that was illegal in Canada as well as efficient purse seine methods, American fishers were able to make the most of their geographical advantage. Behind Washington State's criticism of the infringement of states' rights, stood the self-interest of fishing groups fearful that

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<sup>10</sup>BCARS, BC Department of Fisheries Papers, GR 435, Box 57, File 516, JP Babcock to CH Gilbert, August 30, 1915. Babcock explained some the American offers to Gilbert. None were accepted. On earlier industry attempts, see: CSB, "Think They Own This Province," Victoria Colonist January 29, 1903; "To Hatch Fish on the Fraser," Province September 25, 1901; "Americans Want Run of the Fraser," Province June 11, 1902; "An Offer from Americans to Build Hatchery," Province August 9, 1903.

catch restrictions would erode the US advantage.<sup>12</sup> Before an international agreement could be established either the regulatory aspect would have to be withdrawn, or the US advantage diminished.

The power of a loosely regulated fishery helped to undermine the conditions of its unimpeded progress. Starting in the 1920s catches in both the Canadian and American fishery began to decline markedly. Just as on the Columbia in the same years, a complex combination of fishing pressure, climate change, pollution and habitat destruction made salmon populations dwindle in comparison to turn of the century catches.<sup>13</sup> Although Americans continued to enjoy the majority share of this fishery, it was a majority of a shrinking resource. Adding to these problems, the expanding fishery of Columbia-bound Chinook salmon on the west coast of Vancouver Island by Canadian trollers in the 1920s inserted a new reason for American regulators to consider some form of shared catch agreement.<sup>14</sup> In the late 1920's another round of protracted bargaining began at the diplomatic level.

One possible model for the renewed salmon negotiations was the North Pacific Halibut Commission formed by Canada and the United States in 1924. It established a closed season and appointed a scientific board to study the fate of halibut and the best means to temper the fishery in the interests of perpetual supply. Led by WF Thompson, the halibut commission developed a scientific model that suggested the interplay between natural shifts in the structure of the fish population and changes in the rate of fishing pressure. On the basis of the commission's work, a new series of seasonal restrictions

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<sup>11</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 1, File 1, Babcock to Premier, September 23, 1929

<sup>12</sup>Joseph Taylor, "Historical Roots," p10

<sup>13</sup>Joseph E Taylor III, "Burning the Candle at Both Ends: Historicizing Overfishing in Oregon's Nineteenth-Century Salmon Fisheries," Environmental History 4(1) (January 1999): 54-79

<sup>14</sup> Taylor, "Historical Roots," pp 14-15



was imposed on the international fishery.<sup>15</sup> The halibut case provided an example of the opportunities afforded by international cooperation and the power of science to establish rational methods of resource protection.

The Salmon Convention concluded in 1930 bore certain similarities to the successful North Pacific Halibut Commission. The agreement set out provisions for the establishment of an international scientific commission with powers to recommend catch regulations and closed seasons. In this respect it also mirrored the general outlines of previous salmon agreements signed, but never passed, in 1908 and 1919. Unlike past precedents, however, the 1930 salmon convention also included two new stipulations: the catch would be divided equally between the two nations on an annual basis and the waters regulated in the treaty would be expanded to include non-territorial waters fished by American purse-seiners.<sup>16</sup> As with earlier agreements the simplicity of the three major provisions of the convention did not mean that the ratification process would be straightforward. For seven years the convention remained without force, after immediate passage in Canada and prolonged debate at the federal level in the United States.

Before the 1930 convention was concluded aspects of the agreement were looked upon with trepidation by the Conservative opposition under Bennett. Read from a certain perspective, the convention provided the American government with a degree of authority over the management of a Canadian resource. As a point of principle, this arrangement was unacceptable; subsequent amendments that qualified the powers of the commission

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<sup>15</sup>Tim Smith suggests that the importance of the Halibut commission in developing methods to scale fisheries: Tim Smith, Scaling Fisheries, pp 202-214. George Rounsefell judged the results of the commission's regulatory policies, however, to be largely a failure, at least in economic terms: George Rounsefell, Ecology, Utilization and Management of Marine Fisheries (Saint Louis: CV Mosby Co., 1975), p 6.

<sup>16</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 1, File 1, Babcock to Premier, September 23, 1929. In this letter, Babcock outlines the differences with earlier treaties. An earlier version of the convention did not include the expanded territorial scope and was rejected on this basis by Canada.

or defined them more precisely removed these concerns.<sup>17</sup> In any event, sufficient bureaucratic, industrial and provincial Conservative support was marshaled to convince the federal Conservatives of the essential soundness of the agreement, allowing for its passage in 1930 without opposition.<sup>18</sup>

The delay in the United States was, as before, driven by opposition from Washington State and conducted within the US Senate. Washington Governor Hartley argued over a number of years that the ideal solution would be to conduct joint regulation of the resource between the state of Washington and the Canadian government rather than vest an international body with powers over areas of Washington State's constitutional authority.<sup>19</sup> It was not until the defeat of Hartley in the election of 1933 that new life was breathed into the agreement. Governor Martin, Hartley's successor, viewed the convention favourably as a small concession in light of potential benefits.<sup>20</sup> Advised by Miller Freeman, the publisher of the Pacific Fisherman, Martin threw himself strongly behind the agreement at the state and federal level, meeting with BC Premier Duff Patullo

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<sup>17</sup>BC MP, 'Leon' [Dennison? on H of C letter head] related the views of Bennett and the federal Conservatives to Conservative BC Premier Simon Fraser Tolmie. Leon said that only he of all federal Conservatives was supporting the agreement and that he had warned his colleagues of the depth of support in BC and amongst members of the fishing industry. He asked Tolmie to help to add pressure on the federal government: UBC Special Collections and Archives, Simon Fraser Tolmie Papers, Box 7, File 7-15, 'Leon' to Tolmie, March 27 [1929?] and May 15, 1929. HH Stevens, the Vancouver Conservative MP, suggested that the convention posed a threat to questions of sovereignty: City of Vancouver Archives, HH Stevens Papers, Add MSS 69, Vol 2, File 4, Stevens to Canadian Fishing Co., May 21, 1929 (copy).

<sup>18</sup>The importance of passing the convention and explaining its advances on past agreements was set out in a Department of Fisheries Memorandum: NA, RG 23, Box 1079, File 721-19-2[18] "Memorandum Re Fraser River Treaty," May 26, 1930. Federal deputy minister of fisheries, WA Found instructed BC assistant fisheries commissioner, Babcock that the federal Conservative opposition would melt away with Tolmie and the industry's support so clearly given. He also felt that federal reticence might also expedite the approval process in the US: BCARS, BC Commercial Fisheries Branch Papers, GR 1378, Box 1, File 1, Found to Babcock, June 12, 1929. The generally agreeable atmosphere of the final debate in the House merely underlines his point: Canada, Debates of the House of Commons (1930), May 29, 1930, pp 2798-2814.

<sup>19</sup>Roos, Restoring Fraser River Salmon, pp 45-46

<sup>20</sup>For a statement of Martin's views, see: Clarence D Martin, "Should Sockeye Treaty Be Ratified with Proper Interpretations?" Pacific Fisherman 33(8) (July 1935): 13-14.

in a bid to raise the agreement's profile and then organizing bi-national meetings to consider possible regulatory models.<sup>21</sup>

The shift in policy marked more than a change of leadership. It also reflected developments within the fishing constituency in Washington state politics. In the mid-1930s disputes within the state over appropriate fishing limits between recreational fishers, fish trap users and purse seiners helped to mobilize an opposition to exploitative fish trap techniques. In 1934 Initiative 77 went to Washington voters as a referendum item, asking whether fish traps should be eliminated from the fisheries. Its passage had the consequence of eliminating fish trap users from the US-based Fraser fishery as well as all Washington State fisheries. Purse seiners based in Puget Sound and at Point Roberts' now held claim to all of the American catch of Fraser salmon. Due to the internal clout of the sports fishery and segments of the commercial fishery, new conservation measures were pressing the fishing industry towards the logic of an international agreement.<sup>22</sup>

Just as new gear restrictions changed the nature and extent of the US Fraser fishery, a momentary re-orientation was occurring in the migration patterns of Fraser sockeye that would help to seal the success of the 1930 convention. Put simply, more fish were returning to the river by Johnstone Strait-- beyond the reach of American control-- than was typical of past years, due to a variety of climatic and oceanic factors. Although this trend was not well understood at the time, the decrease it created in the American catch as a share of the total Fraser fishery was widely interpreted as a result of

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<sup>21</sup>UWA, Miller Freeman Papers, Acc. 1038, Box 5 contains a wealth of correspondence covering seven years of Freeman's private lobbying to politicians and industry leaders about the necessity of passing the Salmon Convention. Both Freeman and BC's Assistant Fisheries Commissioner, Babcock became unofficial backroom lobbyists from the state and provincial point of view: BCARS, BC Commercial Fisheries Branch, GR 1378, Box 1, File 5, Freeman to Babcock, June 3, 1935, Babcock to Freeman, June 6, 1935 (copy). Martin also brought key fisheries officials from Canada and the US together in 1934 to hash out the organization of the proposed Commission: "International Commission is Proposed for US-Canadian Salmon Research," Pacific Fisherman 32(13) December 1934; see also Roos, Restoring Fraser River Salmon, pp 44-47.

<sup>22</sup>Taylor, "Historical Roots," pp 18- 19; Roos, Restoring Fraser River Sockeye, 46-47.

the changes in allowable gear in American waters.<sup>23</sup> The previous advantages of the American fishery, produced by geographical and technical factors, appeared to have vanished-- and with them the roadblocks to an agreement.

It still took almost three years, however, before the US Senate passed the convention on June 16, 1936 and only then with some minor amendments. Reaction to this process in Canada was mixed. When American approval did arrive, reservations were expressed about the unilateral Senate amendments, but to little effect.<sup>24</sup> The Canadian Liberal government understood that if the convention were rejected on that basis, no agreement would be possible in the foreseeable future. The convention was passed into law in 1937. Despite a tangle of conflicting constitutional and market interests an agreement had occurred that gained wide support from industry, politicians and fisheries officials. With the salmon stocks of the Fraser so heavily depleted after more than fifty years of commercial exploitation, the convention was perceived to be the right measure, arriving rather late.

It would be even later. One of the US Senate amendments insured that the convention's results would not be speedily felt in the fishery: it laid out an eight year period of scientific study of the resource before the commission would receive authority to advise either nation in regulatory and closed season restrictions. Science would have to create a basis for rational judgment in order to mediate political conflict.

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<sup>23</sup>Roos, *Restoring Fraser River Sockeye*, p 47.

<sup>24</sup>Tom Reid, the Liberal member from New Westminster and future IPSFC commissioner, represented the views of local fishermen, who, for example, wished to see the convention terminated if amendments were added. UWA, Miller Freeman Papers, Acc. 1038, Box 1, File 1-26, George Alexander, BC Fisheries Department to Miller Freeman, March 11, 1936. Alexander wrote that Reid was representing the views of certain Fraser River fishers who supported amendments proposed by the Salmon Conservation League of Washington State. There was also concern expressed by the Fisherman and Cannery Workers Industrial Union of Canada to the effect that a commission would be in the control of the big fishery trusts and ought to contain representation from fishers: BCARS, BC Commercial Fisheries Branch Papers, GR 1378, Box 1, File 5, Fisherman and Cannery Workers Industrial Union of Canada to BC Department of Fisheries, January 7, 1935, enclosure, "Amendments to the Sockeye Salmon Convention." When it came finally to ratification, Reid spoke at length about the agreement and in its favour. Although the Conservatives raised questions on points of terminology, they made no attempt to hold up the agreement's passage: Canada,

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Reflecting on the early years of the IPSFC, William F Thompson noted in the late 1950s that the eight-year period when the commission was devoted solely to scientific inquiry allowed for uncommon latitude in charting new directions in fisheries research. "The Commissioners were, for a time," Thompson recalled, "free from the job and glory seekers who were not interested in doubtful personal futures... free from the demands of regulation according to this or that popular theory [and]... free from the pressure of immediate results." The treaty, he argued, provided a research opportunity beyond the clawing control of "small organizations" and national policy concerns.<sup>25</sup> Memory works sometimes as a salve, but Thompson's remarks do provide insight into the importance of institutional arrangements for the conduct of scientific research, particularly when such inquiry impacts vested economic and political interests. Whether the IPSFC was as successful at deflecting industry pressures and national policy concerns as Thompson remembered is another question.

The commission established under the Pacific Salmon Convention was composed of what might be considered three layers of organization and operation. The commission proper contained six members (three from each country) and held responsibility for the general planning and implementation of the convention. Members of the commission were appointed by their respective national governments and were connected in some respect to the fishing industry, or regulatory bodies. The founding Canadian commissioners consisted, for example, of a fisheries official (WA Found), an industry representative (AL Hager) and a politician (Tom Reid); two of the American commissioners, on the other hand, were fisheries officials (BM Brennan and Charles E

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Debates of the House of Commons (1937), March 25, 1937, pp 2176-2198. See also Roos, Restoring Fraser River Salmon, p 49.

<sup>25</sup>UWA, William F. Thompson Papers, Acc. 2597-3-83-21, Box 3, "Fishery Treaties between the US and Canada," nd (but probably c. 1959), pp 18-22

Jackson), while the last was a prominent Washington lawyer with expertise in fisheries matters (EW Allen). An advisory committee, made up initially of ten industry representatives, with five from each country, performed an ad hoc role connecting commissioners to industry and organizational concerns. The third layer of individuals connected to the commission was the professional and technical staff overseen by a director of investigations, separate from, but subordinate to the chairman of the commission.<sup>26</sup> This was the most important group in identifying and carrying out the restoration efforts in the commission's early years, and the focus of the current analysis.

The scientific activities of the early commission derived their main impetus and direction from William F Thompson. Thompson might be considered as one of the leading lights of the second generation of fisheries scientists on the Pacific coast in the twentieth century. A product of the Stanford fisheries program, Thompson went on to do important fisheries studies as the head of the Halibut commission in the late 1920s and developed a substantial research career in the area of scaling fisheries. He also acted as chair of the University of Washington College of Fisheries starting in 1930 and oversaw the transformation of the school from a practically oriented program to an important research institute that attracted significant private, state and federal research funds.<sup>27</sup> A better scientist than a politician, Thompson accepted the role as director of investigations under the Salmon Convention more perhaps for the research opportunity than the prestige. He did not enjoy publicity and within five years resigned from the Commission, embittered by the personal and political conflicts that had tainted his scientific mission. But before that time he would lead a research team to one of the most important single discoveries in fisheries management in BC history.

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<sup>26</sup> On the organization of the commission, see: Roos, *Restoring Fraser River Salmon*, pp 54-55.

<sup>27</sup>UWA, Richard Van Cleve Papers, Acc. 1683-71-10, Box 4, RVC, "The College of Fisheries, University of Washington," nd, pp1-2

Thompson's responsibility was to gather and supervise a team of researchers to pursue a set of investigations with a view to restoration and regulation possibilities. Initially, he tried to follow his earlier halibut experience and center the work at the University of Washington, using his people. This approach did not wash with the Canadian commissioners. The Canadian MP Tom Reid, a volatile critic at the best of times, insisted that the benefits of the convention ought to be more evident in Canada, particularly his riding of New Westminster. He also criticized Thompson's penchant for American staff, and asked why Canadians were not being hired for the research jobs. Thompson lost the battle over the location of the commission offices, but managed nevertheless to carry out substantial research in the University labs and hire his own people. There simply were no qualified UBC graduates, explained American commissioner, BM Brennan; better people, trained in fisheries science, were available in Washington.<sup>28</sup> The initial confrontation stunned the American commissioners somewhat. EW Allen worried that Reid was bullying Thompson and that he "look[ed] upon the commission as an opportunity for patronage." Apparently Reid even tried to find his son a job.<sup>29</sup> But on another level, Reid's attacks were merely an example of the depth of national division that remained within the institution and that could not be ignored in its operation. Canadian commissioners would not tolerate turning the research into an American project. And in any event, some of the most experienced talent did reside in Canada. Jack L Kask, a UBC graduate and PhD from the University of Washington had formerly worked under Thompson on the halibut study and made a seamless transition into salmon research, though he would develop a deep antagonism towards Thompson.

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<sup>28</sup>UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File 1940, BM Brennan to AJ Whitmore, May 31, 1940 (copy). Despite Thompson's preference for University of Washington-affiliated staff, he did, Brennan reported, advise UBC on how to improve its undergraduate program to bring it into line with the commission's requirements.

<sup>29</sup>UWA, EW Allen Papers, Acc. 129-3, Box 2, File 2-52, EW Allen to Charles E Jackson, US Bureau of Fisheries, July 1, 1939 (copy)

In 1943 both men resigned from the commission citing their poor relationship as a key factor.<sup>30</sup> Quite appropriately, Thompson and the IPSFC also engaged William Ricker and Russell Foerster, two Canadian researchers based at the Nanaimo federal fisheries lab with substantial experience on the Fraser and sockeye research. Ricker would conclude his relationship with the IPSFC a year later and become its most outspoken scientific critic in the late 1940s.

Rarely are such large subjects like the sockeye salmon of the Fraser basin examined in integrated studies. Before the advent of the IPSFC research program, a range of provincial and federal fisheries scientists studied the Fraser's salmon. Much of the early work consisted of cataloguing distributions and determining the validity of the home stream theory. Stanford zoologist Charles Gilbert produced the most important work in this line by attempting to distinguish racial groups within species by means of growth ring analysis. In the 1920s, federal research made advances in the area of fish culture with a set of intensive studies at Cultus Lake on the returns of 'wild' and reared sockeye. Other work concerned the control of predator populations. All of these projects were foundational in different ways, but also segmented as to region and restricted in terms of application.<sup>31</sup> The IPSFC research mandate allowed Thompson and his team to look to broader questions that connected the watershed as a whole and suggested the basis for a sweeping restoration program. Few precedents for such a program existed internationally, besides the halibut commission and the pioneering

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<sup>30</sup> For a biography of Kask and mention of the dispute with Thompson, see: Kenneth Johnstone, The Aquatic Explorers: A History of the Fisheries Research Board of Canada (Toronto: University of Toronto Press, 1977), pp 208-209.

<sup>31</sup> I have summarized and analyzed this early fisheries biological research in an Chapter 1, "'Nature's Methods Have Been Improved Upon': The Scientization of Salmon and Water in British Columbia, 1900-1930".



International Council for the Exploration of the Sea, which coordinated research in the North Atlantic.<sup>32</sup>

One of the most important opening strategies of Thompson's research program was maintaining flexibility.<sup>33</sup> Research funds were not allocated to particular projects lasting five years in duration. Instead, IPSFC scientists pursued a problem-oriented survey approach in the first year to identify worthy areas of study. While the existing literature on the Fraser fisheries was collected and added to with historical material on past catch levels, the main emphasis of the initial field work was to differentiate the sockeye fishery through tagging studies and spawning bed surveys. The early studies of Gilbert and others at the turn of the century had established that salmon populations were not a homogeneous mass, but could be separated into 'races' with their own particular migration patterns and spawning areas. The racial theory was a cornerstone of the IPSFC's initial survey. By tagging sockeye in closed periods off the coast of Vancouver Island near Sooke, and at various stages upstream, statistics were collected on the length of migration and salient characteristics of the particular racial groups. Contextual information was gathered as well: survey parties examined each of the major spawning areas in the watershed during the summer and fall runs, determined the number of returning spawners and entered relevant environmental information into standardized notebooks for each spawning region. Incidental to this work, some attempt was made to observe the native fishery in order to develop some estimate of its annual take with a view to regulation. And despite some initial reservations, Thompson decided to fund the continuation of the Canadian Department of Fisheries studies at Cultus Lake on the rate

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<sup>32</sup>For a discussion of the halibut commission, see: Tomasevich, International Agreements, pp 125-209; on the science of the ICES and the halibut commission, see: Smith, Scaling Fisheries, pp 110-229 and 202-214

<sup>33</sup>Thompson's program is detailed in a memorandum to the commissioners: UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File 1938, Thompson to International Pacific Salmon Fisheries Commission, May 18, 1938.

of sockeye returns.<sup>34</sup> This marked the transition from federal to commission control in Fraser sockeye research. Hereafter the field would be dominated by the commission while the federal department would turn its attention to the Skeena River.<sup>35</sup>

In describing his approach, Thompson wrote "I am holding the program open to change. It must not be allowed to crystallize before the direct utility of its several features is seen."<sup>36</sup> After the first summer of investigations some of those features were becoming apparent. One was obstruction conditions in the Fraser Canyon. In some sense, the problem was stumbled upon, without prejudice. After having conducted tagging experiments in salt water, it was determined that too few of these marked fish were surviving the entire migration process to provide meaningful statistical data. Various upstream locations were chosen to tag fish and collect in-river migration data. One such position was located near Yale, but was shifted to Hells Gate in mid-season because fish were more easily captured at this point. From rocks and crags, and later little scows, scientists fished for sockeye using gill nets, tagged them, removed some of their scales for racial analysis, and then released them again into the water. Using this method, scientists developed significant findings that would shape the course of the IPSFC's research mandate over the next decade.

Tagged fish, the scientists found, did not simply pass Hells Gate as expected. Frequently they were held up for days, turning up in the tagging nets more than once as 'recaptures', and sometimes downstream, as far away as the river's mouth. Although many of the tagged fish were recaptured upstream and provided evidence of migration timing to spawning areas, enough did not get through that Thompson and his team

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<sup>34</sup>The outline of the IPSFC's research program is outlined in Thompson's memorandum to the commissioners: UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File 1938, Thompson to IPSFC, May 18, 1938

<sup>35</sup>Kenneth Johnstone, *The Aquatic Explorers*, pp 175-176

<sup>36</sup>UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File 1938, Thompson to IPSFC, May 18, 1938

thought it prudent to focus greater attention on the problem in subsequent seasons. Could it be, they asked, that the rumor about Hells Gate, so frequently dismissed by fisheries officials over the past two decades, was true? Did the gorge still contain material from the slides that made salmon passage difficult? From 1939 to 1941, the IPSFC placed a special emphasis on determining this question. Their main means of analysis was the tagging procedure, which was contextualized by the addition of relevant data on water levels, catch statistics and spawning ground counts of escapements. But given the centrality of the tagging method, it is well to consider the operation of this experiment more closely. How were small celluloid disks representative of shifts in nature?

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By the 1920s fish tagging experiments were becoming a fundamental tool in large-scale fisheries studies. Thompson had used them in the previous halibut commission work, and they were a basic technique of the much-celebrated International Council for the Exploration of the Sea.<sup>37</sup> Joint Canada-US tagging experiments on salmon had provided part of the conceptual basis for the initiation of the Salmon Convention by demonstrating the transnational migration patterns of Fraser sockeye. But before the commission experiments on the Fraser, tagging had been used more frequently to demonstrate ocean migration paths in order to inform fisheries regulations. In-river tagging was a less common exercise. It had never previously been used on the Fraser in a major study. Wilber Clemens of the Biological Board lab in Nanaimo had suggested just such a project a decade previously when the Board of Engineers examined conditions at Hells Gate, but the idea went nowhere.<sup>38</sup> In-river tagging was only adopted by the commission when it appeared that too many of the fish tagged in saltwater were being taken in the commercial fishery.

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<sup>37</sup>On early plaice-tagging experiments, see: Smith, *Scaling Fisheries*, pp 143-146.

<sup>38</sup>NAC, RG 23, Box 679, File 713-2-2[9], JA Motherwell to WA Found, April 19, 1928

Fish tagging was a scientific exercise in differentiating populations and analyzing their movement through space. In the commission experiments, fish were captured according to a random fishing process, pierced with a nickel pin and identified by two celluloid disks, inscribed with a serial code, placed directly under the dorsal fin. The fish were then returned to their natural habitat and scientists waited to discover where their coded fish would reappear. The assumption was that the tagged fish mirrored the experience of the larger population, at least in probability terms. Tags did not intrude upon or alter natural patterns; they merely reflected them.

Tagging, however, was not carried out in a hermetically sealed scientific space where natural relationships could be distinguished unproblematically from cultural contexts or ways of seeing. Data were meant to provide direct clues about natural change and salmon movement, but the very means of collecting tags created filters between the scientist and the rest of nature. Collection methods as well as aspects of the 'natural laboratory' introduced various forms of selectivity. The very tools of capture were selective: gill nets snagged certain sizes of fish more than others and were replaced by dip-nets in 1942.<sup>39</sup> More fundamentally, such nets were imprecise gauges of passing populations. The disjuncture between an ideally constant tagging pressure and a variable rate of salmon passage meant that when a large cohort passed, or was delayed, a different proportion of the population was sampled than at other times.<sup>40</sup> What this meant for the nature of the sample and the resulting data was unknown. Beyond the gate, in the upper basin spawning grounds, the collection of the dispersed data created further problems. All tags were not retrieved. On some streams, river flow carried the carcasses of spawned fish away, taking their precious tags with them.<sup>41</sup> On others, tags were discovered, but

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<sup>39</sup>William F Thompson, "Obstructions..." p 97

<sup>40</sup>GB Talbot, "A Biological Study of the Effectiveness of the Hell's Gate Fishways," Bulletin III, International Pacific Salmon Fisheries Commission (New Westminster, 1950), p 12

<sup>41</sup>GB Talbot, "A Biological Study..." p 22

after the spawning was complete. Judging when the fish arrived became a guessing game and it was only compounded when intermediaries turned in the tags. And then there were oddities that could not be wholly explained: many of the tagged fish collected in the spawning grounds bore scars. Thompson stated in his final report that the proportion of fish thus affected was "relatively high." He suggested that native gill nets might be the cause.<sup>42</sup> But as with all of these anomalies, it was difficult to say. Commission scientists knew these problems existed and acknowledged all of them in their published findings. They did not attempt, however, to account for them statistically in their analyses, or publish quantitative findings to report how much of the data might be affected by any one or all of these discrepancies. Such problems would provide the basis for subsequent critiques of the commission's science and its conclusions.



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<sup>42</sup>William F Thompson, "Obstructions..." p98

Photograph #4: Tagged Sockeye Salmon from the Hells Gate Investigations. Notice the placement of the tag below the dorsal fin. Photograph courtesy of the Pacific Salmon Commission Library.

Perhaps the most blatant problems with the data collection showed up in the interaction of commission scientists and native fishers in the canyon. On the face of it, the commission's plan to study native fishing on the Fraser blended perfectly with its tagging experiments. Natives were asked to return fish tags to the commission that were captured in the seasonal fishery. This would provide scientists with data about fish movement as well as the rate of fishing pressure. Natives even had an incentive. As with commercial fishers in the salt-water experiments, individuals would be paid fifty cents per tag. A simple arrangement no doubt, but one complicated by the long history of antagonism and unequal power relationships between native fishers and fisheries regulators in the canyon. Native peoples did not return the tags as expected, but sometimes hoarded them, turned them in at locations distant from the point of catch, and sometimes did not return them at all. The problem was not that native fishers were necessarily setting out to sabotage research, but that they were collecting tags for different reasons than the scientists. One person's data were another's fifty cents.

Whereas the tags were a marker of fish passage for scientists, inscribed with data and representative of natural change, they became a "fungible" in the economy of native fishers and others in the canyon. Karl Polanyi defines a fungible as a durable object that can perform the functions of money: as a means of payment, a standard of value, a store of wealth and a means of exchange.<sup>43</sup> Although no statistics were published by the commission about the number of tags collected by natives, in the 1941 season Thompson estimated that due to a lack of commission tag collectors on the spawning grounds, over

one thousand dollars would be paid out to natives searching the spawning grounds alone.<sup>44</sup> That works out to two thousand tags, more than ten percent of the total number of tags used in that year. In the seasonal fishery, tag collection became a lucrative by-line, and sometimes an end in itself. Fish tags turned into local currency.

The fungible quality of fish tags was a lesson that commission scientist, Jack L. Kask learned with much frustration in the fall of 1940.<sup>45</sup> After recording peculiar patterns of tag returns from native groups in the canyon that did not correspond particularly with commission expectations, Kask was sent to investigate how tags were collected and returned. At the Indian reserve near Anderson Creek, Kask questioned Chief Joe Brown about tags and discovered to his displeasure that tags were captured by a variety of people, some without fishing permits, who subsequently took them to places as far away as Lytton before returning them, if they did so at all. Besides confiscating some illegal gaffes that he found in the vicinity, Kask collected eight tags from Chief Brown and tried to insist on the importance of prompt tag returns. Kask was following in a long tradition of state salmon officials telling native fishers of the canyon how to fish, and expecting their cooperation. He shared his frustration and prejudice in a memorandum to his superiors: "A thorough search of the Indian villages would probably unearth many more [tags], although the Indians do not hand in the tags until they are good and ready and as long as there are stores and other centres where cash can be obtained for tags it will be difficult for any commission employee to get to them."<sup>46</sup>

Stores accepting tags? This was a key problem, said Kask. The commission had hired a scattering of individuals in the canyon to collect tags directly from native peoples

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<sup>43</sup>See Karl Polanyi's essay on "Money Objects and Money Uses," *The Livelihood of Man* ed. Harry W. Pearson (New York: Academic Press, 1977), pp 102-103.

<sup>44</sup>UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File 1941, Thompson to IPSFC, August 4, 1941

<sup>45</sup>PSCA, File 2550.2-21 JL Kask, "Indian Fishing for Tags in the Closed Area Above Hell's Gate," November 4, 1940

and record these returns promptly. Commission scientists did not envisage the emergence of middlemen. In order to study the methods of tag collection, Kask accompanied one such commission employee, Tom E. Scott, a federal fishery agent based in Hope, during his round in the lower canyon.<sup>47</sup> Scott, while insisting to Kask that he collected all tags directly from native fishers, lead his employer to a series of general stores. At Yale, he confessed that the majority of the tags from the lower canyon ended up in the cash register of the local Chinese-Canadian shopkeeper. Natives were allowed to use tags in the store as cash equivalents. The proprietor held the tags and then Scott would reimburse him for the stated price of fifty cents per tag. Or that is what Scott said. After visiting the Spuzzum general store where a similar transaction occurred and then the Alexandra Lodge where dealings were carried out beyond Kask's view in the kitchen, the commission scientist had a fair idea of how the wily seventy-one year old Scott operated. "Scott's great enthusiasm for collecting tags can be explained in this way. In 1938 and 1939 tags were redeemed at his appointed centres of tag collection at a reduced rate. As they were turned in to the Commission at the full rate of 50 cents per tag, it is conceivable that a small rake-off was made by the store-keeper and Scott."<sup>48</sup> In view of Scott's activities, said Kask, it would be best to stop employing tag collectors who used further middlemen and did not keep accurate records. A commission scientist, he argued, ought to be employed full time on the task to insure accuracy and prompt collection.

Kask's frustration at how tags were treated out of the water was only one part of the problem. Because tags were stores of value for native peoples, they attracted a different kind of fishery: a strategically aimed fishery that torqued 'normal' fishing pressures in new directions and frustrated commission statisticians. The shiny white

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<sup>46</sup>Ibid.

<sup>47</sup>PSCA, File 2550.2-21 JL Kask, "Trip Made with Thomas E. Scott to Recover Tags and Remove Weirs in Nicola Valley," November 4, 1940

<sup>48</sup>Ibid.



disks placed underneath the dorsal fin could be seen by a skilled fisher in eddies and pools. Native peoples fished selectively for salmon because they contained use value in food and exchange value in celluloid.<sup>49</sup> It was only in 1947 that a new kind of disk was used that was less visible under water. In that year, commission scientists reported a significant drop in native tag catches.<sup>50</sup> Commission scientists also suspected that fish that were unable to pass Hells Gate and drifted downstream to die were monitored and collected by native fishers. Given the haphazard recording system for tags, at least in the first few years of tag collection, it is entirely possible that such tags were mixed up with different catch dates, or carried north up the canyon and exchanged in a store beyond Hells Gate, giving commission scientists erroneous data from which to measure the passage of fish. Moreover, the extent of the Indian fishery may well have been exaggerated by virtue of selective fishing. For one of the first times since restrictions were imposed on native fishing after the Hells Gate slides, natives were reaping some material return from the regulatory control. They were also incidentally causing problems for the commission scientists.

Kask's views were taken seriously. Beginning in 1941, commission scientists were detailed to collect tags directly from natives in return for the fifty-cent price. The middlemen were gone and the surveillance was intensified. GV Howard wrote an instruction guide for commission tag collectors in 1944 that explained the best method:

Visit all the Indian fishing stations in your district as often as possible, and acquaint yourself thoroughly with these localities. Acquaint yourself with these Indians and attempt to gain their confidence. In this way you will be able to determine the number of Indians who actually engage in fishing. From these fishermen obtain the following:

1. Name
2. Permanent Address
3. Number of dependents
4. Occupations other than fishing

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<sup>49</sup>PSCA, File 2550.2-3, A Welander and Peterson, "1941 Indian Fishery Report, Lower Fraser and Canyon"

<sup>50</sup>GB Talbot, "A Biological Study..." p 31

### 5. Reliability of volunteered information<sup>51</sup>

Collectors were instructed to record whether they collected counts verbally, or made them themselves, to specify types of gear used, determine the placement of fish stations and note how fish were preserved and consumed. Cards were kept on each fisher, and daily reports filed. Salmon scientists cum ethnographers were attempting to gain a comprehensive sense of the native fishery not only to control it and set limits on the catch, but also to ensure the purity of their data. While native fishers experienced some of the most intrusive and intensive surveillance of their fishery to date, commission scientists were coming to believe that their data was solid. Their ethnographic research was intended to shore up the validity of the tags as mirrors of natural shifts. Of course, for native peoples the tags were still worth fifty cents.

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After a number of field seasons, the commission scientists found what they believed to be strong evidence of a primary cause of fish problems at the gate: water levels. The tagging experiments provided enough sound data on the length of time it took fish during periods of 'normal' passage to overcome the gate and turn up in spawning beds that anomalies could be spotted. The major anomaly appeared in the recapture and upstream recovery data. At certain water levels between twenty-six and forty feet in Hells Gate, the number of fish recaptured below the gate after tagging would climb sharply, leading observers to believe that few fish were passing. This seemed to be further substantiated by the low recovery of fish upstream after these 'block' periods. The increases in recaptures showed a strong correlation with periods when water levels were at a middling level in the annual fluctuation. They did not seem to correspond to other factors. The gate's unevenness under water seemed to create high turbulence at certain levels and make passage

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<sup>51</sup>PSCA, File 2550.2-56 GV Howard, "Instructions for the Collection of Indian Fishery Statistics," 1944.

increasingly difficult when the water dipped into the danger zone. It was as if the gate were shaped like an hourglass and fish were trying to pass-- but failing-- when water coursed through the narrow middle section.<sup>52</sup> (See Diagram #1) By the beginning of the 1941 field season, commission scientists believed that water levels were the primary problem. The upcoming season provided an opportunity to test that belief with an expanded experimental program.

The 1941 field season was as unusual as it was revealing. From the early days of July until the end of October, Hells Gate appeared to be blocked to migrating salmon. In previous seasons blocks lasted for up to a week. In 1941, whole months were affected. William Thompson, a scientist not fond of superlatives, was astounded and said so in his memoranda to the commissioners.<sup>53</sup> It was as if, he wrote in a later report, the whole drama of 1913 were being played out again, in front of the scientists' eyes. Just as in 1913, when Babcock surveyed the slide scene, salmon gathered in a confused traffic directly below the gate. They stretched down the river for six miles, and, as the season progressed, matured into the famous red of the spawning sockeye. Few passed through in the late summer months. Hardly any passed in September. For much of the season, water rumbled through the gate within the middling zone. A few respites in July, early September and in late October allowed for delayed fish to pass through. Few of the tagged fish in their number were discovered later on the spawning grounds.<sup>54</sup>

The spectacle of blocked salmon impressed the scientists and lead to a rapid re-deployment of scientific effort. At the beginning of the season Thompson had laid out a research program that would include studies of the native fishery, close examinations at

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<sup>52</sup> I borrow the metaphor of the hour glass from TG Northcote and PA Larkin, "The Fraser River: A Major Salmonine Production System," in DP Dodge, ed. Proceedings of the International Large River Symposium Canadian Special Publication of Fisheries and Aquatic Sciences 106 (1989): 196

<sup>53</sup>UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File 1941, Thompson to IPSFC, October 31, 1941

<sup>54</sup>William F Thompson, "Effect of the Obstruction..." pp 92-96

Quesnel lake to determine the long term consequences of the dam built at that location, as well as expanded work on tagging at Hells Gate.<sup>55</sup> But as the salmon began to mount in numbers below the gate, all the carefully made plans were remade. "Every available man from the other divisions of the work," Thompson informed commissioners, "was concentrated on [the Hells Gate problem] including some of the Director's time. No other question could possibly arise which would equal the importance of this Hell's Gate blockade and ordinary arrangements were ruthlessly sacrificed accordingly."<sup>56</sup> By late August two teams of fish taggers handled one hundred and fifty fish per day. Over thirteen thousand sockeye would carry tags by the end of the season. The project was, as Thompson noted with pride, "one of the most extensive tagging programs of its kind ever undertaken."<sup>57</sup> Scientists were so over-extended by the end of the season that other projects risked incompleteness. But the opportunity provided by unusual conditions had not been missed. Now the problem was to tie all of the data together. "Unmistakable as the indications are," Thompson stated, "the returns must be tabulated and analyzed with care."<sup>58</sup>

As the drama unfolded, Thompson believed he could see the process that lay ahead. The press was beginning to publish stories on the massive build up and journalists wanted interviews.<sup>59</sup> Thompson, by contrast, wanted to be "protected", as he told the commissioners.<sup>60</sup> He succumbed to the need to prepare a preliminary release on the problems at the gate, but argued vigorously within the commission that the press

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<sup>55</sup>UWA, William F Thompson Papers, Acc. 2597-8-83-21, Box 7, File 1941, Thompson to IPSFC, August 4, 1941

<sup>56</sup>*Ibid.* Thompson to IPSFC, October 31, 1941

<sup>57</sup>UWA, EW Allen Papers, Acc 129,129-2, Box 3, File 5, Thompson to IPSFC, November 14, 1941

<sup>58</sup>UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File 1941, Thompson to IPSFC, October 31, 1941

<sup>59</sup>See, for example, Bruce Hutchison's epic article on the blockade: "International Sockeye Board Inspects Fraser River Blockade" Vancouver Sun, September 21, 1941; and the Sun editorial of the same day, "Salmon Blockade," as well as "Salmon Board Declares Hells Gate Must Be Cleared," Sun December 5, 1941,

coverage should not seek to arouse alarm.<sup>61</sup> The risks were too great of having publicity force political decisions on the commission that could only disrupt the research. Optimism, he advised Miller Freeman, the publisher of the Pacific Fisherman, was premature.<sup>62</sup> The commissioners, probably keen to air the progress of the commission's work, acceded to his request.

Part of the reason why Thompson did not wish to blow the event out of proportion or attract attention was that the imagined solution to the block required further study. In order to restore the gate and release the blockage conditions, a fishway of some kind would be needed. This was not a problem that could be handled quickly. The commission scientists were biologists, not engineers. New expertise would need to be drawn upon to proceed. Furthermore, any building project would require a special disbursement from the national governments. That might not be simple to procure. Better, he thought, to control the flow of information as much as possible so the request would not be prejudged.

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Unlike the early decades of the century when fishways were simple in design and crude in execution, by the 1940s the technology had developed substantially.<sup>63</sup> These advances occurred principally as a by-product of development on the Columbia River where main stem dams were raised at Bonneville, Rock Island and Grand Coulee from 1931 to 1941.<sup>64</sup> The Bonneville project included an extensive fishway system as an integral aspect of the design, while the Grand Coulee dam was designed without fish in mind and

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<sup>60</sup>UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File 1941, Thompson to IPSFC, October 31, 1941

<sup>61</sup>UWA, EW Allen Papers, Acc. 129, 129-2, Box 3, File 5, Thompson to IPSFC, November 14, 1941

<sup>62</sup>UWA, Miller Freeman Papers, Acc. 1038, Box 2, File 2-38, Thompson to Freeman, September 5, 1941

<sup>63</sup> For a brief review of the history of fishway designs, see: CH Clay, Design of Fishways and Other Fish Facilities (Ottawa, Department of Fisheries Canada, 1961), pp 14-18

had fishways added after the main project was completed. Both these different procedures added to the general knowledge of fishway designs, one in terms of planning and the other in terms of reclamation. It was unclear by the early 1940s how well they worked in terms of maintaining runs over the long term, but at least the Bonneville facility appeared capable of passing fish. The Hells Gate fishways were thus conceived in an atmosphere when dams were the problem and fish passage devices the technical solution.

Following the drama of the previous season, in 1942 a team of engineers and biologists cooperated to plan how to pass fish around the gate.<sup>65</sup> Some work was completed the previous summer amidst the confusion of the blockage. For the most part this consisted of soundings and topographic studies so that the contours of the granite gorge could be known and the fluvial dynamics studied. What this preliminary work established was that two "jutting rocks," one on each side of the river, created obstructions and increased the fall of water at the problem levels between twenty-six and forty feet. Creating safe passage for salmon would require the alteration or circumvention of these points. The commission engaged a number of hydraulic engineers in 1942 to study how this might be done. With a special one-time disbursement from the national governments, \$ 45,000 was spent to set up a model project at the University of Washington to test various construction scenarios. A mini Hells Gate one-fiftieth actual size rose in Seattle. Milo Bell, formerly of the Washington State fisheries department, took on primary responsibility for engineering investigations at Hells Gate and contributed his considerable experience gained as a designer of the Bonneville and Grand

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<sup>64</sup>Courtland L Smith, Salmon Fishers of the Columbia (Corvallis: Oregon State University Press, 1979), p 78; Paul C Pitzer, Grand Coulee: Harnessing a Dream (Pullman: Washington State University Press, 1994), pp 223-227; Richard White, The Organic Machine, pp 89-98.

<sup>65</sup>This description of the engineering studies is based on: Milo C Bell, "Report on the Engineering Investigation of Hell's Gate, Fraser River," Annual Report of the IPSFC (1944): 15-22.

Coulee dam fishways.<sup>66</sup> At the University, Professor Harris, an expert in the area of hydraulic engineering, led the model project and was assisted by Ted Pretious, a UBC engineering professor, as well as Walter Hiltner, also of the University of Washington.<sup>67</sup> At all points during their studies they had a team of biologists at the ready to advise on the physiological and behavioral capabilities of salmon.

By 1943 they had a prototype.<sup>68</sup> The fishways were unlike those previously created for dam structures that carried fish up and over obstructions. Instead they were designed to operate at different stages of the gate on both banks, assisting fish only at problem water levels. They would not surmount the gate, but work through it. Positioned directly behind both of the "jutting rocks" the conduits were to provide salmon with an alternate route through high velocity points with a steep fall. At safer water levels, the fishways would be either submerged or above surface. Novel to the design was the use of vertical slot baffles within the fishway flumes as a means to slow the water speed to a consistent and manageable level.<sup>69</sup> The emphasis placed on disturbing the existing site as little as possible was deliberate. The tests on the model had shown that more radical plans to remove portions of "jutting rock" on the east and west banks would only risk creating new and potentially damaging conditions. The fishways were experimental enough that a thorough reconstruction of the gate was too risky to contemplate, and in any event, unnecessary. As Ted Pretious later put it, "the scheme devised was to aid the natural river to perform its function, rather than substitute artificial

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<sup>66</sup>Vancouver Sun, February 8, 1944, "Famed Engineer on Hell's Gate Project"

<sup>67</sup>UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File 1942, Thompson to International Pacific Salmon Commission, May 27, 1942.

<sup>68</sup>For a discussion of the hydraulic studies, see: Bell, "Report on the Engineering..."

<sup>69</sup>CH Clay In Design of Fishways, p 13 describes the operation of the vertical slot fishway thus: "This fishway is constructed by installing a series of baffles at regular intervals between the walls of a flume. The baffles are so shaped as to partially turn the flow from the slots back upstream, with the result that if the slots are properly shaped and dimensioned, energy dissipation is excellent over a wide range of levels and discharges. It has the added advantages of permitting the fish to swim through the slots from one pool to the next at any desired depth, since the slot extends from top to bottom of the flume."

features where the natural ones were adequate."<sup>70</sup> In the fall of 1944, with the support of the two national governments, construction crews began to excavate the site.<sup>71</sup> Built by Coast Construction Co. under the supervision of Bell and the commission, the fishways cost over a million dollars.<sup>72</sup> By 1945 one set of fishways was complete and the second was operable the following year.

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Despite Thompson's certainty of the causes of the seasonal blockades of salmon, his reasoned justification for the commission's building program did not appear in print until the fishways were complete. Published as the first Bulletin of the IPSFC in 1945, his analysis of the blockade conditions at Hells Gate was a major statement on the history of salmon populations in the Fraser basin and drew together a wealth of material developed over six years of commission research. Completed after Thompson had quit the commission in 1943 in frustration because of political and personal disputes, the bulletin represented his personal commitment to and pride in the commission's scientific endeavor.<sup>73</sup>

Thompson cast the analysis of the problems at Hells Gate in a wide context. He offered a long-term explanation for shifts in the populations of Fraser sockeye, premised on the logic of racial analysis applied to historical data. The long view was enhanced by

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<sup>70</sup>ES Pretious, "Salmon Catastrophe at Hell's Gate," BC Professional Engineer (February 1976): 17

<sup>71</sup>The rationale for participation in the project was spelled out by Department of Fisheries staff in: NA, RG 23, Vol 681, File 713-2-2[18], "Memorandum: Re: Permanent Fishway Facilities-- Hell's Gate Canyon, Fraser River," February 22, 1944.

<sup>72</sup>For a description of the building project, see: "Preparing to Open Hell's Gate," Pacific Fisherman 43(1) (January 1945): 63. The total cost of fishways at Hells Gate including later extensions was \$1,351,000: International Pacific Salmon Fisheries Commission, "Hell's Gate Fishways," (pamphlet) New Westminster, 1971, p 5.

<sup>73</sup>Thompson's resignation in 1943 followed on disputes with colleagues, particularly JL Kask and continued problems with Tom Reid. Kask resigned in the same year after the blow up with Thompson. Thompson was also generally frustrated with the amount of time required for executive duties. UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 7, File: "Correspondence (re: Thompson's Resignation)," Thompson to AL Hager, Canadian Fishing Company, August 3, 1943 (copy). Thompson also complained about personal disputes and the politics of his position to his diary: Box 1, File "Diary 1943"



the specific knowledge of migration timing and the effect of obstructions developed through the Hells Gate investigations. Recent shifts in salmon populations were analyzed with a particular focus on the differential effects of Hells Gate on distinct racial units in the upper basin's various spawning grounds. As a whole, the analysis suggested a new race-based approach to future fisheries regulation and justified the construction of the Hells Gate fishways as the only reasonable way to restore Fraser sockeye to past levels.

Thompson's long-term view of the fishery pictured a healthy set of racial units buffeted by a series of significant and sometimes regionally specific environmental insults. Dividing the history of the fishery into five periods of decline and recovery since 1872, Thompson created a serial index of past sockeye populations based principally on catch records. These were added to with reliable evidence and qualified to account statistically for changing rates of fishing pressure. Alongside the population index, Thompson examined changing regional escapements as evidenced in spawning ground surveys and remaining hatchery records. This allowed for a specific analysis of which racial units plummeted in years of decline, or were responsible for general declines in the fishery four years later.<sup>74</sup> The first decline of the fishery, for example, was traced to the episode of the Quesnel Lake dam that existed from 1899 to 1903 without an operational fishway. Although Thompson allowed that over-fishing might have added to the declines after 1903, he placed the primary emphasis on habitat destruction.<sup>75</sup>

The second major decline in salmon populations that Thompson identified was also rooted in a specific event of environmental destruction: the building of the CNR through the Fraser Canyon beginning in 1911. This second event, however, had a broader impact across the basin and a longer term, if variable, effect. Whereas the Quesnel Lake dam was specific to a number of racial units, the Hells Gate problem

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<sup>74</sup>Methodological considerations are treated in Thompson, "Effects of Obstruction..." pp 22-39

<sup>75</sup>Ibid, pp 50-55

affected all racial units in the upper basin (and thus the vast majority of the Fraser sockeye population). But as Thompson and the commission scientists had discovered in the Hells Gate tagging experiments, the obstruction changed daily. At key water levels it blocked fish, at other times it provided passage. Thompson specified the consequences of this shifting impact by cross-hatching different environmental data: the variable of water level (recorded at Hells Gate since 1912, and extrapolated from Hope data for earlier periods), the factor of racial unit and size of run (based on the latest data of typical migration dates and past spawner escapement information), as well as qualitative reports of regional population cycles. Viewed through the optic of racial analysis these different strands held together to explain what had formerly appeared to observers like Babcock as wild upper basin fluctuations.<sup>76</sup>

Consider the case of the Adams River runs that had experienced a number of puzzling patterns in the two decades after the slides. Thompson charted the population history of the river's runs in relation to two key environmental events: the creation of a lumber splash dam in 1907 and the Hells Gate slides in 1912-3 and after. The earliest impact was the easier to explain: a river blockage affected all Adams River runs, but was specific to that river, because no parallel declines were experienced in other spawning grounds. The Hells Gate effect was more complicated. Just as different upper basin runs experienced Hells Gate's variations differently, so too did the temporally distinct runs to the Adams River. The spawning region hosted both early and late season runs of distinct racial units. In 1913, Thompson suggested, early runs survived, while later ones were diminished, some becoming extinct. In the years following the disaster, problems remained, though they changed with seasonal water flows. The impact on the Adams River runs was that some runs experienced a precipitous decline, while others began to expand. In the course of ten years these shifts were registered in a transformation of the

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<sup>76</sup>Ibid, pp 84-156

pattern of quadrennial dominance. Whereas before the slides, the 1913 cycle year was responsible for the greatest volume of spawners, after ten years, the 1922 cycle year had replaced it as the dominant run year. What this meant, in lay terms, was that salmon numbers now peaked on a different four year cycle than previously: Hells Gate was shaping the success and failure of upper basin spawning runs by blocking some and favouring others. Over all the impact created a decline in the aggregate population.<sup>77</sup>

This explanatory framework held a certain amount of common sensical appeal: it pointed to obvious episodes of environmental destruction and explained their importance; it suggested why lower basin stocks, south of Hells Gate, had remained steady over the first three decades of the century, while upper basin runs fluctuated. But the analysis was closely tied to Thompson's understanding of the limits of different racial units to environmental insults gained from the tagging experiments. These studies supplied relatively precise data about how long it took certain races to complete their run to the spawning grounds in normal and delayed conditions, how resilient certain racial units were to delay, and how different migration times were affected more or less than others. These experiments instilled confidence in Thompson to state that the Hells Gate obstruction-- and not over-fishing-- was the primary cause of the decades-long decline in Fraser River sockeye.

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But what if his assumptions were false? Thus did William Ricker put the question in a 1947 article in the Journal of Wildlife Management entitled, "Hell's Gate and the Sockeye."<sup>78</sup> Ricker was then a professor of Zoology at Indiana University at Bloomington and a well-respected student of the sockeye and west coast fisheries. Holding a PhD from the University of Toronto, Ricker began his career at the Pacific

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<sup>77</sup>William F Thompson, "Effect of Obstruction..." pp 20, 62-66

Biological Station at Nanaimo and assisted Russell Foerster in his studies of sockeye at Cultus Lake. He had departed for Indiana in 1938 after working one season for the IPSFC at the time of the first discoveries of blockages at Hells Gate. It is unclear whether personal disputes had any role in his departure.

Starting from the position that such an important study and large body of evidence required careful debate and scrutiny in the fisheries field, Ricker leveled an empirical and interpretive critique of the Hells Gate study that raised serious doubts as to the necessity of the fishways. He started by focusing on a key empirical finding of the Hells Gate studies: that during periods of blockage only twenty percent of delayed sockeye were able to pass. This was an important point because it undergirded all of the claims made by Thompson concerning the rate of passage and the impact on different racial units from delay periods. The problem, claimed Ricker, was that the figure was reflective of the data, but that the data were so selective of the larger population as to be unreliable and misleading. For one, the sample taken at Hells Gate almost certainly did not represent a cross-section of the population, but likely contained a far greater representation of 'weak' fish over strong fish. Since strong fish could pass the obstruction quickly they would be caught by taggers less frequently than weak fish that milled about in anticipation of passage, sometimes for days at a time. The weakness of the fish forming the major component of the sample, furthermore, was intensified through the very process of tagging. Netting a fish, placing it in a box, clipping it and returning it to water caused stress and sometimes split a fin-- minutes before fish were tested by the most difficult stretch of river in their migration. Both of these problems, Ricker stated, could have been accounted for by closer data collection methods and some simple shifts in experimental design (changing the location of the tagging stations, or using control fish, for example).

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<sup>78</sup>William E Ricker, "Hell's Gate and the Sockeye," Journal of Wildlife Management 11(1) (January 1947): 10-20

The consequences of this shortcoming in the data were judged by Ricker to be important: "With regard to the possible magnitudes of the effects of the above two sources of error, it can be said without hesitation that they may be sufficient to completely invalidate the conclusion that the Gate has been (1938-1942) a serious obstacle to migration."<sup>79</sup> Change some of the assumptions about the strength of the sample group, Ricker proposed, and it may have been that the tagging sampled eighty per cent of weak fish and only twenty per cent of the stronger migrants.

Thompson's findings were questionable in other ways. Why, asked Ricker, was it plausible to assume that a correlation between problem water levels at the gate and spawner success in any given year amounted to a cause-and-effect relationship? Climatic conditions, after all, have variable effects across space. While certain high river flow levels might prove beneficial at the gate, if they were caused by flood conditions in upper basin watersheds, they would also scour spawning grounds and reduce the success rate of the spawn. Water conditions at Hells Gate should not be considered as an independent variable, but placed in a wider context.

And then there was the absence of data in the report: it contained no discussion or compilation of the sex ratio of migrants past the gate. Given that it was widely understood that male spawners were more powerful swimmers than females, it logically followed, Ricker wrote, that a blockage would create a preponderance of male returns to the spawning grounds over females. Spawning ground surveys in the years of blockage, however, provided no such evidence of abnormal sex ratios. Did this mean that the appearance of a block at the gate and through the tagging studies was false? Possibly, Ricker said, or at the very least it required explanation.

What then was one to make of the fishways? If the proof of blockage conditions was in doubt, so too was the necessity of this expensive conservation measure. If in

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<sup>79</sup>Ibid. p13

future years they proved able to rebuild upper basin spawning grounds, in the absence of other conservation measures, Ricker judged, then they would surely be deemed worthwhile. He worried, however, that they would instead serve as an excellent excuse not to approach problems of over-fishing. Although Thompson's report discounted fishing as a primary cause of declines, he did report, Ricker underlined, that "the commercial fishery may take about 80 per cent of the sockeye returning from the sea; and tag returns show that 50 per cent is the absolute minimum."<sup>80</sup> What if the fishways were not about to save sockeye spawners? Would it not be worth considering stringent catch controls, at the very least to enhance the fishways' possible success? It would be a "gamble", Ricker concluded, to leave the task of conservation only to the fishways.<sup>81</sup>

Ricker's paper was framed as a scientific critique of an admirably complex study based on an enormous body of evidence. It did not shy away, nevertheless, from drawing strong conclusions about the wisdom of the IPSFC's research and building programme as well as William Thompson's capabilities as a scientist. If it was intended as a disinterested critique, it was not received in that spirit. The paper led to a major scientific controversy in the fisheries research community that spilled into the fisheries press and was cast by its participants along national lines. The international cooperation inherent in the IPSFC programme seemed for a time in tatters.

The depth of feeling that Ricker's paper aroused is ably demonstrated in the correspondence between Thompson and some of his closest colleagues in the fisheries research community. Days after the journal was printed, Richard Van Cleve, the IPSFC Chief Biologist and a professor at the University of Washington College of Fisheries, registered his dismay to Thompson in a personal letter.<sup>82</sup> Interestingly, Van Cleve did not

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<sup>80</sup>*Ibid.* p19

<sup>81</sup>*Ibid.*

<sup>82</sup>UWA, Richard Van Cleve Papers, Acc. 1683-71-10, Box 4, File Correspondence to Thompson, 1947, Van Cleve to Thompson, January 21, 1947 (copy)

comment on the scientific aspects of Ricker's paper, but judged it as merely the expression of a "personal grudge" against Thompson and the IPSFC, though with wider implications. Not only did the paper put Thompson and the commission's reputation in a bad light, but it was "in effect an attack on all biological fisheries work on the Pacific coast and will result in casting a doubt on the validity of any of our work, especially that on salmon..." A scientific reply would be useful, Van Cleve advised Thompson, but better still would be a popularly accessible response that would win over an audience without the capacity to understand the depth of the original bulletin.<sup>83</sup> In the following months, Thompson took up Van Cleve's idea and penned a short, vitriolic response that expanded the debate from the focus on the Hells Gate studies to the deficiencies of Canadian science.

The kernel of Thompson's reply was aired in advance in personal correspondence with trusted colleagues. Writing to Fred Foster, formerly the regional director of the US Bureau of Fisheries in the Pacific Northwest, Thompson explained what he thought was the motivation for Ricker's critique. The matter, he implied, was not scientific. Ricker was formerly a member of the Biological Board of Canada. The Board had not discovered the problems at Hells Gate; its policies were abandoned in the light of the IPSFC's work and, as a result, were made to look ill advised. Ricker, he thought, was salvaging the reputation of the past Board and its research. "These Canadians," he wrote, "are somewhat in the position of a man who sat on a powder keg while the fuse burned, telling the world that it could not blow up."<sup>84</sup> But already improved returns through the fishways in 1946 were showing that the commission had been right all along. It was his duty, Thompson explained, to air the debate for what it was. Although his perspective

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<sup>83</sup>Van Cleve later read a preliminary version of Thompson's reply: PSCA, File 1180.1-74, Van Cleve to Thompson, May 5, 1947 (copy).

<sup>84</sup>UWA, William Thompson Papers, Acc. 2597-77-1, Box 15, File 29, Thompson to Fred Foster, February 14, 1947

had shifted significantly since he wrote magnanimously in 1944 that the Hells Gate obstructions could not have been understood previously, now his reputation was at stake.<sup>85</sup>

For a man who claimed to hate publicity, Thompson showed uncharacteristic relish in fanning the flames of controversy in the public sphere. His reply was a model of intemperance. Rather than focusing on Ricker's published criticisms, he reviewed the history of research on the Fraser sockeye and judged it wanting. Even the work carried out at Cultus Lake that had been widely hailed as the most exacting examination of the efficiency of artificial propagation (and in which Ricker had had a hand) was cast in the same light. "None of these investigations led to positive remedial action, successful or otherwise." The Hells Gate situation, meanwhile, went unstudied. The Canadian Fisheries Research Board, he claimed, "either tacitly, or actually, acquiesced" in the "official view" that nothing was amiss at Hells Gate after the initial clean up. "Either the problems at Hell's Gate were not appreciated by the Research Board and Dr Ricker, or as often may happen in governmental work, an 'official' view was allowed to modify the research program, consequently its results." Either possibility was a stinging indictment of Canadian scientists: they were fools or lackeys or both in this representation. Thompson reserved some space to attempt to dismantle each of Ricker's critical arguments, but much of his defense rested on the received wisdom of the spawning returns after the fishway construction. Fish numbers were improving; therefore the fishways were necessary and a success.<sup>86</sup> The reply was mimeographed and sent to over

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<sup>85</sup>See the quotation at the head of the chapter.

<sup>86</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 3, File 5, William Thompson, "Hell's Gate Blockade and Salmon," March 1947



fifty scientists in the United States and Canada, to the main fisheries dailies and to the IPSFC commissioners and select politicians.<sup>87</sup>

Two fisheries journals featured the reply and spun out the story as a significant battle between national fisheries science communities. The Pacific Fisherman defended Thompson's position entirely. The editor of the journal showed a preliminary version of the story to Thompson and heaped added scorn atop Thompson's views.<sup>88</sup> Ricker was cast as a "scientific sharpshooter."<sup>89</sup> In a subsequent article, aiming to provide equal space to the opposition, the editor continued to deride Canadian scientists as defensive and evasive.<sup>90</sup> He said that Ricker's role was personally motivated, political and vindictive. The release of Ricker's article shortly before Canadian parliamentarians were to reassess IPSFC funding was stated to be "significant" and presumably deliberately destructive. Like all of Ricker's critics, the journal stated, "The proof of fishways is in the fish which pass them."<sup>91</sup> The Canadian Fishermen's Weekly, by contrast, seemed to side with Ricker's viewpoint initially, or at least provided him with a platform.<sup>92</sup> Subsequently, the journal played host to a filtered conversation between Ricker and Thompson, as they sparred back and forth in public view. The journal also reported the views of commissioners, such as Tom Reid, who lashed out publicly against Ricker's statements, and allowed members of the Canadian Fisheries Research Board the opportunity to defend their research record.<sup>93</sup>

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<sup>87</sup>UWA, William Thompson Papers, Acc. 2597-77-1, Box 15, File 29, BM Brennan, Director of IPSFC to Thompson, April 1, 1947. Brennan's letter lists forty-seven individuals and institutions to whom Thompson's paper was sent and included twenty-five more re-prints for Thompson to send personally.

<sup>88</sup>UWA, William F Thompson Papers, Acc. 2597-3-83-21, Box 8, File, "Ricker's criticism," Stedman H Gray, Executive Editor, Pacific Fisherman to Thompson, April 10, 1947

<sup>89</sup>"Scientific Sharpshooting," Pacific Fisherman 45(5) (May 1947): 37

<sup>90</sup>"Do Nothing Biology," Pacific Fisherman 45(7) (June 1947): 30

<sup>91</sup>"Scientific Sharpshooting," 30

<sup>92</sup>"Hell's Gate and the Sockeye," Commercial Fishermen's Weekly XIII (8) (March 14, 1947): 90-91

<sup>93</sup>The key articles are, "Salmon Commission Hits Back at Critic," Commercial Fishermen's Weekly XIII (10) (March 28, 1947): 111, 113; "Review of Evidence Suggested by Ricker," XIII (12) (April 18, 1947): 135-137; "Research Board Said Not Open to Charges," XIII (13) (April 25, 1947): 152-153

Members of the Board were personally affronted by Thompson's public remarks and conducted a campaign to defend the reputation of their institution and themselves. Wilber Clemens, who had been director of the Pacific Biological Station in the period of so-called negligent research, prepared his own mimeographed response for wide circulation. In it he reviewed the research projects of the decades before the commission came into being and pointed out that none of them aimed specifically at rehabilitation activities, as Thompson had suggested. To fault life history research for not turning up the Hells Gate problem was misleading and unfair, he charged. More to the point, Canadian research had been held up because of the interminable delays in ratifying the Pacific Salmon Convention: "The Fisheries Research Board was not asked to undertake a general investigation of the Fraser River with the objective of rehabilitating the sockeye runs because from the time of the establishment of the International Fisheries Commission (Halibut) in 1923, negotiations were almost steadily in progress for the establishment of an International Commission for dealing with the sockeye salmon problem of the Fraser River."<sup>94</sup> In personal letters both Wilber Clemens and Russell Foerster criticized Thompson for drawing the Fisheries Research Board into the debate.<sup>95</sup> Foerster described Thompson's views as "totally incorrect and misleading."<sup>96</sup> Thompson answered these reactions by standing by his remarks and pointing out that the many activities carried out by the Biological Board in the years before the IPSFC had done little for the rehabilitation of Fraser sockeye. He also made it known that he had heard that Ricker had aired his views to Canadian scientists before publication and that he had been encouraged to proceed. Why had Thompson or the commission not been contacted in advance before such destructive criticism was unleashed? Thompson stated plainly that

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<sup>94</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 3, File 5, WA Clemens, "A Statement Regarding the Memorandum 'The Hell's Gate Blockade and the Salmon,' by WF Thompson" [April 1947]

<sup>95</sup>UWA, William Thompson Papers, Acc. 2597-77-1, Clemens to Thompson, April 8, 1947

<sup>96</sup>UWA, William Thompson Papers, Acc. 2597-3-21-83, Foerster to Thompson, April 10, 1947

he would not stop criticizing Ricker until his point was understood. "There are deeper issues at stake than mere argument."<sup>97</sup> In 1948 the Fisheries Research Board's executive passed a special resolution in the proceedings of its annual meeting condemning the IPSFC for its member's criticisms of the FRBC's past research and called on Canadian commissioners to state publicly whether they agreed with the allegations. Dr Dymond of the University of Toronto sponsored the item and was seconded by Wilber Clemens.<sup>98</sup>

The actions of the FRBC executive in calling on Canadian commissioners to dissociate themselves from Thompson's views are suggestive of the complex national and international politics that developed in the Hells Gate debate. Whereas before the controversy, the most obvious signs of national antagonism occurred within the IPSFC, after Ricker's critique of Thompson's research a remarkable solidarity developed within the commission against the perceived external threat. Tom Reid, for example, a frequent critic of Thompson within the commission, and a reputed cause of Thompson's departure from the directorship of scientific investigations, helped to defend Thompson's work at the height of the controversy in his position as Commission chairman. The FRBC's call to the Canadian commissioners a full year after the high point of controversy underlines the extent to which the Canadian commissioners were not viewed as vocal enough defenders of past and current Canadian fisheries science. Ironically, Ricker's critique and Thompson's crude attack on the FRBC and Canadian science had the effect of lessening national differences within the IPSFC. Such a drawing together would only increase in the 1950s when the threat of dam building created a further common cause.

There were no doubt personal, national and scientific aspects to this debate. Thompson was bitter at the personal and political conflicts that had led to his departure from the commission. His certainty that Ricker's critique was primarily based on a

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<sup>97</sup>UWA, William Thompson Papers, Acc. 2597-3-21-83, Thompson to Clemens, May 8, 1947 (copy)

grudge was born of the paranoia he had developed operating in such a politicized scientific environment. Although it would appear that Ricker's motivations were more properly scientific than Thompson allowed, he also contributed to the controversy's escalation by the use of provocative statements in his paper and the press. Personal and national antagonisms seemed to share some common ground. Thompson's relationships with each of the Canadian scientists originally hired in 1938 had soured by the time of the controversy. His persistent view that the best scientific staff could be hired in Washington no doubt frustrated Canadian scientists as much as it did Tom Reid. These personal and national tensions helped to insure that the underlying scientific issues in the debate were overshadowed by the perceived motivations of its participants. Tim Smith, a fisheries scientist and historian, claims that at the heart of the debate was a fundamental disagreement about the role of over-fishing in fisheries depletion.<sup>99</sup> Yet Thompson was so bent on defending his reputation that he rarely engaged with Ricker's point that the IPSFC's conservation program was primarily aimed at restoring habitat rather than controlling fishing. Nor did he launch a detailed justification for his belief that fishing pressure exerted a much less problematic effect on fish populations than others claimed. After Ricker's contention was dismissed, the debate became political in orientation rather than scientific and did not focus on these key questions. In future research, Ricker would develop what became known as the spawner-recruit theory to establish the effects of spawner success on fry development.<sup>100</sup> His concerns were not merely a reaction to the fishways project or Thompson's bulletin, but were part of a longer-term consideration of the limits to fisheries sustainability.

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<sup>98</sup>NA, RG 23, Box 682, File 713-2-2[26], Fisheries Research Board, Extract from an Executive Minute, June 9-11, 1948, Vancouver, BC

<sup>99</sup>Smith, *Scaling Fisheries*, pp 276-285

<sup>100</sup>*Ibid*, pp 285-292

Resentment over the allegations and counter-allegations in this debate lasted for many years within the fisheries science community in BC.<sup>101</sup> But publicly, the controversy did not de-legitimize fisheries science as a whole as Richard Van Cleve had feared. The public perception of the Hells Gate research program was, to the contrary, almost entirely positive. This was due to the favourable response to the idea of restoring the Hells Gate site once and for all and the actual increase in salmon populations following the fishways' completion.

The fishways were greeted publicly as a miraculous exercise in technical mastery over nature. Completed in the euphoria of war's end, journalists described the fishways as one more battle won, a great public works project forging coast and interior. Hells Gate was a door unlocked and pushed ajar, a barrier overcome with a highway, a staging ground for the "invasion" forces of salmon. Scientists were the miracle workers with keys, "tough men," freedom fighters.<sup>102</sup> The connections drawn in these representations between the commission scientists and armed struggle suggest not only the saturation of military metaphor in public discourse, but also the ideas of science as liberator, and scientists as hard-working soldiers. In praising the Hells Gate studies in 1942, a lead Vancouver Sun editorial described the scientists' work as "definite and clear, completely proven-- checked a score of times to prevent the possibility of error..."<sup>103</sup> The virtues of an idealized science became the virtues of the fishways. In the ultimate representation of the transformation of Hells Gate from turbulent passage to domesticated space, one cartoonist drew passing salmon as ordinary citizens involved in a commute. The fishway

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<sup>101</sup>Roos, Restoring Fraser River Salmon, p 306

<sup>102</sup>Clippings were found in NA, RG 23, Box 682, File 713-2-2[21], "Fish Travel Modern Highway," Province October 28, 1944; "Hell's Gate Soon Ajar for Salmon," Western Business and Industry January 1945 Vol 19(10), pp 8-9; "Ready for Salmon Invasion," Province June 2, 1945; Vancouver Sun, August 6, 1945, cartoon; "Hell's Gate a Job for Tough Men," Province August 11, 1945; "Hell's Gate Unlocked by Science," Seattle Times September 30, 1945; "Freeing of 'Hell's Gate'," Ottawa Citizen January 28, 1946; "Hell's Gate Aids 'Miracle' of Nature," Province October 2, 1946.

<sup>103</sup>"Ottawa Cover Up on Bygone Errors," Vancouver Sun February 9, 1942

was drawn like a modern transportation system. Salmon passing through were dressed in the attire of businessmen and lay people. "I've been herring [sic!] a lot about this fishway!" declared one, toting a brief case. "Let's rest behind the next baffle," said another. Besides this kind of public enthusiasm, the debate between Thompson and Ricker had little broader importance. Newspapers were too busy drawing happy salmon.

It is also important to note the extent to which the fishways appeared to be 'working' in the late 1940s. GB Talbot's study of the efficiency of the fishways in passing fish at problem water levels judged it to be high. Using the same tagging methods to gauge the passage of fish as were used in the original experiments, Talbot found that the fishways eliminated the periods of seasonal delay that had played such an important role, in Thompson's view, in diminishing the capacity of salmon to spawn successfully. Furthermore, the commission's counts of returning spawners, the so-called escapement figure, showed a marked increase following the final completion of fishways in 1946. "After installation of the fishways," Talbot summarized, "the mortality rate between Hell's Gate and the spawning grounds was reduced approximately 20 per cent to 30 per cent."<sup>104</sup> Notwithstanding other factors (and there were many) the fishways appeared to have provided the basis for a rise in Fraser sockeye populations in the post-war period. Commission scientists spoke publicly of the possibility of restoring hitherto forgotten and depleted runs. Although the enhanced regulations of the fisheries played an important role in this expansion of sockeye populations, Commission scientists marshaled significant data to suggest that past obstructions were less of a factor than in the past. Further fishways were added in the late 1940s at Hells Gate, the Bridge River Rapids and Farewell Canyon.

Hells Gate haunted fisheries scientists, regulators, native and commercial fishers for decades. It imposed a burden on fish populations that was crude and simple, but

mysterious to determine and difficult to substantiate. For years questions surfaced as to whether the gate was cleared. One of the major proponents of the Pacific Salmon Convention, John Pease Babcock, consistently argued that the problem was solved. A convention was needed, he argued, to control fishing, the real culprit of fisheries depletion.

The formation of the Pacific Salmon Convention in 1937 followed a difficult, decades-long process of international negotiation and debate within state, provincial and both federal realms of government. Constitutional disagreements, conflicts in the fishery and unequal bargaining positions made agreement impossible until shifts in the American fishery leveled the playing field. By the mid-1930s after sharp declines in the fishery, the end of the American trap fishery and a periodic shift in migration patterns, the US agreed to a joint management agreement as well as an equal catch provision. The stipulation that the commission established under the convention should concern itself with scientific investigations for its first eight years of operation lead to the major discoveries of problems at Hells Gate.

The investigations centering at Hells Gate under William Thompson's leadership operated within a natural-cultural nexus. Scientific data did not simply represent nature; it was created by methods that produced various forms of selection, the most interesting of which was cultural. The confusion of scientists collecting tags from native fishers followed and reproduced established patterns of interaction between fisheries officials and natives in the canyon. The identification of problems at Hells Gate had rippling effects in local communities, as celluloid disks became currency equivalents. What affect all of these discrepancies had on the final data is impossible to know.

No single environmental event was as important in sealing the judgment of Thompson and his research team as the water conditions in the canyon in the 1941

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<sup>104</sup>GB Talbot, "A Biological Study..." p 77

season. The spectacle of six miles of mature sockeye turning red below the gate convinced Thompson that Hells Gate was a major obstruction that must be cleared. Through the prism of this event and the data collected in the tagging experiments, he analyzed the history of sockeye populations in the basin as a saga of fish and dams. Correlations between an index of population size and environmental insults demonstrated, in his view, that the primary causes of fisheries decline were to be found in episodes of habitat destruction. A healthy fishery needed clear passage.

The fishways constructed in 1945-46 to by-pass problem water conditions at Hells Gate were said to restore the river to its natural condition. The river, instead, had artifice placed upon artifice. An unnatural dam was deposited in the gorge in 1912-13 and the fishways were an unnatural response. Science tamed the gorge, as the newspapers never failed to suggest, and made a rough passage into a salmon highway. Subsequent studies argued that the fishways were a major factor in allowing for significant expansions in upper basin spawning runs in the post-war period.

The re-making of Hells Gate, however, raised various questions, some scientific, some national and others personal. William Ricker asked whether the IPSFC data could be trusted. William Thompson replied that Canadian scientists were carping after realizing their own errors. The dispute ripped apart whatever collegiality was left in the fisheries community after years of national tension within the international commission. It also incidentally strengthened the internal coherence of the IPSFC. The science of Hells Gate remade careers, reputations and institutions as well as the water and fish.

The undamming of the gate had various lessons to teach scientists, politicians and the fishing industry about the dangers of dams. They were lessons that required increased prominence in the late 1940s. The counter-example of the Columbia, claiming three major main stem dams by the late 1930s, modeled the dangers, but also produced the knowledge base to create the fishways. Proposals in BC to dam the Fraser gained



credence by the end of the war and were proposed by a variety of private interests. Hells Gate could stand as a monument to potential destruction against these proposals, but it also raised expectations: if scientists could tame this beast, why not another, human-designed dam, where fishways would be integral to the design? The enigma of Hells Gate was reproduced in the fish vs. power debate. Its meaning could not be fixed.

William Ricker in a parting salvo in his critique of the commission's science raised an intriguing idea about the possible rationale for the fishways. Maybe, he mused, the IPSFC wanted a fishway to ensure that the Hells Gate site, and the canyon around it, would be safe from the dreaming of hydroelectric power developers. For once the fishways were built, publicity created and salmon apparently saved, who then would think it permissible to sink this bi-national investment under the placid waters of a reservoir?<sup>105</sup> Ricker was not the only individual with this suspicion. BC Water Branch officials fretted that the fishways would destroy their plans for major post-war water development plans in the canyon. The fishways not only saved fish, they also claimed territory.

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<sup>105</sup>Ricker, "Hell's Gate and the Sockeye," p 19

**Chapter 5****Pent-Up Energy: British Columbia Embraces Power, 1939-1948**

If one were to choose any particular moment in the years after the war in which the hopes, self-doubts and politics of power were on display in full dress, none could serve as well as the inauguration ceremony for the BCER's Bridge River project in 1948. Taking place just months after a major flood displaced tens of thousands of British Columbians, the event was a cathartic experience of self-affirmation in which the virtues of electrical technology were praised and the divisions it created in society downplayed. The ceremony mixed tradition and modernity, private enterprise and public sanction; it acknowledged past shortcomings and pointed to their present rectification.

The symbolism paraded at the Bridge River powerhouse on October 24, 1948 bespoke a new, electrified British Columbia. In front of two hundred Vancouver businessmen, municipal and provincial politicians, Dean Cecil Swanson of Vancouver's Christ Church Cathedral dedicated the project to "the Glory of God and the service of man." Shuffling to the podium, an aged Geoffrey Downton, the first surveyor to identify the Bridge River site in 1912, sounded the official siren to open the penstocks and let the water power flow. He envisioned that the project would "brighten the lives and lighten the toil of countless thousands in the years to come." Acting Premier Herbert Anscomb told members of the press that the Bridge River project was a marvelous addition to the BCER's "great free system." If another world war came, he intoned, the project would gain even greater significance. Editorial writers noted that the BCER would now be selling excess power to the Bonneville Power Administration in Washington State along power lines that only a year before had served as an electrical lifeline in the opposite direction. What had once been a cause for shame was now a source of pride. British Columbia, the editors implied, had come into its own.<sup>1</sup>

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<sup>1</sup>BCER CF, "Bridge River Just in Time to Avoid Power Brown-Out," Province, November 25, 1948; "In a Position to Help," Victoria Daily Times November 22, 1948; "Vancouver Seen as Industry Hub, 'New York of Canada,'" Vancouver Sun, October 28, 1948; "Former Victoria Man Honored in Opening of Electric Plant," Victoria Daily Times, October 25, 1948; "Prayers, High Hopes Dedicate Power Dam," Province, October 25, 1948; "Bridge River Development Work Initiated Many Years Ago," Vancouver

This was the beginning of a new hydroelectric era in British Columbia. After no substantial expansion to the province's electrical supply during the 1930s and sharply increasing demands during the war, the late 1940s witnessed a host of new power development and transmission projects. The BCER expanded its power supply for its urban markets. The newly invented public power commission consolidated the hinterland market, developed a rural electrification program and began to build dams on Vancouver Island and in the Okanagan. The spirit of the times was conveyed well by one nervous salmon official who observed in 1947 that, "If you shake a tree another engineer falls out."<sup>2</sup>

Wartime dissatisfaction drove change. Criticisms of the relatively poor state of rural electrification, the high rates for electricity and the limited electrical supply led numerous groups and commentators to call for a grand solution: state expropriation of the electricity business. Where private industry had failed, went the hope, public power would create the basis of a new future, in city and hinterland alike. Channeled through the post-war rehabilitation council and later the Rural Electrification Committee, this political protest forced the provincial coalition government to plan for a major intervention in this field, in contradiction to past Liberal and Conservative party platforms. It also led the BCER into a desperate attempt to secure its power supply, lest shortfalls force the government's hand. By the end of the war a distinctive, mixed system of private power in the cities and public power in the hinterland emerged.

Just as this new building phase gained momentum, the Fraser River flooded. In the spring and summer of 1948, the river inundated the Fraser Valley, severed major transportation routes and threw the province into a state of anxiety. As the flood receded, the federal and provincial governments agreed to conduct a joint river management

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News Herald, October 23, 1948; "Power Line Defeats Mountains," Province, August 28, 1948. The quotations are from the Victoria Daily Times article of October 25, 1948

<sup>2</sup>NAC (Pacific Region), RG 23, Vol 2301, Folder 6, Proceedings of the IPSFC meeting, August 9-10, 1947

strategy in the future with a view to developing flood control dams. Thus, added to the hydroelectric building program would be a distinct, but related concern for flood control.

The consequences of the power scramble and the flood shaped BC river politics into the 1960s. This chapter seeks to explain the origins of institutions, the social impetus to development, the politics of power and the making of a new era in river management policies. The aim, in short, is to peel back the layers of the Bridge River inauguration, to peer at the contradictions hidden in ceremony and to listen for the conspicuous silences.

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In 1942, members of the Duncan Rotary Club sat down to write a letter to the Post-war Rehabilitation Council. So did the Summerland Women's Institute, and the Prince George Junior Chamber of Commerce. Besides their common participation in the Council's still pre-mature dreaming of a post-war future, these groups and others like them also had a similar idea. The government, they wrote, would do well to expand electrical power in the province, make it available in isolated areas, and put idle rivers, like the Fraser, to work.<sup>3</sup>

The council dealt in such matters. Appointed by the provincial government in 1942 to plan for the inevitable dislocation of the post-war period, a team of ten MLAs, primarily from the coalition government and led by education minister and former mayor of Prince George, Harry GT Perry, toured the province that year and solicited the views of individuals and groups by mail.<sup>4</sup> In their number was a handful of politicians who

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<sup>3</sup>Different organizations and individuals that made submissions on the topic of electric power, hydro-electricity and water power are listed in the Appendix to Hon HGT Perry, Chair, Interim Report of the Post-War Rehabilitation Council (Victoria, January 1943), p. 22. Some short versions of proposals offered in these submissions are listed in a later section of the Appendix, pp. 57-59, 83-85. It is evident that some groups listed in the second section are not listed in the first. I have combined the two lists to arrive at a rough total of thirty-eight.

<sup>4</sup>Members of the Council were as follows: HGT Perry, WAC Bennett, ET Kenney, CG MacNeil, JA Paton, WT Straith, HE Winch, Mrs. N Hodges, Mrs. TJ Rolston and Mrs. DG Steeves. The latter three female councilors were added late to the council, perhaps to make an attempt at bridging the gender imbalance. The Interim Report stated "that letters and copies of the Post-War Rehabilitation Act were sent to all public

would have an important impact on BC's post-war political scene and hydro-electric development: WAC Bennett, the future Social Credit Premier, but at this date a Conservative, would oversee the creation of BC Hydro and major developments on the Columbia and Peace Rivers; ET Kenney, a Liberal and future Minister of Lands and Forests, would shepherd the development of a large dam and aluminum plant in the late 1940s; and Harold E Winch, leader of the provincial CCF, would remain a staunch advocate of public power throughout the post war era. David Mitchell, WAC Bennett's biographer, suggests that the Post-War Rehabilitation Council not only focussed the attention of the province on post-war possibilities, but also opened the province and its regions to this group of politicians as never before.<sup>5</sup>

In reply to the written solicitations of this band of traveling politicians, British Columbians, it turned out, had much to say. Tourism, forestry, fisheries, road building--these were some of the many topics that gained attention. In their report, the councilors weighed these views, summarized some of them and published a few compelling briefs in full; they also chose to defend key ideas as their own. On the issue of hydroelectric development, and in contradiction to past Liberal and Conservative policy in BC, the report came down firmly in favour of a post-war role for the state in hydroelectric development and electrical distribution. Electricity, the report argued, had become a necessity of life; its reliable supply was a foundation of society. State intervention in this sector could help to reduce rates, provide better provisions for emergencies, serve new areas through inter-connections, develop more waterpower and decentralize industry.<sup>6</sup>

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bodies in the Province. These included:-- Cities, District and Village Municipalities, Boards of Trade, Chambers of Commerce, Veterans, Farmers, Labour, Manufacturing, Industrial, Trade and Service Organizations, Women's Institutes and numerous other public organizations." (p9)

<sup>5</sup>David Mitchell, *WAC Bennett and the Rise of British Columbia* (Vancouver: Douglas & McIntyre, 1983), pp 72-74, 76, 303.

<sup>6</sup>*Interim Report of the Post-War Rehabilitation Council*, p131

In the appendix, a forceful brief amplified these points and stressed the need for immediate action.<sup>7</sup> Written by Harry V Warren, a UBC geographer and geologist, the document attempted to point to past failings and suggest the best means of rectifying them before the end of the war. Warren started by reviewing BC's potential energy sources and then listed the relatively small amount of developed hydroelectric power. He mused about the reasons why power had not been more actively developed in the past and decided that the high capital cost and the lack of awareness of BC's potential in other parts of Canada and the world were to blame. Warren's estimate of the necessary funding ran to \$90,000,000, with an annual return on developed power of \$10,000,000. To gain a sense of the costs, promote the province and involve the government in these undertakings, no time could be lost. Waiting until the end of the war would be "entirely too late," he insisted.

Where were these great development opportunities? Many of the briefs gestured vaguely towards the Fraser or mentioned one of its tributaries. These views reflected the fact that the majority of the population lived in the Fraser basin and considered the river's development as the most feasible and propitious. Provincial government staff, in charge of surveying BC's waterpowers, made parallel observations. Ernest Davis, the provincial water comptroller, stated to the council that the best post-war water development opportunities existed in the Fraser basin.<sup>8</sup> Three exceptional sites for diversion of interior flows to the coast were located in the upper basin and the main stem afforded major possibilities. Interestingly, the key sites of post-war development on the Columbia and

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<sup>7</sup>Harry V Warren, "Excerpts from a Brief Submitted to the Post-War Rehabilitation Council," in Appendix of *Ibid.*, pp 419-421. Warren also made such views public in a speech to the Vancouver Board of Trade in 1942: BCER CF, "Dr Warren Urges Hydro Development," Vancouver Sun, October 16, 1942; "Raw Material Wealth Answer to Postwar Problems," Province, October 16, 1942

<sup>8</sup>BCARS, GR 1006, BC Water Rights Branch, Box 1, File 10, Comptroller of Water Rights to Hon HGT Perry, Chairman, Post-war Rehabilitation Council, September 8, 1942 (copy). Davis also promoted the power possibilities of the Fraser during the war in the business press, Ernest Davis, "Fraser Drainage System Could Furnish Power for Giant Metallurgical and Chemical Industries," The Financial News, October 31, 1941 and "Development of Water Power in British Columbia," British Columbia Financial Times, XXVIII (21), Nov 1, 1941. These articles are contained in the same file as Davis's brief.

Peace Rivers gained barely a mention: the Columbia's importance was described as modest and the Peace was not listed at all. Here, then, was a telling register of mid-war attitudes of the geographical boundaries of power development. The limitations of transmission costs, of course, informed Davis' advice. But one also suspects that distant developments, outside of the core region of the province, could not quite be imagined at this date.

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Governments shelve undesirable reports. The Post-war Rehabilitation Council's firm advocacy of public power did not lead to this result. Instead, following the Council's recommendation to study the issue, the Coalition cabinet established a committee of civil servants for this purpose in 1943 with instructions to focus on rural electrification. The mandate, admittedly, narrowed the focus, but the possibility of state intervention opened, as never before.

The emphasis on rural electrification reflected the concerns of many of the participants in the hearings of the post-war rehabilitation council. Although Warren believed in the possibility of an integrated, developed electrical state, most of the submissions to the council asked simply for local electrical hook-ups, or a drop in electricity rates. Of the thirty-eight submissions to the council on the topic of electrical development, thirty-one of them originated outside of Vancouver and Victoria.<sup>9</sup> Although civic populism had been a major political force in pressing for public power in earlier decades, urban groups were conspicuous in their absence from the roll call amassed by the council.

Rural electrification as an ideal had broad appeal in the war years. During the New Deal era, the American government had developed a number of state funded

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<sup>9</sup>Of the seven submissions I identify as originating in Victoria or Vancouver, provincial government bureaucrats submitted two.



projects to expand the boundaries of the electrified universe. The Tennessee Valley Authority, the Columbia River projects and the Rural Electrification Administration (REA) all received wide publicity in the late 1930s.<sup>10</sup> Pioneering examples in Canada, such as the Ontario Hydro-Electric Commission and its equivalent in Manitoba were also the point of frequent comparison.<sup>11</sup> Across Canada, from around 1942, rural electrification emerged as a major subject of post-war planning.<sup>12</sup> The growing appeal of collectivism during the war, the enhanced role of the state, and the rise of the organized left, all forced the agenda.

'Rural' perhaps was a misnomer, at least in British Columbia.<sup>13</sup> The object of consideration was non-metropolitan British Columbia: the province, less Vancouver and Victoria. Unlike the New Deal REA program, the mandate of the rural electrification committee focussed not on dispersed settlements engaged in agriculture, but on hinterland regions of the province. These included smaller cities in the urban hierarchy, resource towns, regional service centers as well as dispersed settlements and farms. Such areas received electrical services from a host of small systems owned in some cases by municipalities, run as offshoots to industrial projects or as minor private corporations. One dominant firm, on the other hand, the BCER, controlled the urban market in Vancouver and Victoria, as well as the interior city of Kamloops (See Table 2). Although

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<sup>10</sup>David E Nye, Electrifying America: Social Meanings of a New Technology, 1880-1940 (Cambridge: MIT Press, 1990), Chapter 7 "Rural Lines," pp 287-338; and Ronald C Tobey, Technology as Freedom: The New Deal and the Electrical Modernization of the American Home (Berkeley: University of California Press, 1996).

<sup>11</sup>Although a number of provinces had experimented with rural electrification programs before the war, Ontario had by far the greatest level of rural extension: Keith R Fleming, Power at Cost: Ontario Hydro and Rural Electrification, 1911-1958 (Montreal and Kingston: McGill-Queen's Press, 1992), p16. The interest in the experience of other jurisdictions is well represented in the discussion devoted to the subject in the Interim Report.

<sup>12</sup>In 1945 the Vancouver News Herald presented results from a survey by Canadian Press that showed every province had some form of post-war rural extension program in development: BCER CF, "Rural Electrification Interests Every Province," Vancouver News Herald February 28, 1945

<sup>13</sup>The committee dispensed with the terms rural and urban and referred to different systems by numbers of consumers, classified into five groups. For a discussion of the term rural as an analytical category and a conceptual boundary marker, see: RW Sandwell, "Finding Rural British Columbia," in Sandwell ed., Beyond the City Limits: Rural History in British Columbia (Vancouver: UBC Press, 1999), pp 3-14.

the perception existed that the hinterland regions were poorly served and paid dearly for electricity relative to the cities and other parts of the country, arguably the entire province experienced relatively high rates. The committee's comparison of rates in different BC locales with communities and cities of similar size in Ontario showed in general that British Columbians used less than half the domestic electricity of Ontarians, while paying more than twice the cost per unit of power (See Table 3). The problem, then, was how to extend electrification to the remaining undeveloped regions, while making electrical use more accessible and affordable in areas of existing, but unsatisfactory, service.

The word 'rural' also signaled a set of political concerns. By 1943, the coalition government had produced a number of blunt signals that it intended to expropriate private utilities after the war: the post-war rehabilitation council's report explicitly advised this route; and on June 18, 1943, Premier John Hart issued a press release that appeared to leave little doubt as to his government's direction: "The proposal," Hart stated, "is for the Province to take over development of power and furnish it to municipalities at arranged centres. The Government thus will participate in the purchase to this extent."<sup>14</sup> Despite pointing to the direction of policy, however, this statement was unclear as to how such a transfer would be arranged. The ambiguity may have been deliberate: from one perspective, the coalition government's flirtation with the issue of public power was a calculated attempt to capture non-metropolitan support and keep the rising popularity of the CCF in check.<sup>15</sup> The CCF's policy of universal state ownership in the electrical industry served to push the formerly non-interventionist Liberal-Conservative coalition towards some public-private mix, at the very least. This leftward shift in policy

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<sup>14</sup>BCARS, GR 1222, Premiers' Papers, Box 171, File 8, "Press Release, Premiers' Office," June 18, 1943

<sup>15</sup>In the 1941 election, the CCF received the largest portion of the popular vote, but this did not translate into the largest number of seats: CCF: 33.6 % (14 seats), Liberals: 32.94 % (21 seats) and the Conservatives: 30.91% (12 seats). See: Martin Robin, Pillars of Profit: The Company Province, 1934-1972 (Toronto: McClelland and Stewart, 1973), p 51.

**Table 2: Central Station Groups, 1942<sup>1</sup>**

<u>Central Station Group</u>	<u>Number of Consumers</u>	<u>% of Total Provincial Consumers</u>	<u>KWH Production</u>	<u>% of Total Provincial Production</u>
BCER group	152,762	73.90	634,268,540	85.35
West Kootenay Power and Light	8,289	4.01	42,234,446	5.68
Northern BC Power Co.	3,011	1.46	16,636,480	2.24
West Canadian Hydro-Elect Corp	4,390	2.12	9,524,001	1.28
Nanaimo-Duncan Utilities	6,129	2.96	3,760,063	0.51
5 companies sub-total	174,581	84.45	706,423,530	95.06
26 other private utilities	4,941	2.39	5,657,694	0.76
19 municipally owned utilities	21,907	10.60	8,754,834	1.18
15 industries and institutions	5,294	2.56	22,258,436	3.0
65 total for Province	206,723	100	743,094,494	100

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<sup>1</sup> This table summarizes information from the Progress Report, Table 13, p 52.

**Table 3: Comparative Electrical Costs and Domestic Consumption for Systems of Equal Size in BC and Ontario, 1942<sup>2</sup>**

<u>Distribution System</u>	<u># of Customers</u>	<u>Avg. Annual Domestic Consumption</u>	<u>Avg. Charge per KWH (Domestic) in cents</u>
Lower Mainland*	105,507	1,068	2.45
Toronto	178,956	2,400	1.15
Victoria and Region	22,332	895	3.12
London	21,373	2,952	1.03
Nanaimo	4,085	609	5.4
Brockville	3,491	1,884	1.10
Kimberley	1,479	1,098	3.5
Bowmanville	1,381	1,716	1.58
Courtenay	940	483	6.2
Prescott	959	2,196	1.28
Princeton	570	530	4.3
Caledon	557	804	1.9
Quesnel	252	368	9.7
Elmvale	251	912	2.2

\* Not including the Fraser Valley

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<sup>2</sup> This table summarizes data provided in the Rural Electrification Committee's 1944 Progress Report, pp 28-31.

paralleled a variety of coalition attempts to engage reform issues as their own.<sup>16</sup> Furthermore, the hinterland focus of rural electrification fit well with the coalition government's interest in opening new northern and interior regions to resource development after the war.<sup>17</sup> State-led rural electrification could be envisioned not as a great departure for the parties of the center and right, but as an accompaniment to such government activities as road building. Ideology did not have to change, only the assumptions about the proper tools to be used by the state in assisting private capital accumulation.

The committee of civil servants created in 1943 to consider rural electrification was composed of WA Carrothers (Chair), JC Macdonald and Ernest Davis who grasped this problem from the start and attempted to instruct politicians and the public in the possibilities and limitations of BC's existing techno-economic electrical infrastructure. The first two members of the committee held a firm knowledge of the electrical scene through their posts in the provincial Public Utilities Commission (Carrothers since its founding in 1938, MacDonald since 1939).<sup>18</sup> Before the war, they had overseen a major study of the province's private utilities with a view to mapping electrical rates and capital investments in order to determine the fairness of consumer costs. Far from being radical interventionists, members of the PUC, for the most part, shored up the claims of the dominant utility, the BCER, and judged its rate of profit to be fair.<sup>19</sup> They came at the issues of public power and rural electrification with a jaundiced eye, seeing in them the possibilities for great government expense and dubious outcomes. It is possible that

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<sup>16</sup>Robin, *Pillars of Profit*, p78.

<sup>17</sup>John R Wedley, "Laying the Golden Egg: The Coalition Government's Role in Post-war Northern Development," *BC Studies* 88 (Winter 1990-1991): 58-92

<sup>18</sup>JC MacDonald had also been Comptroller of Water Rights for the province from 1926 until 1939 when he joined the PUC: BCARS, GR 1006, BC Water Rights Branch, Box 1, File 1, "Board of Investigation and Water Branch Administrators, 1909-1965"

<sup>19</sup>The study, commenced in 1939, finally reported to the public in 1943: BCARS, GR 1160, BC Public Utilities Commission, Engineering Department, Box 1, Public Utilities Commission, "Report to the Lieutenant Governor in Council on the Investigation into the Rates and Service of the British Columbia Electric Railway Company Limited and Associated and Subsidiary Companies," July 1943

Ernest Davis also had an impact on the committee's thinking, but the scant attention to water development in its reports would suggest otherwise. It is probable that the rural electrification committee operated as an extension of the PUC and shared its assumptions.

The program recommended by the REC early in 1944 walked a fine line between state intervention and support for private utilities.<sup>20</sup> It focussed on the organizational structure of the existing industry as the main obstacle to expansion. Unlike boosters such as Warren, the REC argued that state-led hydroelectric projects were not the answer, nor was the development of a province-wide grid. Electrical supply should grow modestly with market demand; it should build on the existing infrastructure. What the Committee was recommending, in short, was a rationalization and integration of the existing medley of hinterland utilities. Economies of scale would provide a base for extension; rates could be dropped; and with time supply increased. Although state expropriation of the non-metropolitan market might be one route to achieving this outcome, the report pointed out on several occasions that it was not the form of ownership, but the management style that determined the price structure of a given utility.<sup>21</sup> The report thus provided the coalition government with a technical strategy, but left open the question of how to obtain this outcome politically. Private utilities and public power advocates could both find reasons for cheer and concern in the REC's findings.

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Private power interests followed the activities of the Post-war rehabilitation council and the REC with trepidation. BCER directors, in particular, understood the politically pleasing ambiguity of the term rural electrification. Perhaps it portended few difficulties, but the possibility could not be ignored that the provincial state might enter the electrical business, and the scale of that intervention was utterly undetermined.

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<sup>20</sup>Progress Report of the Rural Electrification Committee as of January 4, 1944 (Victoria, 1944)

<sup>21</sup>Progress Report of the Rural Electrification... pp 16 and 19

Throughout the 1930s, the BCER had sought a close match between the flattening demand of the electricity market and its own supply position. In 1931, the much-anticipated Bridge River project was shelved indefinitely when the depression cut into Vancouver's industrial and domestic electrical market. Only in 1938 would extra capacity be added to the metropolitan Vancouver system with an upgrade at the Ruskin dam facility-- accounting for a mere 47,000 HP.<sup>22</sup> Thus although capacity was added over the 1930s, the rate of growth was slower than in previous decades and the actual installation of additional HP was less.<sup>23</sup> Such a policy could be justified in uncertain times when demand was soft. But when war arrived in 1939, the company discovered the perils of forecasting on the basis of slow growth assumptions.

Vancouver changed with the war, and so did its electrical market. Wartime needs brought forth an unprecedented level of shipbuilding, airplane and armaments production, with all of the associated commodity processing.<sup>24</sup> As the city returned to full employment, the utility found streetcar ridership sharply increasing, placing a greater pressure on the daily load factor.<sup>25</sup> Although domestic demand was kept in check with dim-out restrictions and the company's own decision to halt the sales of electrical appliances in 1942, there was an over all growth in Vancouver's population, not to mention the additional draw of soldier encampments on the edge of the city.<sup>26</sup> Until 1942, the company could cope with these changes. It was only when the Bonneville Power Administration in Washington state requested a purchase of 90,000 HP in the

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<sup>22</sup>BCARS, GR 1289, BC Water Rights Branch, Hydro-Electric Progress in Canada (Department of Mines and Resources, 1937), p 2

<sup>23</sup>RC Farrow provides aggregate figures of provincial installed capacity at: 65,000 HP in 1910, 310,000 HP in 1920, 630,000 in 1930 and 789,000 HP in 1941: RC Farrow, "The Search for Power in the British Columbia Coast Range," The Geographical Journal CVI (3-4) (September-October, 1945): 89.

<sup>24</sup>BCARS, GR 1289, BC Water Rights Branch, Hydro-Electric Progress in Canada (Department of Mines and Resources, 1942), p 2

<sup>25</sup>Henry Ewert, The Story of the BC Electric Railway Company (North Vancouver: Whitecap Books, 1986), p 225

<sup>26</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, 'WGM' [President Murrin] to HJ Symington, Power Controller, Department of Munitions and Supply, May 13, 1942 (copy). Murrin describes the impact of the war on the electrical business in this letter.

Spring of 1942 that BCER directors reassessed their position.<sup>27</sup> They could not meet the request, that much was obvious. But how many new needs would be placed on their system? How long could the company's existing supply meet the unprecedented rising demand?

BCER management believed that the most feasible expansion plan was the re-development of the Bridge River project, abandoned a decade earlier. A small system was already in operation, supplying a local mining venture, and some aspects of the earlier expansion work were complete. To add the facility's capacity to the metropolitan system, transmission would be required, new generators and an over-all expansion plan. This would be costly, and require a host of scarce materials and labour; but it might be completed within two years. The problem was to obtain government priority, so that the envisioned supply of five hundred miles of copper transmission wire, for example, might be forthcoming. For this, Ottawa's indulgence would be necessary.

To receive government priority for its construction needs, the BCER had to turn to the Department of Munitions and Supply and make a case that the expansion was a wartime necessity.<sup>28</sup> During the war, a power controller in the department assessed the energy outlook across the country, imposed rationing methods where necessary and approved or post-poned hydroelectric construction projects on the basis of forecasted demand and a sense of national priorities.<sup>29</sup> The BCER's appeal thus stressed the enormous burden of wartime demand rather than a failure of past planning as the reason for new construction. In correspondence to the department, BCER President Murrin

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<sup>27</sup>UBC Special Collections and Archives BCER Papers, Box 79, File 1583, Diary of JA Brice, May 13, 1942, reports discussion of the BPA request and the inability of the company to meet it.

<sup>28</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, Copy of Application to the Controller of Construction, Ministry of Munitions and Supplies, nd; 'WGM' [President Murrin] to HJ Symington, May 13, 1942 (copy); 'WGM' [President Murrin] to WE Uren, Director General, Priorities Branch, Department of Munitions and Supply, August 20, 1942.

<sup>29</sup>John de Nevarre Kennedy, History of the Department of Munitions and Supply Canada in the Second World War Vol II (Ottawa: King's Printer, 1950), p 181



noted the sharp recent increase in demand in the Vancouver system: up by over fourteen percent in the first six months of the year.<sup>30</sup> He stated that there were risks to the power supply and that it might be overdrawn by the fall of 1944. He laid out the plans for the Bridge River project, provided cost estimates of six and a half million dollars and envisioned a completion date of September 1, 1945. Authorities at the Department of Munitions and Supply mulled over the problem. They forwarded the documentation to the power branch of the War Production Board for advice.<sup>31</sup> And then, in early September 1942 the Director General's assistant delivered the judgment: by their estimates, the project would not be completed by the end of the war. It could not, therefore, be considered a wartime necessity and would receive no priority license.<sup>32</sup>

Embittered by this response, BCER management canceled the expansion plans and hoped that their predictions would not come true. A year later they began to worry again. Not only was their supply position in question, but so too was their political reputation. In the spring of 1943 company managers attempted to devise a new course; an internal committee of engineers and managers discussed future war problems and the readiness of the firm for a return to a peacetime market. The wartime conditions, reasoned EH Adams, BCER Vice President, would continue to eat into the BCER's supply. With the possibility of a mobilization for the Pacific theatre on the horizon, all bets were off as to how much Vancouver would grow as an allied staging ground and how much energy needs would rise.<sup>33</sup> As to the post-war situation, management had commissioned a number of internal studies on making the transition to peacetime

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<sup>30</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, 'WGM' [President Murrin] to HJ Symington, July 16, 1942 (copy).

<sup>31</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, CL Rogers for WE Uren, Director General, Priorities Branch to WG Murrin, August 28, 1942.

<sup>32</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, CL Rogers for WE Uren to WG Murrin, September 3, 1942; JH Gain, Executive Assistant to Controller of Construction to Bridge River Power Company, September 9, 1942.

<sup>33</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, Diary entry for AE Grauer, "Meeting of the Post-war Construction Committee held in board room," May 3, 1943

markets. Although a large block of kilowatt-hours would become available with the end of wartime production, these studies forecast a steady growth in industrial demand from the forestry-processing sector, amongst others, and a jump in domestic demand.<sup>34</sup> Adams also believed that the Public Utilities Commission would be looking to impose a new rate structure on the province with sharply lower domestic pricing. Experience elsewhere suggested that a drop in rates was usually accompanied by a rise in consumption.<sup>35</sup> Both the short and long term outlooks, therefore, pointed to the need for additional capacity.

There was, of course, the further consideration of political forecasting. Public discussion of a state role in hydroelectric development and the activities of the Rural Electrification Committee had gained the attention of BCER managers. Additional capacity, they hoped, might also solve a public relations problem. "The development of a sizable block of power," explained BCER President Murrin to Montreal director AG Nesbitt,

would put us in a much stronger position successfully to meet agitation for public ownership. This is particularly so in the face of the fact that the most common accusation against us is that we have not gone ahead with the Bridge River or other sources of power, with the result that we have hampered the economic development of the area we serve. The impression is, of course, that under public ownership additional generating capacity would be forthcoming. The fact that the Press has periodically reported additions to generating capacities of companies throughout Canada, while we have made no addition to the Lower Mainland system since 1938, has been played up by those who have been accusing us of lack of initiative..."<sup>36</sup>

In order to effect a defensive expansion, however, Ottawa's assistance would be needed.

BCER management attempted a different strategy and revised their request in their second bid in the spring of 1943. They by-passed the bureaucracy and headed straight for the Minister, CD Howe. President Murrin wrote to Howe of the company's supply problems, the potential difficulties that would be encountered with the Pacific

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<sup>34</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, "Report on Post-war Activities: General Sales Department-- Lower Vancouver Island," June 18, 1943; Diary entry for AE Grauer, July 14, 1943, "Meeting of the Post-war Construction Committee held in the board room," July 14, 1943

<sup>35</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, Diary entry for AE Grauer, "Meeting of Post-war Construction Committee held in the board room," May 3, 1943

<sup>36</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, 'WGM' [President Murrin] to AJ Nesbitt, June 1, 1943 (copy)

war, and the need for some form of government assistance, beyond mere priority, in order to install two new units at Bridge River. He predicted a cost of sixteen million to complete the project. Perhaps, Murrin suggested, the federal government could take control of the facility for the remainder of the war (and pay for it) with the company in charge of operations. Or maybe the federal government could ease the financial burden by the allocation of depreciation certificates.<sup>37</sup> After a subsequent visit with Howe in Ottawa, Vice President Adams reported that Howe seemed utterly unaware of their project, but genuinely alarmed at the suggestion of a looming supply shortfall. Adams claimed that Howe appeared ready to grant aid for the construction through depreciation certificates at a generous level, so long as his controller of power, Symington, was in agreement.<sup>38</sup> Believing that Howe commanded all he surveyed, the BCER managers and directors took this news as near confirmation of their goals. Supply would be enhanced at federal expense, thus averting provincial expropriation. What they did not anticipate was that Symington did not see the problem as they did and that Howe trusted his judgment.<sup>39</sup> Reading over the BCER's request, Symington's mind was not changed from a year before. He consulted military staff and concluded that the talk of massive expansion in Vancouver because of the Pacific war was unlikely. Had there been no war, Symington stubbornly suggested, the BCER would have built the Bridge River project anyway. He could provide some assistance to the company in terms of depreciation on a single generation unit (not two as had been asked for) as well as priority in obtaining supplies.

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<sup>37</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, 'WGM' [President Murrin] to CD Howe, June 3, 1943 (copy)

<sup>38</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, Adams to Murrin, June 16, 1943

<sup>39</sup>Herbert Symington and CD Howe had worked in close association since Howe had appointed Symington to the Board of Directors of the CNR in 1937. Howe later appointed Symington to the post of power controller. Robert Bothwell and William Kilbourn, CD Howe: A Biography (Toronto: McClelland and Stewart, 1979), pp 98, 135.

But that was all. He did not explain what his department proposed to do if the threatened shortages arrived. Nor did he lay bare his basis for judgment.<sup>40</sup>

This decision effectively killed the BCER's immediate plans for expansion. In the summer of 1943, right in line with predictions, or even in advance of them, Vancouver suffered power shortages. An unusual stretch of dry weather had left the BCER's reservoirs lower than normal, thus reducing their generating capacity. The company's usual strategy of augmenting the system with expensive thermal generation at the Burrard Inlet plant was impossible given oil shortages. Instead, the company had to buy a block of power from the Puget Sound Light Company and impose new lighting restrictions in the city, above and beyond those created for the entire dominion the year before.<sup>41</sup> All the while the Bridge River project remained virtually idle. Engineers began surveys and consulted possible contracting firms, but no shovel was turned before the end of the war; new power from Bridge River would not be delivered to Vancouver until 1948. Instead, the city would hold on with the assistance of a power tie-in with the Bonneville Power Administration starting in 1946. The BPA's appeal for assistance in 1942 had triggered the BCER's quest for expanded capacity on favourable terms. Now at war's end, the BPA bailed the BCER out of its unenviable position. But was this good enough to hold off the agitation for state expropriation?

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Although the coalition government supported the general concept of creating a public power commission of some variety after the war, the actual design and mandate of such an agency remained an open question. The post-war rehabilitation council's interim

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<sup>40</sup>UBC Special Collections and Archives, BCER Papers, Box 79, File 1583, Symington to Murrin, July 30, 1943. The BCER argued with Symington about this decision and received a blunt rebuke: Murrin to Symington, August 11, 1943 (copy); Symington to Murrin, September 1, 1943

<sup>41</sup>On the 1943 shortage, see: Kennedy, *History of the Department of Munitions...* p 185. On the tie in with American sources, see: BCARS, GR 1289 BC Water Rights Branch, Hydro-Electric Progress in Canada (1943), Department of Mines and Resources, p 2.

report advised a cautious approach: appoint a commission to study the possibilities of state intervention. To some extent, the Rural Electrification Committee fulfilled this goal, while nudging the government towards a more conservative approach than earlier proposed. The problem was that more ambitious plans had already created an expectant public audience.

From small beginnings, reflected in the briefs to the post-war rehabilitation council in 1942, the public power issue developed momentum by 1944, attracting a conglomeration of interests calling for state intervention. Despite the fractious party politics of the day and the CCF's best efforts, the idea of public power resisted narrow party or ideological definition. While CCF politicians tried to monopolize the issue for the left in the provincial budget debate in 1943 and at party conventions in 1943 and 1944, the coalition government could respond that this was a cherished ambition of government as well.<sup>42</sup> As a political concept public power was plastic: from the right it could be justified as a means to efficient service, from the left as a step to state socialism. Thus, the initial public response to the post-war rehabilitation council contained briefs from numerous boards of trade, chambers of commerce, union locals as well as veterans', women's and other service organizations. The political persuasions of these groups apparently ran the gamut. Despite the preponderance of hinterland over urban support in the council's findings, public power also resisted easy regional definition. Through the war, the largest dailies in Vancouver supported a broad program of public power. Urban based labour groups, including the Vancouver Trades and Labour Council, also weighed in favorably on the issue, as did a host of municipal organizations.<sup>43</sup> As the question of

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<sup>42</sup>Robin, *Pillars of Profit*, p 73

<sup>43</sup>BCER CF, "Develop BC Industries, Take Over BC Electric, Establish New Industry is Demand at PP Meeting," *Pacific Advocate*, nd; "Labour Urges Public Power," *Pacific Advocate*, November 25, 1944; A number of different labour groups contacted the Premier calling for a public utility: BCARS, GR 1222, Premiers' Papers, Box 172, File 1, John Turner, Executive Secretary of Vancouver Labour Council to Premier, November 27, 1944; AE Papke, Secretary of the International Woodworkers of America, District 1, Local 424 to Premier, August 18, 1945. This letter sates the local's support for a provincial utility.

the appropriate post-war course reached a head in 1944, municipal governments across the province intervened in the debate in an attempt to transform state intervention from a narrow rural program to one that encompassed the province as a whole.

The municipal role reflected the breadth of support for public power across the province, but also portended difficulties in the implementation of a state controlled system. Municipal involvement in this debate grew out of a long tradition of antagonism between municipal governments and utility monopolies, particularly in the more urbanized regions of the province. Vancouver's battles with the BCER in the first two decades of the century were legion, and under Mayor Cornett in 1944 Vancouver leant its support to the public power endeavor again. In the summer of that year, Cornett and municipal leaders from cities and towns controlled by the BCER and its affiliated utilities gathered to debate the prospect of provincial expropriation. In a final resolution municipal councilors stated their support for provincial expropriation under an independent hydroelectric commission.<sup>44</sup> Of the twenty-nine municipal councils concerned, eighteen supported this resolution unconditionally, while eleven others supported it with minor qualifications.<sup>45</sup> A month after this meeting, the Okanagan Valley Municipal Association considered a similar proposal, with six of nine municipalities in favour, one undecided and two against because of pre-existing municipal ownership.<sup>46</sup> This broad based municipal support-- representing metropolitan and hinterland municipal councils-- suggested that municipalities were ready to hold the

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<sup>44</sup> The resolution put to the municipal councils for a vote stated "That the Council of.... a Municipality served by the BC Electric system, (on the assumption that any municipal revenues now accruing in respect of the Company shall not be impaired) goes on record as being in favour of the Province taking over and operating through an independent Commission the whole of the affiliated Companies' undertaking without participation by the municipalities."

<sup>45</sup> BCARS, GR 1222, Premiers' Papers, Box 171, File 8, Mayor JW Cornett, Vancouver to Premier Hart, July 25, 1944

<sup>46</sup> BCARS, GR 1222, Premiers' Papers, Box 171, File 8 The balance of municipal support in the Okanagan listed above is a summary of separate letters sent to the Premier by JW Wright, honorary treasurer, Okanagan Valley Municipal Association, August 30, 1944.

provincial government to a broader meaning of public power than that recommended by the authors of the Rural Electrification Commission Report.

The emphasis of municipal support, however, highlighted a major area of municipal-provincial disagreement. The final wording of the resolution produced by the BCER- serviced municipalities supported provincial control with this important proviso: that the municipal governments should not be forced to assume a role as the owners of municipal utilities. This position grew out of the background of depression era municipal finance. During the 1930s two Vancouver suburbs had defaulted on loans and fallen into commission government.<sup>47</sup> The combination of unpaid taxes, rising service costs and ballooning debt had struck all Vancouver region municipalities. Mayor Cornett of Vancouver placed much of his focus during the early 1940s on reining in Vancouver's financial position.<sup>48</sup> These municipal politicians could see benefits from public power, but did not wish to expose their governments to any financial risks. Yet, dating back to John Hart's press release of June 1943, the coalition government had envisioned some role for municipal governments in a state-controlled system. The province, the original idea went, would generate power and distribute it to municipally controlled utilities. In 1944, Premier Hart announced that the province would enter the power business by expropriating all of the private utilities, but that this action would be contingent on the province's municipalities assuming the business of local utilities: street cars and gas as well as electricity. This announcement followed meetings between the Premier and the President of the BCER and may have represented the BCER's publicly unstated demand that if the power business went public, then the corporation should also be bought out of the less profitable municipal transportation field.<sup>49</sup> Quite apart from corporate influence,

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<sup>47</sup>Alan Morley, Vancouver: From Milltown to Metropolis (Vancouver: Mitchell Press, 1961), p 178

<sup>48</sup>Ibid. p 198

<sup>49</sup>Hart's meeting with President Murrin was announced in a June 18, 1943 press release. At least one further meeting occurred in September 1943, referred in the following correspondence. BCARS, GR 1222,

the province also had studied other models of public power and seemed convinced that a two level system, with a provincial commission paired with municipal utilities, would prove the most feasible. From a municipal viewpoint, however, this approach amounted to a major off-loading of costs. The municipalities, not the province, would have to finance the take-over of urban utilities and cover looming costs of re-investment in the transportation field. If public power were not to sink municipal government in debt, the municipal politicians claimed, then the provincial government would have to demonstrate financial as well as legislative support.

In the midst of the debate, the grounds of discussion changed. In the fall of 1944 the BCER announced that it would invest fifty million dollars in a major overhaul of its utilities at the end of the war. This would allow for the development of delayed projects, like the Bridge River facility, and provide infrastructure for rural electrification in areas around the BCER's urban markets.<sup>50</sup> To judge by the press coverage of these events, the government was left quite unprepared by this declaration.<sup>51</sup> With the province and the municipalities unable to agree on the division of powers under state control and no administrative framework established to organize the take-over of private power firms, the BCER's defensive move put the public power campaign on hold. Dailies sympathetic to state expropriation chided the BCER for its late conversion to a progressive agenda and claimed that the move was a cynical attempt to extract more money from the province in an eventual take-over purchase.<sup>52</sup> Editorial writers of the Victoria Daily Colonist, the

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Premiers' Papers, Box 171, File 8, Press Release, June 18, 1943; President Murrin, BCER to Hart, September 15, 1943.

<sup>50</sup>BCER CF, Copy of President Murrin's press release, September 26, 1944; "BE Electric Has Ambitious Plans," Financial Times, October 20, 1944; "\$50,000,000 Program for BC Electric," Financial Counsel, October 12, 1944; "BCER's Expansion Plans," Province, October 2, 1944; "BCER Planning an Outlay of \$50,000 Improving Plants," Vancouver Sun, September 30, 1944

<sup>51</sup>BCER CF, "Hart Silent on BCER Proposals," Vancouver Sun, October 2, 1944; "Hart Silent on BCER Plan," Vancouver News Herald, October 2, 1944

<sup>52</sup>BCER CF, "Belated Repentance by BCER," Vancouver Sun, October 2, 1944; "BCER's Expansion Plans," Province, October 2, 1944



Victoria Daily Times and the Vancouver News Herald, however, struck a different note.<sup>53</sup> The BCER, they claimed, had "scored" in the public-private debate. With provincial-municipal agreement in disarray, these dailies deemed it prudent to stick with a private system able to deliver on its promises; for public power to go ahead, it would have to improve on the BCER program.<sup>54</sup> Instead of introducing expropriation legislation, as had been intimated around this time, the provincial government and the municipalities agreed to establish a commission, made up of engineers from the New York firm WC Gilman and Company, to assess the BCER and recommend a public power administrative structure.<sup>55</sup> What such a commission would discover beyond what the Public Utilities Commission already knew was unclear. As the Province, BC's largest daily and a pro-public power voice stated, the appointment of the commission signaled the government's inability to act. It dubbed the commission, the 'board of delay.'<sup>56</sup> Editorial writers claimed that Premier Hart seemed "bewildered" by developments and was ready to push the municipalities into a "blind alley" with his insistence on municipal control of transportation and other utilities.<sup>57</sup>

The bewilderment soon turned into a policy of abandonment. With no resolution to the BCER expropriation issue in sight, the provincial government by-passed the municipalities and introduced legislation to establish the BC Power Commission in the late spring of 1945. The commission received a mandate to extend and expand electrical services in the non-metropolitan regions of the province.<sup>58</sup> It had no authority to supply

<sup>53</sup>BCER CF, "BCER's Electric Vision," Victoria Daily Times, October 2, 1944; "Utilities Expansion," Vancouver News Herald October 2, 1944; "Looking Forward," Victoria Daily Colonist, October 3, 1944

<sup>54</sup>BCER CF, "Utility Responsibility," Vancouver News Herald, November 9, 1944

<sup>55</sup>BCER CF, "Hart's Plan Finding Favor," Province, December 20, 1944; "Mayor Mott Firm for BCER Deal," Vancouver Sun, December 13, 1944; "Local Board to Operate Utilities," Vancouver Sun, December 11, 1944.

<sup>56</sup>BCER CF, "A Board of Delay," Province, December 9, 1944; "Why Take Over BCER?" Vancouver Sun, December 5, 1944

<sup>57</sup>BCER CF, "In a Blind Alley," Province, November 1, 1944; "BCER Issue Back 'In Lap of the City,'" Vancouver Sun, October 31, 1944

<sup>58</sup>BCER CF, "Vast Power Distribution Schemes Announced by Province and BCER," Province, February 5, 1945; "Electricity for Most BC Farms," Vancouver Sun, February 5, 1945

power in areas already serviced by the BCER or the second largest private utility, West Kootenay Power. This left the BCER with its urban empire in place and handed the public utility the job of extending services in less profitable markets. Months before a provincial election, the promise to put a 'light bulb in every barn' proved, as Martin Robin writes, to be "excellent electoral fare" in the hinterland areas of the province.<sup>59</sup> In the urban southwest, on the other hand, the coalition government received support from the BCER: the corporation assigned two hundred employees, led by a public polling expert, to a two month door knocking campaign in Vancouver and Victoria. These campaigners extolled the virtues of private power, and by implication, the ruling coalition government's standing policy to leave the utility alone.<sup>60</sup>

In the aftermath of the coalition government's re-election in October 1945, provincial and municipal politicians continued to speak in favour of public power while trying to insulate themselves from financial responsibility. The so-called 'board of delay' reported in August 1945 and found substantially in favour of the provincial position.<sup>61</sup> Armed with this expert advice, which had been jointly called upon by both levels of government, Premier Hart cornered municipal politicians. If they were not willing to ante up with the necessary financing for the expropriation of municipal utilities and their operation, he argued, then municipal referenda should be held on the issue to let the electorate decide the matter once and for all.<sup>62</sup> Mayor Cornett of Vancouver replied to the Premier that there was little point in calling the question so long as municipalities were being asked to assume costs they could not afford.<sup>63</sup> The municipalities could not

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<sup>59</sup>Robin, *Rush for Spoils*, p 80

<sup>60</sup>Robin, *Rush for Spoils*, p 84

<sup>61</sup>BCARS, GR 1222, Premiers' Papers, Box 171, File 7, "Report on Proposed Acquisition of Properties of British Columbia Power Corporation, Ltd" [August 28, 1945]

<sup>62</sup>BCARS, GR 1222, Premiers' Papers, Box 172, File 7, Hart telegram to Cornett, November 7, 1945; Cornett telegram to Hart, November 7, 1945; Hart to Cornett, November 6, 1945

<sup>63</sup>BCARS, GR 1222, Premiers' Papers, Box 172, File 7, Cornett to Hart, November 8, 1945

move on this point without risking their financial stability. And with that, the public power issue faded in the cities.

The conclusion of the public power issue related to the restatement of the coalition government's goals in the aftermath of the 1945 election. Whereas before the election, the province feared the rising popularity of the CCF and sought to present public power as a central plank of a reform agenda, after having been returned with a majority, the attempt to fill the centre in the political spectrum faded. The creation of the BCPC fulfilled its purpose: firming up non-metropolitan support while laying the groundwork for hinterland industrial development. The threat of public expropriation in the cities, on the other hand, also delivered desirable outcomes: the BCER was now committed to a re-investment agenda and promised massive expansion. The coalition had gone to the edge and reaped political rewards. Now re-elected, Premier Hart extracted his government from the public power issue, while portraying the municipalities as the unwilling partners.

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The resolution of the wartime public-private power fight unleashed an unprecedented hydroelectric building program in BC. The BCER built a transmission line connecting metropolitan Vancouver to the BPA's Washington state grid in 1946 and began construction on the much-post-poned Bridge River facility in the same year. The newly formed BCPC proceeded in 1945 to purchase a host of small electrical systems on northern Vancouver Island, the Okanagan and interior. As well as improving plant and transmission infrastructure, in 1947 the BCPC launched new hydroelectric projects on northern Vancouver Island and in the Okanagan.

The BCER's inability to coax Ottawa to extend priority and later financial incentives to expand its metropolitan supply system during the war placed the utility in dire straits by 1945. Demand continued to climb even as wartime production contracted.

The provincial Public Utilities Commission went so far as to insist that the company delay no longer in expanding its supply system by constructing the Bridge River facility.<sup>64</sup> The BCER, understandably, had delayed expansion plans in part to avoid the high costs of materials and labour in 1945, but also no doubt because of the threat of public expropriation. Its political problems seemingly averted with the formation of the BCPC in the summer of 1945, the BCER began to deliver on its promise of a fifty million dollar post-war expansion program.

The BCER's expansion focussed on the development of the Bridge River facility. Located near the Fraser Canyon in the headwaters of the Bridge River, the project consisted of a major pipeline diversion from the Bridge River fed through a two-unit generation powerhouse. Operating at a high head, the facility would use a relatively low volume of water to create a substantial new block of power, estimated in 1947 in the range of 186,000 HP upon final completion.<sup>65</sup> Like similarly designed projects in the lower basin that took advantage of 'natural' storage in lakes, the project's small diversion dam and pipeline would not pose as great a danger to salmon runs as main stem river developments. Although the site had some plant facilities already in place in 1945, the company still had a two-year construction timetable ahead of it when construction contracts were let in 1946. The new transmission lines to Vancouver-- over one hundred miles in length-- would alone constitute a major initiative. Although the building phase of the Bridge River project proceeded apace, the question remained as to whether it could come on line before Vancouver's metropolitan system faced a supply crisis.

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<sup>64</sup>BCARS, GR 1222, Premiers' Papers, Box 172, File 7, Copy of BC Public Utilities Commission Order, June 6, 1945; File 2, WA Carrothers, PUC, to Premier, May 16, 1945

<sup>65</sup>British Columbia, Lands, Surveys and Water Rights Branch Annual Report (1947), p 130. The initial installation to be completed, however, would be 62,000 HP. The Department of Mines and Resources, on the other hand, provided an "ultimate capacity" figure of 600,000 HP: BCARS, GR 1289, BC Water Rights Branch, Hydro-Electric Progress in Canada (1945), p 2.

BCER engineers judged not. Early in 1946, the company obtained Canadian and American authorization to construct a transmission line from its Vancouver system to the border to create an inter-connection with the BPA's Washington State power grid.<sup>66</sup> The new connection provided the firm with enough flexibility to complete the Bridge River project without resorting to drastic rationing methods, or risking brown-outs. Although the immediate problem was supply, the BCER also envisioned using this link to sell excess power from the completed Bridge River facility to the BPA in the late 1940s. The transmission line was the first step in the creation of a trans-national supply-balancing system between the two jurisdictions.

While the BCER focussed on developing physical infrastructure, the earliest initiatives of the BCPC concerned organizational consolidation. The commission's development plan aimed to improve supply and availability, increase the number of electrical districts and consumers and expand the enterprise. Under the leadership of Samuel R Weston, an engineer formerly with the PUC and REC, the BCPC at first followed a relatively cautious approach expropriating three small private utilities in five months and creating two electrical districts, one on northern Vancouver Island, the other in the Okanagan. From these two points, the expropriation of other small systems and utilities continued in the following years, developing by 1949 into two major regional organizations: one coastal, the other weighted in the interior. The commission even succeeded in shearing off sections of the BCER empire by expropriating the company's Kamloops utility. The BCER did not protest; it was a minor concession in order to be left alone in the major markets.<sup>67</sup> The development of the system occurred in this piecemeal fashion, rather than in one fell swoop in part because the provincial funding formula

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<sup>66</sup>The project was announced late in 1945: BCER CF, "BC Enters Power Pool Next Year," Vancouver News Herald, November 8, 1945;

<sup>67</sup>BCER CF, "Vast Expansion of BC Power System Seen," Province, October 24, 1946; "BCER Won't Fight to Keep Power Plants," Vancouver Sun, October 23, 1946; "BCE Properties to Cost BC \$1,400,000," Vancouver Sun, October 22, 1946

covered only initial capital costs. The BCPC had to generate its own administrative and operational costs from revenues and so it could not afford a rapid growth schedule before it found its own financial footing. Within a few years, the integration of smaller systems produced twelve separate electrical districts, some with sufficient supply to offer promotional rates that helped to spur the expansion of domestic consumption-- "one of the main objectives of the commission," as the 1949 annual report put it.<sup>68</sup>

Early in its development the BCPC began to investigate hydroelectric possibilities. Although on northern Vancouver Island and in parts of the interior the BCPC ran hydro facilities, many parts of the interior depended on costly thermal generation. Building on its core markets, the commission looked to develop hydro sites on Campbell River and at Whatashan on the Arrow Lakes to supply the north Island and the Okanagan, respectively.<sup>69</sup> The Campbell River project received priority, as Island power supplies were more limited. Built near Elk Falls, on the edge of Strathcona Provincial Park, the dam generated 28,000 HP when completed in 1947, with room to expand if new generation units were added and up-river points turned to reservoir needs.<sup>70</sup> Although the river hosted the famous Tyee salmon, prized by sports fishers, the BCPC located the dam well above the spawning beds and initial reports produced by the federal department of fisheries suggested that they did no harm.<sup>71</sup> The second project in the Okanagan would produce a new plant supplying 32,000 HP when completed in the early 1950s. After the creation of these regional growth spurs, the BCPC found that the combination of increased supplies and reduced rates propelled domestic and commercial

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<sup>68</sup>The early expansion program of the BCPC and the limits on growth are well covered in the Commission's annual reports, from 1946-1949. The quotation is from p 11 of the 1949 annual report.

<sup>69</sup>BCER CF, "Island Power Project Ready by Next Spring," Vancouver News Herald July 15, 1946;

"Famed Falls Survive Big Island Dam," Vancouver Sun, December 16, 1947; "More Power to BC," Vancouver Sun, December 17, 1947; "Big New Power Project Announced for Interior," Victoria Colonist, December 16, 1947

<sup>70</sup>The site was judged in 1947 to have a potential of 150,000 to 180,000 HP: British Columbia, Lands, Surveys and Water Rights Branch Annual Report (1947), p 130.

<sup>71</sup>BCER CF, "No Loss of Spawning Salmon at New Campbell River Dam," Province, September 29, 1947

consumption. As the Elk Falls development opened December 15, 1947 with John Hart flicking the proverbial switch, plans were already underway for its expansion.<sup>72</sup>

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As if soaring consumer demand and promotional rates were not enough to drive the post-war dam-building program, a new factor arose in the spring and summer of 1948.

The Fraser River flooded. Starting on the holiday weekend of May 24, the Fraser River climbed its banks, pushed back feeble containing walls and dykes and charged forth across the landscape, flooding agricultural lands, destroying homes and severing all of Vancouver's land links with the rest of Canada.<sup>73</sup> Although since 1858 the river had flooded on average once every four years, not since 1894 had the river risen on such a scale.<sup>74</sup> The combination of a heavy snow pack in the coastal and interior ranges in the winter of 1947-48, sustained low temperatures in the months of March, April and early May -- when the river usually began to drain the mountains of their icy load-- and a sudden rise in temperatures in late May created the conditions for an enormous outpouring. The first sign of trouble was the overflow of Bonaparte Creek near Cache Creek in the Fraser Canyon. Then on May 25, meter readings at Mission showed the river at a height of nineteen and a half feet, a mere half foot below the known level of flood danger. The following day dykes began to break in the Fraser Valley. At Hope the river disgorged 401,000 cubic feet per second. Before the flood subsided, the water

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<sup>72</sup>The dam opening is described in: BCER CF, "Famed Falls Survive Big Island Dam," December 16, 1947. On the plans for expansion capacity, see: "Power Scheme Doubled," Province, March 8, 1947; "The Public Demanded It," Victoria Daily Times, February 19, 1947. The building program of the BCPC in the late 1940s is described in John B Shaw, "The BC Power Commission and the Development of Rural Electrification," BC Professional Engineer 1(3) (March 1950): 7-10.

<sup>73</sup>This account of the flood is based on: NA, RG 89, Box 654, File 2258(B), CE Webb, District Chief Engineer, Department of Mines and Resources, "Flood of 1948 in British Columbia," Vancouver, BC, March 15, 1949. For a set of journalistic portraits of the flood that emphasize the cohesiveness of communities in the face of the disaster, see: Nature's Fury: The Inside Story of the Disastrous BC Floods (May-June 1948) held at BCARS.

<sup>74</sup>WR Derrick Sewell, "Changing Approaches to Water Management in the Fraser River Basin," in Gilbert F White, ed. Environmental Effects of Complex River Development (Boulder, Colorado: Westview Press, 1977), p 105.

would climb above twenty-six feet at Mission and an additional 135,000 cubic feet of water would be added to the earlier balance of 401,000 passing every second at Hope. In 1894, when the river rose to an even higher level, the flood passed quickly. In the spring and summer of 1948, by contrast, the river stayed at flood levels for thirty-three days: a flood duration not matched in the historical record, or since. Finally, by June 26 the river receded below the twenty-foot mark at Mission, and the restoration of the valley could begin.

The inundation produced a stream of damage statistics: 70,000 acres flooded, 2,300 homes damaged or destroyed, 16,000 persons evacuated, \$20,000,000 in damages. The brunt of the impact was felt in the Fraser Valley from Agassiz to the delta, where all of the Fraser's swollen tributaries joined in their final approach to the sea. One tenth of the valley's land base, or 50,000 acres, went under water. A quarter of the dyked land in the valley was inundated. First roads, then the CPR line, and later the CN Rail line were battered and severed. Airlines began additional shuttles to Vancouver, carrying supplies. Thirty thousand civilians engaged in relief work and three thousand military personnel lead a centralized flood control program starting June 1. One small pile-driving firm repaired fifty bridges on the Fraser before the year was out.<sup>75</sup> When the press hailed the event as one of the most remarkable environmental catastrophes in the history of the province, they for once did not engage in over-statement.<sup>76</sup>

As geographers of the Gilbert White school of environmental disaster studies might say, there is nothing like a flood to focus attention on water management.<sup>77</sup> As the

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<sup>75</sup>Fraser River Pile Driving: The Company History (New Westminster: Camart Studio Ltd., 1976), p 24.

<sup>76</sup>BCER CF, "Governments Take Action in BC Flood Battle," Province, May 28, 1948

<sup>77</sup>However, as Derick Sewell, a student of White's, would add, once crises pass, their role as a motivating force for action passes too: WR Derrick Sewell, Water Management and Floods in the Fraser Basin (Chicago: Department of Geography Research Paper No. 100, 1965). For a brief statement of White's approach, see: Gilbert F White, "Comparative Analysis of Complex River Development," in White, ed. Environmental Effects of Complex River Development (Boulder, Colorado: Westview Press, 1977), pp 1-22.



flood coursed across the valley floor, metropolitan dailies began the process of airing possible solutions to the devastation.<sup>78</sup> Editorials and opinion articles unanimously suggested the need for an agency of experts to oversee integrated planning in the river basin. Here again, American precedents provided a conceptual vocabulary: many articles leaned towards an authority like the TVA that might bring the Fraser's different interests together.<sup>79</sup> Just as on the swollen Columbia in 1948, the excuse of a flood was quickly deployed to promote dam construction.<sup>80</sup>

In the midst of the crisis, the Province provided a reflective history of the Fraser that cast the river in the role of province builder-turned-province wrecker.

It is not going too far to say that the Fraser was responsible for making British Columbia and that it has been a major factor in the province's development. But today it is a destroyer instead of a creator. Women and children are fleeing before its onset and men are toiling with bulldozers and trucks and sand bags in a vain effort to stay the spread of its waters. One doesn't have to be an engineer to know that the place to control the Fraser is not on its lower reaches and that the filling and piling of sandbags is a desperate and very temporary measure. The Fraser is a system rather than a river. Some of its tributaries are great rivers in themselves. Its lakes and creeks run into the thousands. The place to control the Fraser is up above, where the water comes from. The way to control it is to control the tributaries. For this we need a Fraser River Authority-- a board with authority enough and resources enough to take the river in hand, control its transports, coordinate its industries and make it work consistently for the benefit of the province as a whole...The authority's task will be to make the river work and keep it from destroying.<sup>81</sup>

The sentiments expressed in this editorial, penned at the height of the flood, represented well the mood of the province and its politicians. On a number of occasions,

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<sup>78</sup>Alongside this long-range planning discussion, the press spent much time praising the citizenry for pulling together in unexpected and pleasing ways: Mennonite farmers helping Army personnel sandbag a broken dyke, for example, were images that gained journalistic attention. For a selection of this flood journalism, see the small compilation produced after the flood from a sampling of newspapers: Nature's Fury: The Inside Story of the Disastrous BC Floods (May-June 1948)

<sup>79</sup>BCER CF "No More Floods," Vancouver Sun, June 1, 1948; "From an Angle on the Square," Province, June 12, 1948; letter to the editor from B Whitten, "The Flood Question," Vancouver Sun, October 2, 1948; "IWA Urges Big River Program," Province, June 22, 1948; letter to the editor from A Cheverton, "Food Rehabilitation," Vancouver Sun, June 19, 1948; "Flood Control and Power not Attuned," Vancouver Sun, June 17, 1948; "Lack of Foresight Blamed for Flood," Vancouver News Herald, June 16, 1948; "To Harness the Rivers," Victoria Daily Times, June 14, 1948; "Rehabilitation of Fraser Homeless Pledged by Johnson-- Dams Urged," Victoria Colonist, June 13, 1948; letter to the editor from Donald Bruse, "Technocracy and Floods," Vancouver Sun, June 2, 1948; letter to the editor from 'Waterman', "Electric Power and Flood Control Could Well Be Combined on the Fraser," Vancouver Sun, May 27, 1948; "Flood Control Means Power for BC," Vancouver Sun, May 21, 1948; "Are Dykes Without Dams Sufficient?" Vancouver Sun, September 25, 1948

<sup>80</sup>Richard White, The Organic Machine: Remaking the Columbia River (New York: Hill & Wang, 1995), p 75

<sup>81</sup>UBC Special Collections and Archives, BCER Papers, Clipping File, "Let's Make the Fraser Work, Not Destroy" Province, May 31, 1948

Herbert Anscomb, Conservative leader and Minister of Finance in the coalition government, informed the press that he believed a series of dams in the upper basin would be necessary to stop similar disasters in the future.<sup>82</sup> As the province and the federal government deliberated over how to divide the burden of the clean-up and recovery, politicians from both levels of government agreed to establish a federal-provincial board to study future needs in water management in the Fraser basin. The Dominion-Provincial Board, Fraser Basin, created in the fall of 1948, brought together ten senior civil servants from a number of federal and provincial departments, hired a full-time engineering staff and set to work on a five year mandate to investigate how best to prevent another flood. This new institutional authority held only ad hoc powers (unlike the TVA), but would nevertheless play an important part in the fish-power controversies ahead.<sup>83</sup>

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"To cut a long story short-- we missed the boat before the war, we have missed it during the war, and unless we take steps soon, we may miss it after the war."<sup>84</sup> Harry Warren's comment referred specifically to government waterpower surveying but it might have extended to the whole realm of water development activities that he helped to inspire during the war. For this geographer and British Columbia enthusiast, the rivers of the province represented just so much pent-up energy. From another perspective, the pent-up energy was more properly a social phenomenon of which Harry Warren was a conspicuous element.

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<sup>82</sup>BCER CF "Anscomb Appeals for Power Plan at Fraser Headwaters," Vancouver Sun, June 22, 1948; "More than Dykes Needed," Vancouver News Herald, June 15, 1948

<sup>83</sup>BCER CF, "Board Maps Plan to Study Fraser," Vancouver Sun, November 8, 1948; "Dominion-Provincial Board Set Up to Study Flood Control on Fraser," Victoria Colonist, July 3, 1948

<sup>84</sup>BCARS, GR 1222, Premiers' Papers, Box 165, File 11, Harry V Warren, "Some Thoughts on Post-War Construction," nd.

The political economy of power changed during the war and after. In 1939, a dominant utility in urban regions and a scattering of over sixty small utilities in hinterland areas served the province. Electrical rates were relatively high, particularly in smaller centers; rural electrification was marginal. The state played only a limited role in the business: a Public Utilities Commission established in 1938 assessed the fairness of rates, but erred on the side of corporate interests. Despite BC's abundant waterpowers, no supply driven building program appeared in the 1930s, despite the examples of New Deal projects on the Columbia. The BCER followed instead a strategy that closely matched supply with demand. This approach avoided risky expenditures, but came perilously close in wartime to forcing the hand of the provincial government to expropriate the firm in order to expand the electrical supply.

Wartime unleashed new demands as well as expectations. In urban areas of the province, population growth and the expansion of industry consumed the marginal supply of the BCER and forced it to examine immediate expansion options. Across the province, in hinterland areas and in the urban centers, disparate groups joined in calling for some form of state intervention in the electrical business. In order to stem the rising popularity of the left and reinforce hinterland support, the provincial government launched attempts to investigate rural electrification, while leaving open the option of a broader policy of state expropriation. Although the provincial government cited the intransigence of municipalities as the reason it shifted its policy away from an ambitious program of province-wide expropriation, the greater factor was probably the rearguard action of the BCER and its promise to expand electrical development in the province. In place of an integrated state system, British Columbians received a renewed monopoly of private power in the cities and a public utility in the hinterland regions. From 1945 to the end of the decade a host of building projects studded the rivers of the province with new

dams, power plants, and pipelines. Across watersheds and mountain ranges new power lines transmitted electricity to cities, towns and, increasingly, hinterland areas beyond.

Remarkably, the sudden burst of dam building after the war did not impose a major burden on the river habitats of salmon. The Bridge River facility operated as a pipeline development; the BPA tie-in displaced environmental impacts on the producer region: the Columbia River. Although the John Hart dam was located on a famous salmon stream, the Campbell River, its initial impact appeared negligible. As in the period of hydroelectric dam development before the war, these results were products of fortuitous circumstance rather than conscientious environmental planning.

Yet, if the immediate impact of these developments did not disturb salmon, they helped to lay the conditions for future problems. The development of new power sources after the war provided the supply basis for a major expansion in electrical consumption in BC. Before the war, the high rates and poor service of the electrical business had helped to keep the electrical market under-developed and by implication less damaging to salmon habitat. After the war, new power sources allowed utilities to offer promotional rates, and absorb new consumers, both domestic and industrial. In the first five years of its operation, the BCPC, for example, oversaw a threefold increase in electrical consumption in areas under its jurisdiction. This rate of growth was unprecedented in the province. New dams created the basis for further ones.

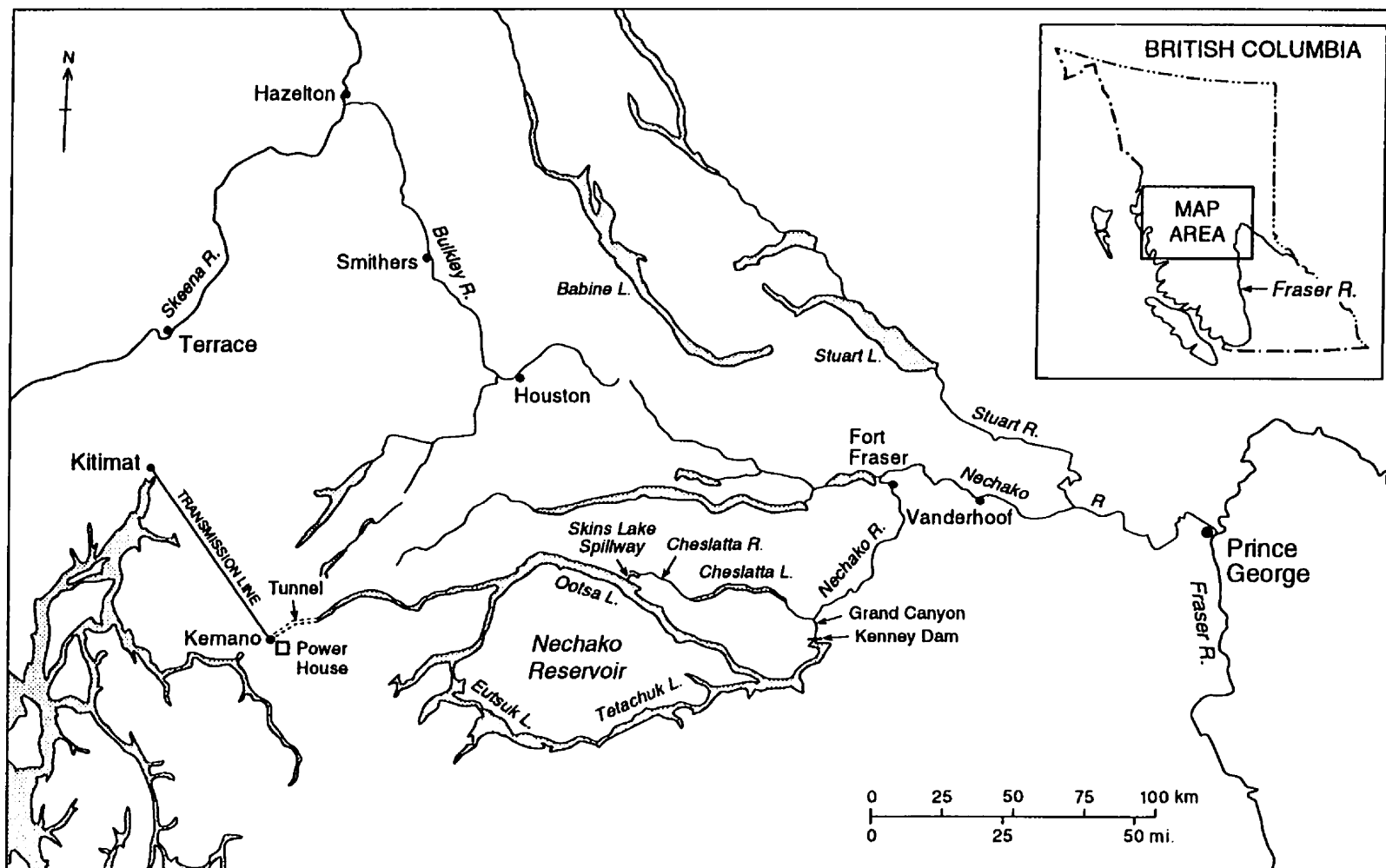
The public power fight and the devastation of the 1948 flood also created new institutions that would weigh heavily in fish-power fights in the future. The BCPC, a small provincial utility by the late 1940s, had grand ambitions. Yet, because its market was relatively small it proceeded according to a regional supply policy, in order to avoid the overhead costs of a major grid network. This established a structural condition disadvantageous to river protection: each region would need its own power supply. Rather than favouring large developments capable of major supply possibilities, the

institutional design of the BCPC set it on course to develop small sites, near to points of consumption. The prospect of more dams meant increased opportunities for damaging salmon habitat. The Fraser Basin Board posed a different sort of problem. Its mandate concerned flood control and a major point of study would be dam development.

Although the decentralized character of the board between different government departments lessened its focus both in design and purpose, it appeared well positioned in 1948 to carry out a major reclamation program on the Fraser. Flood control dams would require main stem developments and upper basin sites. This would place barriers directly in the course of migrating salmon.

By the end of the 1940s, the dam-building era in BC was in full stride. Projects were coming to completion; others were under investigation. It was difficult to imagine, standing at the Bridge River powerhouse in 1948, with the political elite greeting the new day of power, that this released pent-up energy could be stopped.

**Chapter Six:****Alcan, the British Columbia Power Commission and the Defense of the Fishery**



Map 4: The aluminum project.

One by one fisheries officials, scientists, lawyers and union representatives rose before the provincial water comptroller, Major Richard Farrow, to offer criticisms and advice. For over a year the press had reported on the Aluminum Company of Canada's (Alcan) investigations of waterpower sites in the province, and at last, on October 31, 1949 at a water rights hearing in Victoria, the company proposed to stake a claim.<sup>1</sup> The company wanted to build a dam on the Nechako River. Where exactly the dam would be placed was as yet unknown. Before launching into further engineering studies and surveys, company officials wanted to be certain that they would have the rights to the river's flow.

Few of the fisheries representatives on hand must have believed that there was much hope of blocking the project. As Department of Fisheries scientist Dr. AL Pritchard told the hearing, "We realize what is going to happen."<sup>2</sup> It was widely understood that the coalition government of John Hart wanted the project desperately. The water comptroller in charge was a known power booster and did not hide that fact. Most frustratingly, the fisheries officials representing the federal Department of Fisheries and the International Pacific Salmon Fisheries Commission (IPSFC) could not offer a concise report on the possible effects of such a project upon the salmon fishery. With an unspecified dam site, they were helpless to calculate consequences, and in any event, the river's salmon runs were little known. Instead scientists sputtered vague estimates, while Farrow, showing his ignorance too, evinced surprise that so many salmon spawned that far north.

And yet fisheries interests knew that things could be worse. Up until a few weeks before the hearing it was unknown whether Alcan would prefer the Nechako River or a site on Chilko Lake. (In fact, a breathless representative of the Attorney General's office

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<sup>1</sup>BCARS, GR 880, Power and Special Projects, Box 4, File 1, "Record of Hearing on Applications by the Aluminum Company of Canada Ltd., for Water Licenses on the Nechako and Nanika Rivers Held Victoria, BC, October 31, 1949." Another meeting with local residents who would be affected by the project was held at Wistaria, October 24, 1949.

<sup>2</sup>*Ibid.*, p 13



arrived at the hearing thinking that Chilko Lake was under discussion.) Chilko Lake offered a number of advantages as a power site: it was closer to the urban heartland of the province, well sited near Bute Inlet and capable of major power generation. It was also far more important than the Nechako River as a productive spawning ground. Despite the fisheries concerns about the Nechako River, there was willingness, evident in the testimony, to accommodate the project as the lesser of two evils. "[Y]ou see," said Mr. Donaghy, the counsel for the Salmon Canner's Operating Committee, "we are not opposing the present great application, the application for this great power right because... we do recognize the great advantage to British Columbia of that being developed and I am glad the government has come into contact with the Aluminum Company for that purpose. But we do very strenuously object to the Aluminum Company reaching out and tying up other great power sites, particularly the Chilko power site, which is essentially a site for sockeye salmon..."<sup>3</sup> Accepting the Nechako project with qualifications allowed the fishing industry, as one canner put it, to avoid playing the 'dog in the manger' with the province's industrial future, while, at the same time, protecting the Chilko Lake region.<sup>4</sup> Despite the apparent accommodation, Alcan was not taking chances. Even though the provincial government had placed a reserve on the water sites in question, the company wanted quick and legal title before the danger of federal fisheries intervention or some other claim could be mounted.

The most that the fisheries industry hoped for was a delay to allow for some kind of assessment to take place. This is what the federal Department of Fisheries and the IPSFC proposed and so did different representatives of the fishing industry. When at the end of the hearing the pugnacious Communist fisheries unionist Homer Stevens addressed Alcan Vice-President McNeely Dubose directly as to whether a slight delay

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<sup>3</sup>*Ibid.*, p 39

<sup>4</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 1, File 1-4, JM Buchanan, BC Packers to Henry Doyle, October 13, 1949

would cause any serious difficulty for his company, Dubose replied that Alcan had to protect its investment in surveys: "I don't think it really is a very practical question at all, to get right down to it."<sup>5</sup>

A handful of other speakers raised concerns before the hearing, separate from the fisheries problem, though with little apparent effect. A scientist from the provincial Game Commission presented a brief on the possible consequences for wildlife in the region. Cyril Shelford, representing residents who would be flooded out as a result of development, raised his group's concerns but was also quick to thank Alcan officials profusely for their generosity in paying for his travel to the hearing. One lone speaker, a Mrs. Bateaux, who claimed to be the first white child born in the region, raised wilderness concerns and read a personal letter from Lady Tweedsmuir decrying the sacrifice of beauty to progress. Other interested parties, such as native groups who would find trap-lines and burial grounds flooded by the project were not present.

On December 12, 1949, Major Farrow granted Alcan rights to the Nechako River with only a minor qualification as to the fisheries aspect. The water license deal was done.<sup>6</sup>

The water licensing hearing was a poor mirror of the politics of fish and power in 1949, even if the hearing was one of its central events. Many actors central to the planning of the project were absent, as were a number of interests who would be affected adversely by the decision. The roughly unified position of the fishing industry representatives, furthermore, masked internal divisions and belied the laborious process of political organization that had occurred over the previous year and a half. The low-key presence of Alcan and water development supporters, meanwhile, contrasted with the

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<sup>5</sup>*Ibid.* p 16

<sup>6</sup>BCARS, GR 1222, Premiers' Papers, Box 117, File 3, RC Farrow, Comptroller of Water Rights to Mayhew, Minister of Fisheries, December 12, 1949 (copy): the qualification called on the company to provide the federal Department of Fisheries, the BC Game branch and the water comptroller with plans before construction. But, only the water comptroller's approval was necessary to proceed.

near-giddy reception accorded to the company in the province and the bullish determination of the coalition government to see the project through as a cornerstone of post-war expansion.

Alcan's application had been long in the making. The dispute between water development interests and the salmon fisheries dated back to the 1910s, but the post-war fish-power conflict had more specific origins during the war. The rehabilitation of Fraser salmon runs advanced by the Hells Gate fishways and other restoration projects placed the fisheries in an uncommonly favourable position. Not since before the 1920s had the supply side of the industry appeared so favourable. Combined with strong market demand, assisted by the development of new international salmon markets during the war, the industry appeared poised for a favourable period of growth. At the same time, hydropower had gained a new prominence because of wartime industrial growth and provincial attempts to bolster hinterland electrification. The BC Electric Railway, Alcan, the BC Power Commission (BCPC) and other organizations imagined new developments and rushed to keep up with demand. By the early 1940s, prescient observers in both the water and fisheries sectors understood that disputes between the two industries were imminent.

By the end of the decade, two major projects in the northern Fraser basin advanced by Alcan and the BCPC threatened to destroy major salmon runs. Both of these projects grew out of the coalition government's vision of northern development as a central focus of post-war economic development policy and received broad political support.<sup>7</sup> Yet they differed in terms of scale—the first promising a massive new

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<sup>7</sup>John R Wedley, "Laying the Golden Egg: The Coalition Government's Role in Post-war Northern Development," *BC Studies* 88 (Winter 90-91): 58-92. There is only a limited literature dealing with the Nechako project. Two highly readable accounts, one by a former Alcan project engineer, the other by a Prince George journalist and environmentalist provide remarkably different perspectives: John Kendrick, *People of the Snow: The Story of Kitimat* (Toronto: NC Press, Limited, 1987); and Bev Christensen, *Too Good to Be True: Alcan's Kemano Completion Project* (Vancouver: Talonbooks, 1995). A short thesis on the project is: Juan Carlos Gomez Amaral, "The 1950 Kemano Aluminum Project: A Hindsight Assessment," MA thesis, Simon Fraser University, 1986

development that would transform the provincial north, the second a more modest stimulus to the interior's power supply. They also differed in terms of their financial significance—the aluminum project had the backing of a major multinational firm, strengthened by wartime growth and ready for a period of major expansion; the Quesnel project, by contrast, was the vision of a tightly controlled provincial commission, without independent borrowing power, or access to major urban markets. How far the developmentally focussed provincial state would go to privilege power over fish was in some sense a function of scale, and of the leverage of private over public capital in the politics of development.

The impact of the fisheries interest on the planning and development of these projects proved significant and variable. A coherent fisheries defense, organized by the federal Department of Fisheries, emerged in response to aggressive provincial efforts to secure the aluminum project. When fisheries concerns were raised and the provincial government failed to defend them, sections of the cannery elite brokered a private compromise with Alcan that resulted in the acceptance of the Nechako project provided Chilko Lake was left undeveloped. Notwithstanding the federal legal authority to regulate building and operations of this dam with a view to fisheries conservation, Alcan proceeded with remarkably little interference through the adroit deployment of its political strength. In the Quesnel case, on the other hand, a weak provincial commission met the force of an organized fisheries interest, yet without its own private supporters. Using the leverage of the federal department's willingness to demand expensive remedial measures on any proposed project, fisheries bureaucrats within the provincial state worked successfully to cancel the plan.

By focusing on the overlapping claims of two resource sectors, this chapter seeks to unravel aspects of BC's development politics in the early post-war period. It asks how and when different bureaucracies and politicians within the state system worked together

and at cross-purposes? It suggests why and how different industrial groups used the state to advantage, felt its unwelcome regulatory glare, or the impact of competing interests. BC's post-war provincial state, widely reputed for its client-like relationship to private capital, is demonstrated to have been a site of complex and shifting claims where public power frequently fell to private interest, by the design of public authority as much as by industrial concerns.

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Before and during the Second World War, the provincial water branch and the IPSFC forecast a looming fish-power debate and helped to set it in motion. The industrial dispute began, in a sense, within the state, between bureaucracies that took their clients' interests as their own. Ever since the 1920s, when the first serious fish-power problems had emerged, the provincial water branch assumed the role of protector of BC's waterpowers. This was entirely appropriate in the sense that this branch was charged with surveying the province's rivers and regulating water use. The proprietorial sense of the branch, however, extended beyond its formal responsibilities: not only did branch surveyors and engineers promote the province's water powers, but they also felt compelled to protect them against presumed competing interests. Well before any private power developers conceived of the fisheries as a threat, the water branch sought to diminish this sector's political stature and ensure that it did not grow. The other side of power promotion was fisheries criticism.

An early and clearly articulated example of this position came from JC MacDonald, provincial water comptroller, during the negotiation of the Pacific Salmon Treaty in 1929. Having been asked to comment on sections of the treaty that might impinge on provincial jurisdiction, MacDonald reflected on the long-term resource conflicts that might be born from too generous a treatment of fisheries under an international agreement.

The undeveloped and unrecorded waterpower of the Province is of no direct interest to any particular section of the public. There is, therefore, no organized body which will be active in counteracting the pressure which will be brought to bear by the Fishery interests when the conservation of fish and the development of power conflict. As the value of the power which may be developed on the Fraser River many times exceeds the value of the fish, nothing should be done which may allow the interest which will ultimately become the lesser one to be unduly supported by a treaty with a foreign power.<sup>8</sup>

MacDonald's claim that water development lacked a vested interest strained credibility (what after all was the BC Electric Railway?), but his point is revealing: he and his staff in the water branch perceived their role to be that of the primary defenders of the public interest in water development. He also judged future water development to be of such promise as to cancel out the importance of fisheries conservation.

The salmon restoration program of the IPSFC in the late 1930s and 1940s validated MacDonald's prediction in the minds of his successors. By restoring habitat, water branch officials believed, the salmon commission laid a subtle, and sometimes blunt claim to the river. Consider the fishways at Hells Gate. Here, at the base of the Fraser canyon--one of BC's most touted water development sites-- the salmon interest proposed to build an expensive piece of infrastructure during the early 1940s. Although the project received strong federal and American support as well as glowing press coverage, water branch officials considered the project to be an obstruction to future water development. The fishways, stated Ernest Davis, the provincial water comptroller in 1942, would only assist the fisheries interest by handing it "a strong argument in any negotiations for the development of power." In attempting to sway the Minister of Lands to his position, Davis suggested that power resources were "more valuable to the community" and that it would "be impossible in the long run to try to stem the course of [their] development," but his protests are evidence to the contrary of an anxiety that this outcome was not assured.<sup>9</sup> Although the fishways issue did not exercise provincial

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<sup>8</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 1, File 1, JC MacDonald, Comptroller of Water Rights to Commissioner of Fisheries, May 27, 1929

<sup>9</sup>BC Water Management Branch, Department of Lands 'O' Files, File 5254, Davis to Minister of Lands, April 11, 1942

politicians particularly (or private power interests for that matter), Davis did, interestingly, receive support within the civil service from the deputy minister of fisheries (who resented the rising authority of the IPSFC) and the deputy attorney general.<sup>10</sup> Davis and his colleagues did not have the power to block the fishways, but they did manage to condition the nature of BC's acceptance of this project in granting jurisdiction to the federal government for construction purposes. The text of the final provincial approval included this bureaucratically-inspired insertion: "While the government of Province of British Columbia does not contemplate any immediate water power development at this point which would be detrimentally affected by the construction of the proposed fishways, it must reserve to itself all or any rights which it now enjoys, and, therefore, cannot give unqualified approval to the proposal."<sup>11</sup> The province, this proviso suggested, would assert its authority to approve power projects when the time came, no matter the extent of fisheries restoration.

If the provincial water branch assumed the self-appointed role of protector of BC's waterpower, then it might be said that the IPSFC made a parallel claim for the Fraser's salmon. Although the federal Department of Fisheries possessed the formal jurisdiction, the IPSFC's mandate to restore Fraser sockeye led its members into a more activist stance, initially, than the federal government.<sup>12</sup> After the discovery of obstructions at Hells Gate, the commission's research program maintained a continuing interest in determining barriers to salmon migration throughout the basin. Other 'natural'

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<sup>10</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 3, File 3, George Alexander to Commissioner of Fisheries, May 30, 1942 (copy); E Davis, Comptroller of Water Rights to Alexander, July 7, 1942; Deputy Attorney General to Alexander, July 16, 1942; H Carthcare, Deputy Minister of Lands to Alexander, July 17, 1942; Alexander to Commissioner of Fisheries, July 20, 1942 (copy). Alexander's correspondence here cited pointed to his irritation with the IPSFC for not advising the provincial Commissioner of Fisheries. Other items discuss how best to counter or condition the fishways application.

<sup>11</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 3, File 3, Provincial Secretary to WC Woodward, Lieutenant Governor, BC, March 25, 1944 (copy).

<sup>12</sup>In 1943, when water development issues raised comment in the Vancouver press, IPSFC commissioners were quick to see the need for their agency to play an "educational" role, above and beyond their scientific and regulatory concerns: UWA, William F Thompson Papers, Acc. 2597-77-1, Box 14, File 9, copy of AL Hager to Tom Reid, February 1, 1943

slides were discovered and corrected in the Fraser Canyon and existing dam structures were catalogued and assessed as to their fisheries aspect.<sup>13</sup> Such an interest in dams followed logically from the Hells Gate event, but also drew on the experience of American scientists and commissioners whose knowledge of problems with dams on the Columbia affected their reading of the Fraser: in order to restore the Fraser, these scientists argued, it was imperative to maintain the river as free-flowing. Although members of the commission may not have seen their institution as the primary defender of salmon, as the water branch did in its sector, they did take on the role of vanguard in pushing for enhanced measures to protect salmon habitat.

A dispute over the possible removal of a lumber splash dam on the Adams River in the 1940s, for example, originated with the IPSFC's dam surveys and a recommendation to remove the structure. Quite rapidly, however, the commission became further drawn into the dispute and went so far as to help organize formal protests by the fishing industry to enhance its own position. The dam in question sat on the lower Adams River, obstructing the Fraser's most productive run on the 1942-year cycle. Unused in years, the structure was dilapidated: its fishways were broken and the main gates remained permanently open. Although it did not pose the threat that an active dam would have, the salmon commission believed that it was best removed and the right of the owner revoked.<sup>14</sup> The federal Department of Fisheries, with jurisdiction in the matter, received this advice and instructed the owner, one Mr. Mason of the Adams River Improvement Company, to remove the dam under Section 20 of the Fisheries Act. Mason had other ideas. He tried first to sell the derelict dam to the IPSFC for a sum of

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<sup>13</sup>IPSFCA, File 1180.1-77 "1948 Dams on the Fraser River Watershed". This report summarized the known dam structures and their fisheries aspects.

<sup>14</sup>IPSFCA, File 1180.1-28. The case against the dam is set out in WF Thompson, Director of Research Investigations, IPSFC to BM Brennan, Chairman, IPSFC, August 12, 1944



\$7500, and when that failed, applied to the provincial water comptroller for a renewal of his water license, set to expire, August 1944.<sup>15</sup>

The timing and context of the dispute proved important. When the water rights hearing to adjudicate the case was finally set for the summer of 1944, the province was caught up in the debate over public power and the promise of rural electrification. In the vicinity of Adams River, the city of Kamloops and its residents looked on the river as a local resource that might prove important as a power site in the near future. Kamloops was among the BCER-serviced municipalities that called for state intervention in 1944 and the city and its region showed strong support for a program of rural electrification. The possibility that the lumber splash dam might be removed in favour of a salmon restoration project provoked fears among local elites that this would prohibit water development in the coming years. At the water rights hearing, Kamloops Mayor, GR Williams and DB Johnstone of the Kamloops Board of Trade raised this concern and sought to discredit the salmon commission's plans as the designs of outside 'experts' without the interests of the local region at heart.<sup>16</sup> Ernest Davis, the provincial water comptroller leading the hearing, tended to agree: he only grudgingly allowed testimony from the IPSFC following a petition from the Commission's lawyer.<sup>17</sup> A year previously, when the matter had come up for discussion in the provincial civil service, the Water Branch had "strongly opposed" deputy minister of fisheries George Alexander's claim

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<sup>15</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 5, File 8, BM Brennan, IPSFC to Alexander, July 10, 1944. In this letter Brennan explains Mason's offer.

<sup>16</sup>BCARS, GR 1222, Premiers' Papers, Box 51, File 4, "A Hearing Before Mr. E Davis, Comptroller of Water Rights in and for the Province of British Columbia, at Kamloops, in the County of Yale, Province of British Columbia, on the sixth day of July, in the Year of Our Lord, Nineteen Hundred and Forty-Four, on the Application by the Adams River Improvement Company Limited for Extension of the Term of Final License No 4188-- Clearing Stream Purposes." In private correspondence with the Premier, Johnston went further in his attempts to discredit the IPSFC and point to the necessity of saving the Adams River for power development: *Ibid*, Johnston to Premier, July 14, 1944; Johnston to Premier Hart, August 31, 1944; Premier Hart to Johnston, Jul 11, 1944 (copy).

<sup>17</sup>BCARS, BC Commercial Fisheries Branch, Box 5, File 8, Brennan, IPSFC to Alexander, July 10, 1944

that the value of the fishery far outweighed the uses of the dam.<sup>18</sup> Although the Premier appeared to follow the reasoning of the fisheries argument, he intimated to Alexander that the case would be less clear-cut if a hydroelectric dam were the object of concern.<sup>19</sup>

Despite the apparent views of Davis and the appeals of local leaders, Mason's request for renewal was denied. Although Davis might have wished to preserve the dam, as a symbolic claim for future hydro projects, Mason's request proved too flimsy to support within the bounds of credibility. Under questioning during the hearings, Mason had admitted that the dam was not in use and would not be for the foreseeable future, that his company was heavily in debt and that he had attempted to sell the dam to the Salmon Commission before the hearings. Following the guidelines of the legislation, which called for beneficial use of water rights, the water branch refused Mason's request in August 1944.<sup>20</sup> A year later, following another abortive request for a water license at the same site from a spurious timber concern, the dam was removed by the IPSFC under the authority of the federal Department of Fisheries.<sup>21</sup> In this second instance, the IPSFC went so far as to line up its private supporters-- the Salmon Cannery's Operating Committee, the United Fisherman and Allied Workers' Union as well as some local sports fishery groups-- in advance to insure that they would provide testimony at the appropriate time.<sup>22</sup>

The logic of a looming fish-power conflict helped to shape the bureaucratic reception of both the Hells Gate fishways and the Adams River dam dispute. The water

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<sup>18</sup>BCARS, BC Commercial Fisheries Branch, Box 5, File 8, Alexander to Commissioner of Fisheries, June 5, 1943 (copy); Alexander made his case to the Premier in a letter that set out the poor effects on fisheries: BCARS, GR 1222, Premiers' Papers, Box 51, File 4, Alexander to Premier Hart, July 6, 1944.

<sup>19</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 5, File 4, Alexander to Commissioner of Fisheries, June 5, 1943 (copy).

<sup>20</sup>BCARS, GR 1222 Premiers' Papers, Box 51, File 4, E Davis, Comptroller of Water Rights to Adams River Improvement Co., August 3, 1944 (copy)

<sup>21</sup>International Pacific Salmon Fisheries Commission, Annual Report (1945), p 28

<sup>22</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 4, File 2, BM Brennan, Director of the IPSFC to Alexander, September 14, 1945

branch viewed fisheries restoration as a claim on rivers that would have the effect of blocking power dams; the salmon commission pursued restoration in part to rid the river of dams and maintain the basin without obstructions to salmon. Before either of the constituent industrial interests became actively involved in debating the fish-power problem, these agencies pursued its logic in a debate that could be called, fish vs. imaginary power. Yet, as the Adams River case suggests, what was imaginary could quickly become real: the late war context convinced all participants that a province-wide dam building program was only awaiting war's end and provincial action. Thus the problem was no longer limited to bureaucratic rivalries and jurisdictional disputes: it was inserting itself into regional politics, as with the Kamloops participation, and it was embracing a wider fisheries constituency, as the many invited participants in the Adams River case demonstrated. All that would be required to expand the dispute would be the arrival of a power development of a scale to pose a serious threat to the fisheries. It was not long in coming.

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In 1948, the long-awaited promise of BC's waterpower appeared on the verge of realization. Executives of Alcan toured the province examining development sites for a power generation and smelter project. The scale of the plan made editorialists gleeful. In the northern portions of the province, where there was but a seeming wilderness, a major corporation would dam a mighty river, expanding the provincial power capacity by leaps and bounds, and erect a substantial smelting facility, complete with a port and a town that could well rank third largest in the province within a short time.<sup>23</sup> Long awaited this project would also be long in the making.

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<sup>23</sup>UBC BCER CF, "World's Largest Aluminum Plant Proposed by Alcan on BC Coast," Victoria Times, December 17, 1948; text accompanying photograph of Kitimat site, November 21, 1949; "Aluminum Industry to Be BC's Biggest," Vancouver Sun, March 28, 1950

Alcan's interest in BC originated in part from the promotional inspiration of the ubiquitous Harry Warren. As the chair of the mining bureau of the Vancouver Board of Trade in the late 1930s and early 1940s, Warren came into touch with the leading mining men of the province. During the war his research focused on metallurgical questions with a view to assisting the war effort. As a member of a team of engineers and scientists at UBC working in close alliance with the provincial War Metals Board, he took a keen interest in aluminum reduction methods.<sup>24</sup> In a fateful moment that Warren would savor for the rest of his life, he wrote a letter to Alcan in 1940, asking for samples of the company's bauxite for experiments in his UBC lab.<sup>25</sup>

Aluminum-- a precious new metal at the turn of the century-- had become a major strategic material during the war. Its light weight and durability made it well suited for airplane construction as well as a host of other products. Beginning in 1940, new demands for aluminum in Britain and the US created a serious supply crisis that could not be met by the dominant US Alcoa Corporation. In an attempt to generate new supplies, as well as break Alcoa's virtual monopoly control, the US federal government intervened in the aluminum business, establishing its own plants as well as funding expansions in plant facilities of non-Alcoa interests. Despite links to Alcoa, Alcan's legally separate identity helped it to receive favourable treatment in this scenario.<sup>26</sup> Using lend-lease

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<sup>24</sup>For biographical information on Warren, see the file list provided by the UBC Special Collections and Archives. Warren's participation in the UBC metal research is described in Harry T Logan, Tuum Est: A History of the University of British Columbia (Vancouver: UBC Press, 1958), pp 148-149. Some of Warren's mid-war views on the importance of water development for the mining industry were set out in UBC Special Collections and Archives, Warren Family Papers, Box 6: "British Columbia's Minerals and the War," The Miner 12(10) (October 1939): 32-34; "Water Power and Post-War Employment," The Miner 16(2) (February 1943): 24-26; and "Hydro Development and the Iron and Steel Industry," The Miner 16(4) (April 1943): 48-50

<sup>25</sup>UBC Special Collections and Archives, Warren Family Papers, Box 4, File 7, Warren to Kennedy. Amid a sparse collection of personal papers, the carefully preserved correspondence with Alcan stands out. See also Warren's implied reference to this correspondence in his brief to the Post-war Rehabilitation Council cited above.

<sup>26</sup>Alcan's relationship to Alcoa was complex and the subject of a number of different anti-trust hearings in the US that culminated with a 1950 decision that forced major bondholders in Alcoa to divest their control in Alcan. For a consideration of the relationship between the two firms, see: Bradford Barham, "Strategic Capacity Investments and the Alcoa-Alcan Monopoly, 1888-1945," in States, Firms, and Raw Materials:

funds, the US federal government bankrolled a massive expansion at the company's Shipshaw facility and signed a set of generous forward supply contracts that would raise the envy of American producers at the end of the war. The US also built a number of aluminum smelters in Washington state, drawing power from the Columbia dams through the BPA; by 1943, aluminum smelters would consume nearly two thirds of BPA output.<sup>27</sup>

In the 1940s, the aluminum business operated according to a geographically dispersed production model driven by the costs of transportation and energy use.<sup>28</sup> Although most major sources of bauxite, Aluminum's primary crude ingredient, were located at this time in the Caribbean and Australasia, no significant refining occurred in these regions. Because ocean shipping costs of bauxite were relatively low, aluminum producers could reap significant savings by moving the raw material to sites of cheap energy supply in industrialized nations. In this way, the major component cost of aluminum production-- electricity-- could be reduced and the final product delivered efficiently to market in industrialized centers. At a few points in North America, the two key locational factors of this production model-- ocean accessibility and cheap water power-- coincided, as on the Columbia and in parts of Quebec. BC's hidden opportunity resided in the upper Fraser basin, where three power sites, unaffordably distant from urban electrical markets, sat perched near deep fjords, cutting into the interior from the coast. If water were diverted out of the Fraser basin to the coastal fjords, major height differentials (called head) could produce large blocks of electrical power, at tidewater. At Chilko Lake and on the Nechako River, provincial water branch officials had lovingly

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The World Economy and Ecology of Aluminum Eds. Bradford Barham, Stephen G Bunker and Denis O'Hearn (Madison: University of Wisconsin Press, 1994), pp 69-110.

<sup>27</sup>The details of Alcan's dealings with the US federal government and the controversy the deal created after the war is well covered in a chapter on "New Basic Industries for the West: Aluminum," in Gerald D Nash, World War II and the West: Reshaping the Economy (Lincoln: University of Nebraska Press, 1990), especially pp103-105. For the statement of the portion of megawatts consumed by aluminum smelting, see: Richard White, The Organic Machine: Remaking the Columbia River (New York: Hill & Wang, 1995), pp 72-73.

<sup>28</sup>Stephen G Bunker and Paul S Ciccantell, "The Evolution of the World Aluminum Industry," in States, Firms and Raw Materials... pp 39-51.

taken stock of several locations for over twenty years. Reports existed on the site characteristics, water flows, topography and geological characteristics. For an interested party, the territory was already mapped.

Wartime shifts in the aluminum business gained notice in BC, though few were so prescient in foreseeing opportunities for the province as Harry Warren. A year before the height of the crisis in wartime aluminum supply in 1941, Warren was busy at work in his lab attempting to determine the costs of aluminum smelting in BC, given the province's cheap waterpower. In the course of collecting technical data on bauxite and shipping costs from Alcan, with which to study the problem, Warren struck up a correspondence with Alcan Assistant Secretary, EVN Kennedy. After discussions of the aluminum business over a number of months, Warren put a simple question to Kennedy: why did Alcan not operate in BC? The province's waterpower was plentiful and cheap, ocean access was possible at a number of tidewater locations and government support would be forthcoming. Kennedy replied that formerly his company had done little business in the west and so had never considered a western location. But he was intrigued. The war had changed the business. Perhaps Warren could provide further information. Promptly, Warren put Alcan in touch with the provincial mining department. He also readily agreed to Kennedy's request to act as an informal advisor in the future, should the company send representatives to investigate.<sup>29</sup> Having played matchmaker, Warren stepped aside and let the relationship develop.

Warren was not the only one to bring the company and the province together. At the height of the aluminum shortage in the fall of 1941, federal officials encouraged Alcan to investigate new waterpower possibilities and pointed to opportunities in BC.

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<sup>29</sup>UBC Special Collections and Archives, Warren Family Papers, Box 4, File 7, Warren to Kennedy, November 28, 1940; Kennedy to Warren, December 13, 1940; Warren to Kennedy, February 26, 1941; Kennedy to Warren, March 10, 1941; Warren to Kennedy, May 16, 1941; Kennedy to Warren May 23, 1941. T

Ernest Davis, the BC water comptroller, visited Alcan's operations in Arvida and then hosted visits by Alcan officials in turn. None of this came to anything immediately. Not until 1943 would further discussion be opened between the company and provincial officials and then only to initiate further surveys and reconnaissance activities.<sup>30</sup>

Alcan entered a growth phase after 1945. Having expanded rapidly during the war to supply British and American aluminum demands, it continued to develop its business in the post-war period using the comparative advantages of cheaper Canadian waterpower and labour. By the end of the decade, Alcan matched Alcoa in aluminum output capacity and attained a strong position in the North American low price aluminum market, despite a high Canadian dollar and punitive aspects of US trade policy.<sup>31</sup> By the late 1940s, in a market of rising aluminum demand, Alcan considered new development prospects.

In the spring of 1948, Alcan President RE Powell and a number of Alcan officials joined provincial minister of lands and forests, ET Kenney, in a flying tour of the province's possible power sites. The visit was perhaps more a public relations initiative than a scouting expedition. On the ground, Alcan hired the International Engineering Company, an American firm headed by engineer Bill Huber to re-visit a number of power sites first studied by provincial surveyors in the 1920s and 1930s.<sup>32</sup> At Chilko Lake provincial water comptroller, Major Farrow lead Huber through the site, and on the Nechako the provincial water surveyor, John Kendrick explained the possibilities. Both

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<sup>30</sup>The role of the federal government in encouraging Alcan to look west, and the company's inquiries in 1943 are recounted in a brief summarizing the development of the project: BC Crown Lands Registry, Department of Lands 'O' Files, File 0124854, Alcan General (1), GE Melrose, 'Memorandum to Mr. PE Richards, Executive Asst. to the Premier, Re: Aluminum Company of Canada Development,' Nov 14, 1949 (copy)

<sup>31</sup>George David Smith, *From Monopoly to Competition: The Transformation of Alcoa, 1888-1986* (New York: Cambridge University Press, 1988), pp 286-287

<sup>32</sup>Even before these investigations, Alcan engineers were studying the techniques of water diversion projects in order to gain a sense of costs of a possible project in northern BC where such an approach would be necessary: see for example, Alcan engineer, FL Lawton's global survey of diversion projects: "Economics of Water Diversion," *Engineering Journal* 30(10) (October 1947): 462-471.

men had surveyed these sites before the war. Later that summer, based on earlier provincial surveys, Huber produced a report for Alcan on BC waterpower sites and opportunities. Months later Alcan hired Kendrick as a resident engineer on the project and McNeely Dubose began negotiations with the provincial government to establish the company's water rights.<sup>33</sup>

Lest there be any doubt that the provincial government would support Alcan's arrival in BC, provincial officials went to great lengths to assure the company that, in the jargon of a later age, the province was open for business. Following Powell's visit to BC, George Melrose, the deputy minister of Lands and Forests, invited the company to state its needs and wants. To facilitate the company's planning, Melrose pledged to place reserves on the three possible sites of interest to Alcan in order to exclude the intervention of competitors; he offered up front the lowest possible water rental fees allowed under the law; and, should there be any lingering doubt of provincial intentions, he stated: "If after such surveys and investigations have been made, and your engineering studies demonstrate that our existing laws would not economically permit further development, I shall be very glad to discuss ways and means with my colleagues, having in mind the amendment of such laws whereby such a project might be economically pursued to the mutual advantage of both our Government and your Company."<sup>34</sup> Alcan would later use this offer in order to secure the Industrial Townships Act, which removed certain tax obligations from the company, and to achieve maximum advantage in water rights hearings in order to remove fisheries conservation as an obstacle to development.

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<sup>33</sup>Kendrick's memoir is an amusing and sometimes self-critical appraisal of Alcan's activities in northern BC. For the arrival of Alcan and Kendrick's account of the season of surveys, see: John Kendrick, People of the Snow: The Story of Kitimat (Toronto: NC Press, 1987), 81-117.

<sup>34</sup>BC Crown Lands Registry, Department of Lands and Forests Administration Division Papers, 'O' Correspondence, File 0124854 Alcan General (1), Melrose to RE Powell, President Aluminum Company of Canada, June 16, 1948 (copy) Although the copy does not bear Melrose's signature, a subsequent letter from Alcan to Melrose refers to his views expressed in this letter.



Despite the eager reception of the Alcan project announcement in the province, fisheries interests feared the possible impacts on the salmon resource. Both sites under consideration, but particularly the one on Chilko Lake, provided important salmon spawning habitat. Chilko Lake, for example, produced in the range of three-quarters of the entire Fraser basin salmon population in two of the four-year cycles.<sup>35</sup> If a dam blocked these sites to salmon passage, the progress in rebuilding the stocks, inaugurated with the Hells Gate fishways, would be lost. Furthermore, the politics of power in BC suggested that salmon conservation would not loom largely in planning. Two months after the announcement of Alcan's surveys, Tom Reid, the chairman of the Salmon Commission, announced in the House of Commons that the provincial government had contacted neither the Commission nor the federal Department of Fisheries about the matter, despite previous assurances that all fisheries concerns would be kept informed of any large-scale hydro developments. The provincial government, Reid claimed, was "power-minded": it wanted hydro development and it wanted to control the province's rivers. In order to preserve British Columbia's salmon, he suggested, the federal government would have to involve itself in the planning process more than ever before and perhaps strengthen its hand through legislation.<sup>36</sup>

Alcan understood the potential of a fisheries reaction against its project in BC and wanted to avoid the kind of protest offered by Reid before the House. As the surveys commenced, Alcan Vice-President McNeely Dubose sought out the advice of HR MacMillan, a BC lumber baron and former President of the largest Fraser River cannery firm, BC Packers, as to Alcan's best approach on matters of salmon conservation. Interestingly, MacMillan advised Dubose to sit tight and not contact the concerned

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<sup>35</sup>This figure is provided in: NA, RG 23, Vol 1823, File 726-11-6[7], "Memorandum on Negotiations Involving the Department of Fisheries in Connection with Developments by the Aluminum Company of Canada Limited in British Columbia," p 3.

<sup>36</sup>Debates of the House of Commons Vol VI (1948): 5865-5867

fisheries agencies, lest undue suspicion be aroused. MacMillan believed that if the Nechako location were chosen, fisheries problems would be negligible in any event, and even if Alcan chose to proceed with Chilko Lake then some remedial measures, such as spawning channels, could be developed to overcome the problem. Mindful of the fisheries aspect, but hoping to reduce it through silence, Alcan followed MacMillan's suggestion. After Reid's comments to the House, Dubose recalled the public relations plan in a letter to deputy minister of lands George Melrose and--like Reid-- blamed the provincial government for not keeping in better touch with concerned fisheries agencies. "[Y]ou and your associates were going to take steps to ensure that the Fisheries people did not assume from...[Alcan's silence] that they were not being taken seriously," Dubose reminded Melrose.<sup>37</sup> Having aroused suspicions through its silence, Alcan officials understood the double-edged sword of its public relations strategy: silence bred suspicion, but a frank approach would only hand opposing interests time to organize their defense. Hereafter, Alcan would agree to meet with fisheries concerns when asked, but would disclose none of its plans before it received a water rights license.

Reid's protest and MacMillan's scolding created but a minor stir from the provincial government. A reaction from fisheries interests, and particularly the salmon commission, must have been entirely anticipated. In the past when power projects were mooted in the press, the Premier had received inquiries from the salmon commission and the Department of Fisheries asking to be kept informed and the Premier had always duly asked the water branch to keep the commission abreast of developments.<sup>38</sup> This seemed

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<sup>37</sup>BC Crown Lands Registry, Department of Lands 'O' Files, File 0124854, Dubose to Melrose, June 30, 1948. Of course, this report of MacMillan's views is second hand. Why a leader of the fishing industry would advise Dubose on the best means to develop dams without arousing the concern of the fishing industry is something of a puzzle. MacMillan's later role in advising the fisheries defense on the best means to combat dam development, to be discussed in a later chapter, suggests a different intention.

<sup>38</sup>For example: BCARS, GR 1222, Premiers' Papers, Box 40, File 9, George Pearson, Commissioner of Fisheries to Premier Hart, February 13, 1943 Box 165, File 10, Premier Hart to Davis, Comptroller of Water Rights, June 9, 1943 (copy); George Alexander Assistant Commissioner of Fisheries to Premier, June 7, 1943, Premier to Davis, May 11, 1943 (copy); Tom Reid, Chairman of IPSFC to Premier, May 13, 1943; Premier to Reid, May 28, 1943 (copy); Reid to Premier, March 12, 1943; Premier to Reid, March 18,

another of those occasions. Certainly, the province had no intentions of discouraging Alcan by involving fisheries interests early in the planning stages. Even the provincial fisheries department was studiously ignored. There was no legal requirement that the province or water branch should involve fisheries concerns: after all, no project had yet been announced, only surveys. If the salmon commission, or the federal Department of Fisheries, wanted to begin imagining impacts, the province claimed, then they were free to do so. Beyond corresponding with the federal government to suggest that, yes, fisheries problems were a priority, and, no, the federal interest in fisheries would not be ignored in any possible development, the provincial government did little to meet fisheries concerns.<sup>39</sup>

Alcan's silence and the provincial government's intransigence led the federal Department of Fisheries, under a new Minister, British Columbian Robert Mayhew, to devote considerable time to the threat of an Alcan development in BC during 1948 and after.<sup>40</sup> Whereas before the 1930s, the federal department did not well understand the threat to salmon of dams and evinced little concern in any event, after the Second World War, it had the added expertise of the Salmon Commission, the experience of Hells Gate and the shadow of developments on the Columbia to prompt it to action. In keeping with Reid's advice, and a March 1948 resolution passed by the Fisheries Council of Canada, federal civil servants began to explore legal measures to enhance fisheries protection.<sup>41</sup>

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1943. NA, RG 23, Vol 1822, File 726-11-6, part 1, Premier Johnson to Mayhew, September 8, 1949; ET Kenney, Minister of Lands and Forests to Mayhew, September 15, 1949; Mayhew to Kenney, September 23, 1949 (copy)

<sup>39</sup>BCARS, GR 1222, Premiers' Papers, Box 114, File 7, Mayhew, Minister of Fisheries to Premier, January 31, 1949; Mayhew to Premier, November 9, 1949; Premier to Mayhew; September 8, 1949 (copy); Mayhew to Premier, September 15, 1949

<sup>40</sup>In 1951, the deputy Minister, Stewart Bates stated that he and the minister rated the Alcan case to be the top priority of the department, equal in importance to the negotiation of a major fishing treaty with Japan in the same year: NA, RG 23, Box 1823, File 726-11-6[5], Memo, S Bates to Clark, October 19, 1951.

<sup>41</sup>Interestingly, the United Fisherman and Allied Workers' Union had presented views to the Department of Fisheries in 1943 calling for some enhancement of the federal government's legal powers in this regard: NA, RG 23, Box 842, File 719-9-92[1], JA Motherwell, Chief Supervisor of Fisheries (BC) to DB Finn, Deputy Minister of Fisheries, June 22, 1943 (copy)

They also sought to organize a cross-industry fisheries defense. The counter-point to the Alcan surveys was the federal department's examination of its legal powers and its political strength.

The established legal authority of the federal Department of Fisheries in water management issues was not reassuring. Contained in Section 20 of the Fisheries Act, the federal department had the power to insist on remedial activities caused by river obstructions such as landslides and dams. As the department had discovered in the 1920s, however, this power, inherited from an earlier age of mill dams, was not suited to the task of modern salmon conservation: it could only be implemented after a dam had been erected and most modern dams were so large that remedial work would only save, even in the most optimistic scenario, a small portion of salmon runs. Although revisions to the fisheries act in 1932 helped to clarify how fisheries passages should be constructed and established fines for non-compliance, the legislation remained remedial, rather than pro-active in focus. According to a certain reading of the legislation, that the Department of Justice supplied in 1948 upon request, the federal department could rest assured that its authority extended to hydro-electric dams (although this was not specified in the legislation) and that it could demand access to plans of dams in advance of construction so that remedial efforts could be devised before projects imposed damages.<sup>42</sup> As subsequent events were to demonstrate, however, political pressures would condition formal legal authority.

While considering their legal powers, members of the Department of Fisheries began to canvas other fisheries agencies and members of the industry about the best means of approaching a fisheries defense. Their initial suggestion to form a committee representing all segments of the industry in order to coordinate public relations efforts

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<sup>42</sup>The request for legal clarification and the Ministry of Justice's response are contained in: NA, RG 23, Box 1222, File 726-11-5[1], Stewart Bates, Deputy Minister of Fisheries to Deputy Minister of Justice, May 10, 1948 (copy); FP Varcoe, Deputy Minister of Justice to Deputy Minister of Fisheries, May 14, 1948.

and intra-industry cooperation met with immediate agreement from the IPSFC and the provincial Department of Fisheries.<sup>43</sup> George Alexander, the provincial deputy minister, however, offered these sage words of caution: "I would suggest... that if such a committee is contemplated, its recommendations would carry a great deal more weight if the idea seemed to originate with the industry rather than through the Federal or Provincial Department of Fisheries. The more the movement appears as a spontaneous effort on the part of the industry to save itself, the more weight it will carry."<sup>44</sup> Although this would be the ideal, Alexander stated, there was at the current time little hope that the industry would organize itself as desired; besides one resolution passed at a recent conference, the fishing industry remained oblivious to the danger posed by hydro development. As if taking his cue from Alexander's characterization, PE Paulson of the Canadian Fishing Company responded to Department of Fisheries western superintendent, George Clark's suggestion of a committee-- four months after first contacted-- by suggesting that the lobby group, the Salmon Cannery's Operating Committee, which he chaired, already performed the functions of the proposed committee and that it was the federal department's job, not the industry's, to pursue legal and policy-based solutions to the fish-power problem.<sup>45</sup> Subsequently Clark managed to convince Paulson that the problem was not that simple: the fact of provincial jurisdiction in water management severely limited the power of the federal department to intervene; pressure would have to be brought to bear directly on the provincial government, preferably with a strong showing

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<sup>43</sup>NA, RG 23, Box 1222, File 726-11-5[1], BM Brennan, Director of IPSFC to GR Clark, Western Director of Fisheries, July 7, 1948. Brennan also pressed the importance of developing the statistics of past salmon packs and values so as to counter cost-benefit claims.

<sup>44</sup>NA, RG 23, Box 1222, File 726-11-5[1], George Alexander, Deputy Minister of Fisheries (BC) to George Clark, July 6, 1948

<sup>45</sup>NA, RG 23, Box 1222, File 726-11-5[1], GR Clark to J Macdonald, Secretary of the Salmon Cannery's Operating Committee, June 26, 1948 (copy); PE Paulson, Canadian Fishing Company to Clark, October 21, 1948

from the industry.<sup>46</sup> Despite Clark's determination, it is also the case that there is no record that he approached other organizations or labour groups in the fishing industry in his search for a cross-industry defense; the federal department's reflex was to seek cooperation with the canners and expect other groups to follow.

The committee envisioned did not form as the Department of Fisheries had hoped (a later effort along the same lines would succeed in 1956), but Clark did manage to rouse the Salmon Canner's Operating Committee to press for provincial legal protection. In lockstep with Clark's advice, Paulson lead a group of canners' representatives, the United Fishermen and Allied Workers' Union and the United Fisherman's Cooperative Association in developing an industry brief to the provincial cabinet, calling for assurances that the fisheries would be protected in the event of hydro development. The brief set out the importance of the fishing industry to the provincial economy and called for amendments to the provincial fisheries act to provide new powers of approval to the provincial Department of Fisheries in any water development case.<sup>47</sup> This would allay the province's jurisdictional qualms, yet hand the fisheries a form of insurance against destructive power developments.<sup>48</sup> Although Paulson expressed his pleasure with the "initial barrage" represented by the brief when he and a number of labour representatives presented it to the provincial cabinet in January, 1949 accompanied by IPSFC scientists, he did say that the group "locked horns" with Minister of Lands ET Kenney, who did not seem inclined to share their criticisms of his department's inattention to the fisheries aspects of water development. While waiting for a response to the brief, Paulson

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<sup>46</sup>NA, RG 23, Box 1222, File 726-11-5[1], Clark to Paulson, October 27, 1948 (copy); Paulson to Clark, November 10, 1948; Clark to Paulson, November 15, 1948; Paulson to Clark, Nov 17, 1948; Clark to Paulson, November 22, 1948

<sup>47</sup>NA, RG 23, Box 1222, File 726-11-5[1], Salmon Cannery's Operating Committee, United Fisherman and Allied Workers' Union and the United Fisherman's Co-operative Association, "Submission to the Executive Council by the Fishing Industry on the Matter of the Utilization of Fresh Water Resources in British Columbia," January 4, 1949. This brief is attached to Paulson to Clark, January 6, 1949.

<sup>48</sup>NA, RG 23, Box 1222, File 726-11-5[1], Paulson to Clark, January 6, 1949.

reflected to Clark on how the fish-power issue had become "red hot" in the province:

"There is no doubt that the fishing industry, which of course includes your own Department as well as the commercial aspects of it, is faced with a critical period in its existence and our steps at this time must be made with a firm foundation under them, and, naturally, with a full realization of the economic future of the country as a whole."<sup>49</sup>

Paulson's statement reflected the extent to which the act of preparing the brief had helped to politicize the industry and develop a sense of cooperation between the federal department and its industrial constituency: there was no committee as yet, but Paulson classed the federal department as a participating member of "the industry."

The provincial response to the fisheries brief demonstrated how the cabinet weighed priorities between the existing fishing industry and the promise of power and aluminum. Instead of agreeing to the proffered amendments of the provincial fisheries act, the cabinet instead proposed to change the water act by simply including "commercial fisherman or fish cannery operator" in the list of interests who could legally object to the disposal of a water license and receive a hearing before the water comptroller as a result.<sup>50</sup> This means of proceeding followed closely the suggestion of WC Mainwaring, Vice-President of BC Electric to ET Kenney, in March 1949, which argued that it would be better to make changes to the water act than to enhance the authority of the provincial fisheries department.<sup>51</sup> The canner, Ed Paulson found it "ridiculous" that this could be the extent to which the province was prepared to compromise; George Clark, the fisheries bureaucrat, judged the amendment "of little

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<sup>49</sup>NA, RG 23, Box 1222, File 726-11-5[1], Paulson to Clark, January 20, 1949

<sup>50</sup>NA, RG 23, Box 1222, File 726-11-5[2], Paulson to Clark, February 7, 1949; The amended act followed different wording than this quotation but carried the same intent: Bill No. 38, 1949, "An Act to amend the 'Water Act'".

<sup>51</sup>BC Water Management Branch, Department of Lands 'O' Files, File 5254, WC Mainwaring, Vice-President, BC Electric to ET Kenney, March 2, 1949

use."<sup>52</sup> Both men agreed that the fact that the provincial government had introduced legislation in the same session, -- the Industrial Development Act (IDA)-- aimed specifically at establishing a legal basis for aluminum development, proved beyond a doubt the orientation of provincial plans. Clark also believed that the passage of the IDA superseded the amended water act: the third clause of the IDA read, "notwithstanding any law to the contrary..." As later events demonstrated, Clark's reading was correct.<sup>53</sup> All the effort had been for naught, yet Paulson rescued inspiration from the failure: "...we [the industry] are now prepared to go right after the thing and exert every possible bit of pressure we can muster."<sup>54</sup> He proceeded to contact labour and sports groups and received assurances from a number of newspapers of editorial support.<sup>55</sup> In under a year, the industry had gone from apathy to action. Before the problem was concluded, however, "going after the thing," would come to mean something less public and more accommodating than Paulson was yet prepared to imagine. For all of the industry's bluster, the political loss represented in the provincial rebuff would convince some of its influential leaders of the need for a private 'deal' with Alcan.

Complimenting the federal department's attempts to strengthen its legal position and organize the industry, the IPSFC launched its own scientific and political program. Surveys, principally at Chilko Lake, and conducted by IPSFC scientific staff in cooperation with the Fisheries Research Board, assessed the state of existing salmon

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<sup>52</sup>NA, RG 23, 1222, File 726-11-5[2], Paulson to Clark, February 7, 1949; Clark to Paulson, March 29, 1949 (copy)

<sup>53</sup>*Ibid* Clark's suspicions proved to be correct. When in 1951, Clark called on the Water Comptroller E Tredcroft to assist the federal Department of Fisheries in ordering Alcan to comply with Section 20 remedial work, Tredcroft replied: "I have been advised by our Legal Department that under the provisions of the Industrial Development Act of 1949 and the agreement between the Aluminum Company of Canada and the Government of British Columbia that I have no jurisdiction to order any fish protection devices." BC Water Management Branch, Department of Lands 'O' File correspondence, Tredcroft to Clark, October 1, 1951

<sup>54</sup>*Ibid*

<sup>55</sup>This may account for the favourable editorial re: the brief published in the News Herald: UBC BCER CF, "Hydro and Fisheries," November 22, 1949



stocks and forecasted possible outcomes of dam development.<sup>56</sup> Reports produced from these exercises provided the Department of Fisheries with the substantive basis of fisheries information from which to bargain with Alcan about remedial requirements.<sup>57</sup> Although important for this reason, these fisheries surveys remained tethered by the lack of cooperation from Alcan; the company would reveal neither its favoured development sites, nor the probable dam characteristics. IPSFC scientists were thus left unable to study the relevant problems, except in a general way. A month before the water hearing for rights on the Nechako River, McNeely Dubose and two of his engineers met with IPSFC staff and intimated that a northern site might be in the offing. When Milo Bell, an IPSFC engineer, raised the possible effects on salmon, Dubose invited him to consider the project instead as a kind of "laboratory" for the fish-power problem. When Bell replied that there were many examples elsewhere to study, Dubose reminded him that the northern site was not assured in any event; Chilko Lake might be the eventual location. The purported indecision served also as a veiled threat: assist Alcan by allowing the northern site or risk greater damages at Chilko Lake. Bell ended his report of the meeting with this telling observation: "One could ... gain the impression that they do not care to talk about any remedial steps until they have gained their full water rights. This would make future negotiations extremely difficult as once the right is granted we would be asking for charity unless our reasonable requests are protected by limitations in their first rights."<sup>58</sup>

Alongside the problem of scientific assessment, the IPSFC engaged in a variety of political tactics to weaken the Alcan proposal. Using their American representation,

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<sup>56</sup>NA, RG 23, Vol 1823, File 726-11-6 [7], "Memorandum on Negotiations Involving the Department of Fisheries in Connection with Developments by the Aluminum Company of Canada Limited in British Columbia," p12

<sup>57</sup>These studies are summarized in: IPSFC, "A Review of the Sockeye Salmon Problems Created by the Alcan project in the Nechako River Watershed," (New Westminster, February 1953).

<sup>58</sup>NA, RG 23, Vol. 1822, File 726-11-6, part 1, Milo Bell, IPSFC to GR Clark, October 14, 1949

IPSFC Commissioners attempted to draw in the US federal government, claiming that the Alcan development would contradict the conservationist terms of the Pacific Salmon Convention. Although the US State department did not appear willing to intervene in a public manner at this early stage, the US Consul, Paul Meyer, visited Premier Johnson in September 1949 and reminded him of the obligations contained in the Salmon Convention and expressed concerns about the possible aluminum development at Chilko Lake.<sup>59</sup> Apart from this meeting, however, the US federal presence remained studiously unobtrusive: the state department tracked the development and received reports from the Canadian departments of external affairs and fisheries, as well as the IPSFC.<sup>60</sup> In the event of an Alcan development, however, the state department made clear that it would abide by the actions and judgment of the Canadian Department of Fisheries, as American interests were judged to be the same as those of the federal department.<sup>61</sup>

In marked contrast to the IPSFC's diplomatic efforts, the commission's chairman, Tom Reid, launched a vitriolic public campaign against Alcan starting in the summer of 1948 and extending into the early 1950s.<sup>62</sup> Besides raising the Alcan problem in the House of Commons, Reid lashed out at provincial politicians for sacrificing BC's salmon industry to aluminum and attempted to portray Alcan as a self-serving "cartel" with little concern for BC's economic well-being.<sup>63</sup> In an attempt to awaken fears of American domination, though chair of a Canada-US Commission, Reid claimed that Alcan's real

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<sup>59</sup>BCARS, GR 1222, Box 114, File 7, Note recording visit of Paul Meyer, US Consul to Premier Johnson, September 2, 1949

<sup>60</sup>NA, RG 23, Vol. 1822, File 726-11-6, part 1 Under-Secretary of State for External Affairs to Deputy Minister of Fisheries, August 22, 1949; Under-Secretary of State for External Affairs to Stewart Bates, Deputy Minister of Fisheries, September 13, 1949

<sup>61</sup>NA, RG 23, Vol 1822, File 726-11-6, part 2, GE Cox, Secretary, Canadian Embassy, Washington, DC to AR Menzies, American & Far Eastern Division, Department of External Affairs, January 14, 1950

<sup>62</sup>This note refers to general articles reflecting Reid's views. Subsequent notes refer to specific quotations: UBC BC Electric Clipping File, "Hydro Plant Called Danger to Fisheries," *Province*, June 25, 1948; "Tom Reid Denies Opposition to Alcan," *Vancouver Sun*, June 24, 1950; "Senator Reid Still Sure Plan Will Hit Salmon," *Victoria Times*, June 5, 1950; "Senator Continues Aluminum Protest," *Columbian*, April 6, 1950; "Kitimat Development Threat to Salmon," *News Herald*, May 22, 1952

<sup>63</sup>UBC BCER CF, Reid made this statement to a group of young Liberals at UBC. The item was reported in the *Vancouver Sun*, November 18, 1950, untitled.

intention was to export power to the US. He also argued that insufficient public scrutiny would lead to a sell out of BC's resources and irreparable damages to the province's salmon "heritage."<sup>64</sup> Reid went so far as to challenge Premier Johnson to a public debate on the Alcan project in 1950, and received invitations from the provincial CCF to lecture the provincial legislature on the matter.<sup>65</sup> Reid's wide-ranging critique, in short, attempted to reconfigure the nature of the debate over Alcan by pressing its boundaries and invoking the language of populist protest (anti-capitalist, anti-state, anti-American).

For his efforts, Reid not only succeeded in raising the profile of the Alcan case, but also became a public foil for pro-development forces-- the extreme voice to be discredited rather than engaged. Alcan executives fumed about Reid in private, while editorialists claimed that Reid was hindering development and discouraging investment in the province.<sup>66</sup> Only two metropolitan dailies published editorials that could be interpreted as tolerant of, or encouraging to, Reid's position.<sup>67</sup> Provincial politicians in the coalition government, and particularly its Liberal elements, attacked Reid as if for heresy against his party and province: Premier Johnson suggested that Reid's opposition might be "the final straw" to convince Alcan to depart; ET Kenney, the Minister of Lands and Forests, argued that Alcan might just as easily develop power in Alaska, and that Reid ought to fall in line.<sup>68</sup> This tough talk masked the fact, known at least to Kenney, that Alcan was firmly committed to the BC project by 1949: Dubose had assured

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<sup>64</sup>UBC BCER CF, "BC Heritage Laid at Stake in Hydro Plan," Victoria Colonist, November 8, 1949

<sup>65</sup>UBC BCER CF, "Premier Challenged to Debate," Province, May 23, 1950; "Johnson- Reid Feud," Columbian, May 19, 1950; "Johnson and Winch Wrangle Over Reid," Columbian, March 7, 1950; "Winch Fails Again in Alcan Attack," March 7, 1950

<sup>66</sup>UBC BCER CF, "Not Very Helpful," Victoria Times, November 14, 1949; "Senator Reid's Strange Stand," Vancouver Sun, November 8, 1949; "BC Can Have Both," News Herald, January 19, 1949; "Hindering His Province," Victoria Times, May 26, 1950; "Stick to Your Bagpipes Tome," Victoria Times, March 7, 1950

<sup>67</sup>UBC BCER CF, "Reid Again Attacks Aluminum Hydro Deal," Columbian, November 8, 1949; "Senator Can Have His Say," Columbian, October 29, 1949; "Hydro and Salmon," Columbian, January 21, 1949; "All to the Good," News Herald, May 26, 1950

<sup>68</sup>UBC BCER CF, "Sounding a Sour Note," Victoria Times, May 18, 1950; "Reid Menace to Alcan Says Premier," Vancouver Sun, May 17, 1950; "Premier Hits Back at Premier," Province, March 2, 1950; "Kenney Hits Criticism of Alcan," Province, November 12, 1949

Kenney's Deputy Minister of this fact in private correspondence and asked the Minister to ignore claims to the contrary.<sup>69</sup> Kenney, of course, was the author of some of those claims for his own political purposes. The tone of political discourse was so heated that even some of Reid's erstwhile supporters in the fishing industry avoided being seen with him in public.<sup>70</sup> The federal Minister of Fisheries, Robert Mayhew, also disavowed Reid's views in private to the Premier.<sup>71</sup> Although part of the intensity of this reaction may be explained by the personalities involved and the sensitivities of BC politicians to party loyalties at a time when the coalition government was beginning to dissolve from within, the debate also suggests the importance of the cold war context. Whereas the Alcan development was firmly positioned as a contributor to continental military initiatives in the press, opposition to it invited questions about the motives of critics not only in terms of BC's economic development, but also their political beliefs. Kenney labeled Reid BC's "CCF Senator."<sup>72</sup>

Unlike Reid who chose to feud, powerful segments of the fishing industry decided to bargain. Having failed to ensure fisheries protection through legislation, and convinced that the provincial government would favour aluminum over salmon, the federal minister and major canning interests attempted a pragmatic approach. The presence of two possible sites--Chilko Lake and the Nechako River-- provided the fortuitous possibility of a horse trade: the more important salmon spawning grounds could be exchanged for tacit acceptance of development on the less important, northern site. Although its details are admittedly obscure, there is evidence that members of the

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<sup>69</sup>BC Crown Lands Registry, Department of Lands, 'O' Files, File 0124854, McNeely Dubose to George Melrose, March 14, 1949

<sup>70</sup>NA, RG 23, Vol. 1822, File 726-11-6, part 2, Ed Paulson, General Manager, JH Todd & Sons, Ltd. to Dr AL Pritchard, Department of Fisheries, November 8, 1949

<sup>71</sup>BCARS, GR 1222, Premiers' Papers, Box 114, File 7, Mayhew to Premier Johnson, November 9, 1949

<sup>72</sup>UBC BCER CF, "Reid Rapped on Aluminum," Vancouver Sun, December 5, 1950; Reid was also attacked by Conservative MP, Davie Fulton of Kamloops who claimed that Reid and the IPSFC were trying to block interior development: "Raps Reid for Hydro Statement," Columbian, January 22, 1949

Fraser canning industry sought to develop a private agreement with Alcan to save the spawning grounds at Chilko Lake in the fall of 1949. Fisheries Minister Robert Mayhew knew of this plan and may well have played a role in initiating it. James Eckmann of the Canadian Fishing Company wrote to him in late September 1949 and referred to their previous conversations on the matter. Eckmann reported that "The industry held a meeting Monday afternoon to discuss the question of the water application for the Aluminum Co. and without mentioning the conversation I had with you, a discussion took place and finally a recommendation was agreed upon whereby the industry would make no protest or oppose Alcan's two applications for water rights on the Nechako River but it would be distinctly understood that they would withdraw the application insofar as the Chilko is concerned."<sup>73</sup> Later, Eckmann and JM Buchanan of BC Packers, Ltd visited Victoria with the intention of presenting the substance of this compromise to the Premier and the Minister of Lands, ET Kenney.<sup>74</sup> Two years later McNeely Dubose referred to this private agreement when resisting federal calls for remedial work. The minutes recording Dubose's recollection read:

Mr. Dubose referred to a statement credited to him to the effect that the fisheries interests had intimated that if the original Chilko plan were abandoned in favour of the Nechako there would be no fisheries problem. He explained that this understanding was very definitely given to him by a group purporting to represent the BC Salmon Canning Industry at an interview they had with him in Victoria at the time. He wished to record however that official Government Fisheries agencies had not been associated with this statement.<sup>75</sup>

It is impossible to say who knew of this reported trade-off. Logically, the Salmon Canner's Operating Committee could have sponsored the meeting of 'industry' described by Eckmann, and Dubose's reference to the canning industry leads one to suspect that the

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<sup>73</sup>NA, RG 23, Vol. 1822, File 726-11-6, part 1, James Eckmann, President of the Canadian Fishing Company to Mayhew, October 25, 1949

<sup>74</sup>UBC Special Collections and Archives, Doyle Papers, Box 1, File 1-4, Buchanan to Doyle, November 2, 1949. Buchanan refers to the meeting in this letter and says that their presentation to the Premier and Minister paralleled their later statements to the water comptroller in the water license hearing. By the time of the hearing, of course, the position may well have changed the bargaining point of the province and Alcan.

<sup>75</sup>NA, RG 23, Vol. 1823, File 726-11-6, part 5, "Meeting with Officials of the Aluminum Company of Canada, "August 9, 1951

initiative was that of the packers and not the fisherman's union or other representatives. But it is difficult to say. The point is that members of the fishing industry tried to forestall an unfavourable outcome by giving up on the Nechako site under the threat of a worse outcome. They stood outside the bounds of legal process and public debate and sought a cruder political bargain. The deal was a conspiracy, a secret plan to achieve political ends. It was also less conclusive than Alcan might have hoped.

By the time of the water hearing in Victoria, October 1949, little had been revealed about the proposed Alcan project. The much-touted Chilko site, upon which the IPSFC had prepared substantial scientific evidence, vanished from the agenda in favour of the northern, Nechako site, about which much less was known. It is unclear whether Alcan preferred the northern site for engineering reasons as well, but there is little doubt that the company took the fisheries threat as a serious political and legal consideration. Although the IPSFC objected to the Nechako project as well on the grounds of possible effects on the fisheries, most representations to the provincial water comptroller acknowledged that development would have to occur somewhere, but that it would be helpful to conduct some kind of preliminary studies on fisheries effects. Farrow rejected these claims, but did allow in the final water license that Alcan should present its plans before construction to the federal Department of Fisheries.<sup>76</sup>

Once the company had its water license, the politics of the controversy shifted out of the realm of mystery to the concreteness of specific sites and designs. At this stage, the federal Department of Fisheries and the IPSFC came to take the leading roles in the fisheries defense, with the federal department trying to impress upon Alcan its legal power to insist on fishways and the IPSFC providing scientific surveys to calculate the

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<sup>76</sup>BCARS, GR 1222, Premiers' Papers, Box 117, File 3, Farrow, BC Water Comptroller to Mayhew, Minister of Fisheries, December 12, 1949. This letter sets out why it is not possible to include fisheries concerns in the water license granted to Alcan, save an instruction to the company to be mindful of the authority of the federal Department of Fisheries and asks the company to show its plans to the department in advance of construction.

necessary remedial work. The crisis of Chilko Lake having passed, the fishing industry retreated from the scene, yet remained more organized than previously, in expectation of the next event.

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Convincing Alcan of the necessity of remedial work on the Nechako project proved to be a protracted endeavor-- filled with committee meetings, subtle misunderstandings, threats and counter-threats. Before any discussions of the form of remedial work commenced, the IPSFC and the federal Department of Fisheries technical staff conducted surveys in the Nechako basin over the Summer and Fall of 1950 and attempted-- with the assistance of Alcan engineers and technical staff-- to determine possible effects on salmon. The final project design aimed to dam the Nechako River beneath the upper basin lakes, Ootsa and Eutsuk, turning them into storage in the process. The water would then be sent via pipeline, cutting through the coastal range, out of the Fraser basin to a powerhouse project at the outlet of the Kemano River. The power generated would then be transmitted one hundred miles to Kitimat, the smelting center and point of export. The report, issued in January 1951, stressed the fact that although the dam system to be created would only block a small number of runs outright, its withdrawal of water from the Nechako system would impact runs downstream. Reduced flows would affect the riverbed, raise water temperatures, make summer migration more difficult for salmon and reduce winter cover. These effects could be diminished, however, if a guaranteed level of water, within a certain temperature regime in the summer months, could be released from the project reservoirs. Department of Fisheries staff estimated a cost for this remedial work of approximately \$1,410,000.<sup>77</sup>

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<sup>77</sup> NA, RG 23, Vol 1822, File 721-11-6[3], CH Clay, Division Engineer to AJ Whitmore, Chief Supervisor of Fisheries, January 15, 1951

A month after the release of this report, McNeely Dubose met with Robert Mayhew, and a number of federal fisheries bureaucrats, as well as CD Howe, then Minister of Public Works, at the House of Commons and indicated that the final plans for the Nechako project were complete and would soon be provided to the department of public works for approval under the Navigable Streams Act. The point of the meeting, however, as Dubose indicated tartly, was to inform the Department of Fisheries that he and his colleagues had read the fisheries report on the project and could not comply with the remedial requirements. Alcan had no excess water to release for salmon conservation and it had no intention of paying for remedial efforts. Alcan, he insisted, had been invited by the provincial government to develop the project; fisheries representatives had insisted that no salmon problems would attend the northern site; and despite attractive offers from offshore locations, the company had made a commitment to build in BC. But that commitment was not yet irreversible. Should Alcan be asked to provide remedial work, estimated at over a million dollars, well, mused Dubose, that might be enough to sink the project entirely. If the Department of Fisheries wanted to save salmon, he stated, then it should pay for it; and as for the fishermen, they would probably be better off working for Alcan. The calculated bluntness of Dubose was met by a firm reply by Mayhew. He felt that Dubose was delivering an ultimatum, not consulting with the department. Although Mayhew realized that his department would suffer in the public eye if a delay to the project occurred, and, equally, would be blamed if fisheries conservation failed, he also believed that Alcan had much to lose through obstinacy: if fish were annihilated it would look poorly on the company. The only solution, Mayhew insisted, was cooperation. Up to this date, fisheries scientists and engineers had worked together on the remedial investigations. Was all of that "window dressing" Dubose was asked. Dubose replied that this was only an interpretation. After some closing remarks, Mayhew pressed Dubose again and stated that Alcan should expect to pay \$ 1,000,000 for



remedial work. Dubose made no commitment but agreed to relate this statement to his superiors. Nothing was assured.<sup>78</sup>

This meeting was possibly the most contentious between the two parties before a working agreement was hammered out in the summer of 1952.<sup>79</sup> Dubose's tough stand was, it would appear, a calculated attempt to offer nothing and place the department on the defensive, despite its legal obligation and authority. In later discussions, Dubose was by turns, charming, indulgent, capricious and ornery. The shifting postures infuriated and confused Department of Fisheries staff who spent many hours composing memoranda attempting to grasp his direction, wondering if threats would be carried out, asking if his positions were bluffs or real. Dubose's performance was brilliant. The Department of Fisheries wanted cold-water releases and asked for a low opening in the dam for the purpose. Dubose dithered, discussed the safety risk (the dam might break: "I am not exaggerating"<sup>80</sup>), and questioned the biological foundations of the department's advice. One fisheries department scientist summarized one of Dubose's pugnacious letters in three lines: "We do not think you need cold water. In any event, we do not intend to give it to you. We know the weakness of your arguments and we intend to stress them."<sup>81</sup> The department settled for no cold-water releases. Further confusion surrounded the release

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<sup>78</sup>NA, RG 23, Vol 1822, File 721-11-6[3], AL Pritchard, "Memorandum re Meeting February 1, 1951 to discuss Aluminum Company of Canada Development in British Columbia in relation to Fisheries," February 2, 1951; Vol 1823, File 726-11-6 [7], "Memorandum on Negotiations Involving the Department of Fisheries in Connection with Developments by the Aluminum Company of Canada Limited in British Columbia," March 10, 1952"; Further aspects of the negotiations are covered in File 721-11-6[5] Mayhew to Dubose, October 15, 1951; Dubose to Mayhew, September 26, 1951; Mayhew to RE Powell, President, Aluminum Company of Canada, September 17, 1951

<sup>79</sup>Some of the other meetings are reported on in NA, RG 23, Vol 1822, File 726-11-6[3], CH Clay to Whitmore, March 7, 1951, re: meeting with Alcan engineer Kendrick; File 726-11-6[4], SB [Stewart Bates], "Memorandum to the Minister, Re: Discussions with Mr. Dubose RE Aluminum Company of Canada," April 16, 1951; "Memo for File June 13, 1951" [re meeting between Minister, President Powell, Aluminum Co., Dubose and CD Howe]

<sup>80</sup>This statement was made after a final agreement was hammered out, but the IPSFC still made representations for a passage in the dam. Nevertheless it suggests well Dubose's jocular tone mixed with a firm negotiating position: NA, RG 23, Vol 1823, File 726-11-6 [7], Dubose to Mayhew, March 21, 1952. Dubose denied the necessity of a passage in the dam during earlier negotiations: NA, RG 23, Box 1823, File 726-11-6[5], "Meeting with Aluminum Company," August 14, 1951

<sup>81</sup>NA, RG 23, Vol 1823, File 726-11-6[7], AL Pritchard Memo to Deputy Minister, March 21 [1952]

of water to allow for salmon transportation in the summer and cover in the winter. Dubose questioned the Department of Fisheries figures on the required releases, hired expert consultants to criticize the department's findings and then offered to release water at a far lower level (one hundred cubic feet per second) than the department desired. Although the department continued to argue the point, Dubose succeeded in ending discussion of the possibility of major releases from Alcan's main project reservoir by suggesting a secondary spillway via Cheslatta Lake. Even when this point was apparently concluded, however, Dubose continued to press: seeking funds from the department to assist construction and backing off earlier commitments as to the design of storage works.<sup>82</sup> Department of Fisheries scientist, AL Pritchard claimed in a memorandum to his department, March 10, 1952, before any agreement was reached, "We have compromised and accepted maximum risk. The Company has done nothing."<sup>83</sup> In the final analysis, Alcan would do something, but it was far below the Department of Fisheries' early expectations. Dubose had played his advantages well, bluffed and zeroed in on the department's weaknesses. And the Department of Fisheries knew it.<sup>84</sup> From the sidelines, IPSFC scientists and commissioners looked on in wonder as the basic conservation requirements had one by one disappeared.

To correct for the effects of one dam, another would be necessary. In order to provide the necessary water for migrating sockeye in the summer months, Alcan and the federal Department of Fisheries agreed to create an additional spillway and reservoir on

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<sup>82</sup>Apart from the mention of cost-sharing in this final letter of understanding, the Department of Fisheries' willingness to help cover costs is suggested in an internal departmental memorandum: NA, RG 23, Vol 1822, File 726-11-6[4], GR Clark "Memorandum to Minister," April 16, 1951. On Dubose's continuing negotiating tactics, see: RG 23, Vol 1823, File 726-11-6[8], "Supplementary Memorandum No 1 on Negotiations Involving the Department of Fisheries in Connection with Developments by the Aluminum Company of Canada Limited in British Columbia (Covering Period from March 10, 1952 to January 21, 1953).

<sup>83</sup>NA, RG 23, Vol 1823, File 726-11-6 [7], AL Pritchard, "Memorandum to the Deputy Minister, Relevant Factors for Consideration in Future Negotiations with the Aluminum Company of Canada Ltd," March 10, 1952.

<sup>84</sup>The statement of the understanding to proceed is set out in: NA, RG 23, Vol 1823, File 726-11-6, Dubose to Mayhew, March 27, 1952; Mayhew to Dubose, March 28, 1952

the Cheslatta system, further downstream from the main structure and tributary to the Nechako. This would provide the necessary extra water without diminishing the company's power supply. Through fortuitous weather conditions, this 'solution' appeared entirely satisfactory in the first few years after construction, when high water levels canceled out potential problems. One fisheries scientist suggested that this result was bad luck: it discredited fisheries criticism and left the problem unsolved. Agreeing in future years on the quantities of water to be released remained contentious.<sup>85</sup>

The dams that rose on the Nechako River in 1952 remade the river and its surrounding lands. While the fisheries interest focussed narrowly on the problems to be created for migrating salmon, there was a wide range of human impacts that gained, arguably, less attention from government or the broader society. The dams flooded former farms and homes, hunting territories and burial grounds. Homesteaders from the Ootsa lake region protested their lot (producing one future cabinet minister, Cyril Shelford, in the process) and received compensation from Alcan as a result.<sup>86</sup> However, the secondary project on Cheslatta Lake, which was rushed through the water licensing process in order to protect salmon, flooded hunting and trapping lands of Cheslatta natives.<sup>87</sup> Although some compensation was paid out at the time on the prompting of the Department of Indian Affairs, there was little consultation. The problem remains contentious. Although some of these matters have gained the attention of historians, the

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<sup>85</sup>NA, RG 23, Vol 1823, File 726-11-6 contains correspondence covering on-going disputes about water releases.

<sup>86</sup>UBC BCER CF, "Farmers Ask Aluminum Co Compensation," Vancouver Sun, October 26, 1949; "Alcan Promises Compensation," Province, October 25, 1949; "Alcan Buying Tactics Assailed," Victoria Colonist, October 28, 1951

<sup>87</sup>Fisheries efforts to have the dam speeded to completion are contained in: Mayhew to WE Harris, Minister of Citizenship & Immigration, March 28, 1952; a summary of the facts of the case as well as comments on compensation are contained in: NA, RG 23, Vol 1823, File 726-11-6 [7] CH Clay, "Memorandum," March 12, 1952; NA, RG 23, Vol 1823, File 726-11-6[8], AJ Whitmore, "Memorandum, Re: Murray Lake Dam-- Cheslatta System," April 29, 1952 Whitmore reported the evacuation of nine Indian families and the removal of certain Indian graves.

problem of the human impacts of the Alcan project on northern British Columbia awaits further study.

The Alcan case did not augur well for the fisheries interest in facing future power development challenges: in this instance the inclinations of the provincial government to promote hydro development at the expense of the fisheries received ample demonstration; Alcan's ability to out-maneuver the federal Department of Fisheries and other agencies also highlighted the real limitations of the formal legal authority of the federal power and of fisheries conservation procedures more generally. Yet, quite unexpectedly, the precedent of the aluminum project did not hold in the Quesnel case; critical aspects of the context differed. The prestige of multinational capital was not matched by the potential of a chastened provincial commission; large-scale investment was replaced by a relatively small project fund; fisheries interests moved from a peripheral political position to the center of the planning process. Fish and power danced a different step.

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Since its creation in 1945, the BCPC followed a rapid development agenda. From the two pivots of northern Vancouver Island and the Okanagan, where new hydro developments fed growing markets, the BCPC launched a nationalization drive to absorb pre-existing private utilities and develop plans for the expansion of hinterland electrical supply. In 1949, this mandate proceeded apace: Chairman Samuel Weston reported to the Premier that the domestic and industrial customer base had expanded rapidly.<sup>88</sup> To propel this development agenda into new areas, however, more hydro projects would be necessary. Designed on a regional, rather than an integrated, grid system, the BCPC network required that each geographical area be supplied by its own separate power sources. To

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<sup>88</sup>BCARS, GR 1222, Premiers' Papers, Box 198, File 1, "Fourth Annual Report of the British Columbia Power Commission for the year ended 1949"; In 1950 Weston reported a twenty-eight per cent consumption increase over the previous ten months of BCPC operations: Box 216, File 1, Weston to Premier, March 14, 1950.

date, only northern Vancouver Island, fed by the John Hart dam project and the Okanagan, with the Watashan dam, operated primarily with hydro power; most areas were still fed by diesel and thermal generation facilities, inherited from small private utilities.

The numerous gaps in the BCPC's hydroelectric system provided ready openings for the promises of politicians and the ambitions of Samuel Weston to electrify the province. Since the 1945 election, the coalition government had remained committed to an agenda of hinterland development. At different times, local MLAs had offered vague hopes that power might be developed in Kamloops, Quesnel, or maybe further north. The ideas were frequently short on specifics. A more concrete promise came in 1949 when Premier Hart envisioned a vast new era of northern development and announced the intention of the provincial government to proceed with a hydro project on the Quesnel River.<sup>89</sup> The BCPC readily acceded to the request to investigate, on the understanding that the provincial government would fund the expansion. Samuel Weston's report to the Premier on the prospective project in 1949 mirrored the Premier's enthusiasm.

For a man who, during the war, had argued for a cautious approach to electrification, cognizant of the limits of BC's hinterland markets and the folly of using electricity as a primary stimulus for industrial location, Weston was full of excitement for the promotional possibilities of a dam in the northern interior.<sup>90</sup> The project, centered on the Quesnel River, near the town of the same name, would be able to transmit power as far north as Prince George and to all points in between in the Fraser valley. Rising one hundred feet above the river, the dam would be capable of generating a modest 7,000 HP, a figure estimated to be greater than demand in the short term. Yet, with the promise of

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<sup>89</sup>Wedley, "Laying the Golden Egg..." p 73; John BB Shaw, "The BC Power Commission and the Development of Rural Electrification," BC Professional Engineer 1(3) (March 1950): 9

<sup>90</sup>Weston's views on hydro development are contained in the Report of the Post-War Rural Electrification Committee, for which he served in the capacity of advisor on technical engineering matters. He also had contact with the Premier at that time and advised a cautious nationalization programme.

timber and pulp and paper development around Prince George and Quesnel, combined with the planned connection of the Pacific Great Eastern Railway between Quesnel and the Peace River country, Weston argued that the market for Quesnel power would be expansive over the long term. In any event, Weston insisted, "there is no hydro-electric station in America that has not found a market for its output." His new attitude bespoke the BCPC's four years of sustained growth and reflected the necessary salesmanship. What Weston requested from the Premier was financial and political support. The project would cost in the neighbourhood of six and a half million dollars, and other interests such as the fisheries might object. But if all the values were weighed appropriately, Weston predicted, it would be seen that power on the Quesnel River should supersede other concerns.<sup>91</sup>

In the same year as the BCPC began to lobby the Premier to support the as yet unreleased Quesnel plan, the IPSFC fortuitously established a field station on the river and commenced experiments to transplant salmon to spawning habitat in the upper portions of the watershed.<sup>92</sup> This was one of a number of restoration projects commenced in the wake of the Hells Gate fishways, intended to re-open areas of former salmon spawning habitat to new production. At the turn of the century, before a mining dam at the outlet of Quesnel Lake had damaged upper Quesnel runs, the river had accounted for approximately a third of sockeye salmon in the 'big' year cycle.<sup>93</sup> Although the runs experienced a partial recovery after the removal of the dam in 1904, the Hells Gate slides of 1913-1914 reversed this trend and successively diminished the Quesnel's runs

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<sup>91</sup>BCARS, GR 1222, Premiers' Papers, Box 197, File 7, SR Weston to Premier, January 28, 1949. In a later document, the BCPC commissioners spelled out their understanding of the project and costs in finer detail: Box 217, File 7, WW Foster, FL Shaw, and SR Weston, Commissioners, BCPC to Premier, May 4, 1950.

<sup>92</sup>International Pacific Salmon Fisheries Commission, *Annual Report* (1948): 25

<sup>93</sup> This figure is provided in a memo on the Quesnel River supplies by the IPSFC: BCARS, GR 1378, BC Commercial Fisheries Branch, Box 5, File 5, copy of memo requested by federal fisheries minister Mayhew from IPSFC for Alexander, April 2, 1951, "Subject: Quesnel River".

thereafter. With the construction of the fishways, however, hopes were raised in the fisheries biology community that such a formerly productive spawning river as the Quesnel would re-emerge in importance. Only time, assisted by scientific experiment, would tell; but the existence of restoration work on the river lent the fisheries argument legitimacy in the eyes of the public that it might otherwise have lacked.<sup>94</sup>

Despite the firm support of the coalition government for the Quesnel project, the planning and approval process followed a different trajectory than in the Alcan case. Instead of allowing the BCPC to apply for a water license before the provincial water comptroller, as all private interests did, the province established an inter-departmental committee of senior civil servants in March 1949 to review the plan, consider its impacts on regional development and recommend appropriate action. The Departments of Lands and Forests, the Water Branch, Mines, and Fisheries all received representation. For such a large expenditure, tied to broader provincial initiatives in northern development, the creation of this committee made administrative sense. It would bring the expertise of a range of departments to bear on an important government program. Given the context of recent BCPC development controversies, however, and the intervention of both the Fraser Basin Board and the IPSFC in the case, the committee also made political sense: it created a bureaucratic structure, within provincial control, that spoke to all of the resource interests involved in the project, without providing an opening for federal interference.

Despite the undeniable popularity of the provincial government's rural electrification program in the immediate post-war years, the BCPC became embroiled in an intense development controversy beginning in 1948 on Vancouver Island that would instill greater caution in the commission's subsequent development plans and the government's willingness to approve them unilaterally. The dispute centered on Buttle

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<sup>94</sup>This point is made in Tom Reid's memoirs: UBC Special Collections and Archives, Box 33, File 33-5, "Glimpses and Reflections of My Thirty Years with the International Pacific Salmon Fisheries Commission," by Senator Thomas Reid [1962?]

Lake, a small water body located in Strathcona Provincial Park in the upper Campbell River watershed. In the expansion plan for the John Hart development in 1948, Buttle Lake was slated to become a reservoir, raising its level, flooding forests and scenic cabins in the process. In defense of the lake, a curious mixture of political forces and personalities including wealthy American sportsmen with lake front property, the nature writer Roderick Haig Brown and an assortment of urban park enthusiasts lead by the former federal Conservative MP, HH Stevens and his Natural Resources Conservation League, joined to denounce the BCPC's plans and called on the provincial government to restrain its unwieldy agency. Hundreds of protest post cards hailed on the provincial government, most originating from Vancouver.<sup>95</sup> Critics bemoaned the loss of primitive wilderness and that most indefinable of things, natural beauty. The protest collapsed within a few years, tarnished by the association of American millionaires, and transcended by a compromise that would see the lake flooded, but to a lesser extent than originally proposed. The skirmish would continue until 1952, but in 1949, when the Quesnel committee was established, the protest was beginning to emerge, and so were its lessons in terms of planning.<sup>96</sup> The controversy was over an ideal of wilderness conservation unrelated to the Quesnel case; but the latent possibilities of resource conflict that the dispute modeled in robust performance probably suggested the importance of

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<sup>95</sup>The cards and tabulation are contained in BCARS, GR 1236, BC Water Rights Branch, Box 15. Cards originating from Vancouver and vicinity accounted for 365 of 507 cards received in total.

<sup>96</sup>The beginning of the controversy dates back to the completion of the John Hart development in 1948. As the BCPC constructed further upper basin storage, including on Buttle Lake, conservation and parks groups protested the lack of lake clearance and other aesthetic problems: BCARS, GR 1222, Premiers' Papers, Box 197, File 6, RH Baker, Vancouver Tourist Association to Premier, September 24, 1948; Weston to Premier Johnson, February 20, 1948 [re: lake clearing costs]; the proceedings of the hearings held over the Buttle Lake plan, are contained in: GR 1236, BC Water Rights Branch, Box 11, File 4; and the report of a legislative committee struck to consider the issue is found in Box 13, File 15. For brief overviews of the Buttle controversy, see: E Bennett Metcalfe, *A Man of Some Importance: The Life of Roderick Langmere Haig-Brown* (Seattle and Vancouver: James W Wood Publishers, 1985), pp 186-192; and Jeremy Wilson, *Talk and Log: Wilderness Politics in British Columbia, 1965-1996* (Vancouver: UBC Press, 1998), p 100. Another controversy in 1948 over Silver Creek near Hope where the BCPC confronted local anglers over a plan to develop a small dam on the stream provided another example of the opportunity for conflict: BCARS, GR 1222, Box 197, File 6, CE Bradwin, President, Chilliwack Fish and Game Protective Association to Premier, August 20, 1948; Premier to Baldwin, September 7, 1948. The Silver Creek dam was eventually cancelled.



multi-purpose consultation before the development stage in the Quesnel scenario.<sup>97</sup> This, of course, was an entirely different procedure to that involved in the Alcan case and may suggest the different constraints placed on the BCPC's actions as a public corporation. Whereas the provincial government could disguise its own ambitions behind a facade that suggested the need to accommodate private capital at every turn in the Alcan case, the public nature of the BCPC shifted the burden of political legitimacy.

Although the Inter-Departmental Committee aimed to coordinate different and sometimes conflicting resource interests, it did not incorporate either the Fraser Basin Board, or the IPSFC within its sphere, perhaps as a means to exclude a federal role. Certainly, as soon as the Quesnel project was announced publicly in the early spring of 1949, both the Fraser Basin Board and the IPSFC raised interest and concern. The Fraser Basin Board was but recently created and its mandate still flexible; its executive assistant, Russell Potter, followed the Quesnel proposal and tried to imagine means to incorporate a multi-purpose aspect into the design. This would enhance flood control (the Fraser Basin Board's *raison d'être*) and accommodate fisheries concerns.<sup>98</sup> Besides corresponding with the Premier and consulting with the BCPC on these matters, however, Potter's role was merely that of an informed spectator. His experience was similar when he attempted to play a part in the Alcan case, making the improbable charge that the Nechako dam might disrupt navigation around the port of Vancouver.<sup>99</sup> Like the Board he represented, Potter had no practical authority and he was treated accordingly. Although the IPSFC held a similarly limited authority, it, nevertheless, came to play an important role in the outcome

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<sup>97</sup>Proceedings from public hearings before the water comptroller in 1951 and an inter-party committee later the same year, in the wake of protests to the comptroller's decision are to be found in: BCARS, GR 1236, Box 11, File 4.

<sup>98</sup>BCARS, GR 1222, Premiers' Papers, Box 201, File 5, Russell Potter, "Report for FG Godspeed of Work of the Fraser River Basin Board to date," August 26, 1949; Box 202, File 6, Russell Potter to Premier, March 30, 1949

<sup>99</sup>BCARS, GR 1222, Premiers' Papers, Box 222, File 1, Russell Potter to Premier, May 4, 1951; UBC BCER CF, "Engineer Urges Check on Proposed Power Dam," Province, November 23, 1949

of the Quesnel case. Besides providing the committee with a brief on the effects of the project on salmon, the IPSFC, along with the federal Department of Fisheries, managed to channel influence into the committee through the provincial deputy minister of fisheries, George Alexander, who used other fisheries agencies to supply him with arguing points.<sup>100</sup> The IPSFC also tried to encourage protest of the project by industry representatives and lobbied the federal department to make a strong stand.<sup>101</sup> This activity, once again, launched the scientific and regulatory commission into a political role. The calculated lobbying of the Salmon Cannery's Operating Committee to the Premier during the committee's work-- encouraged by the IPSFC-- also added strength to Alexander's position.<sup>102</sup>

Over the course of the committee's deliberations in 1950 and 1951, George Alexander, representing the fisheries interest, managed to complicate the development program and insert the possibility of alternatives.<sup>103</sup> First of all, the stated project costs proposed by the BCPC in the range of five and a half to six and half million dollars were shown by Alexander to be unrealistic given the fact (which he confirmed) that the federal Department of Fisheries had the legal authority to insist on fish passage facilities and would certainly impose this burden if the project went ahead.<sup>104</sup> Establishing this single point changed the Quesnel picture substantially. It opened the possibility that other

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<sup>100</sup>BCARS, GR 1222, Premiers' Papers, Box 5, File 1, International Pacific Salmon Fisheries Commission, "A Preliminary Report Concerning the Sockeye Salmon in the Quesnel District in Relation to a Proposed Hydro-electric Development in the Quesnel River" [1949]; this report is also found in the papers of the BC Commercial Fisheries Branch. BCARS, GR 1378, BC Commercial Fisheries Branch, Box 5, File 5, copy of memo requested by federal minister of fisheries, Mayhew from IPSFC and sent to Alexander, April 2, 1951, "Subject: Quesnel River"

<sup>101</sup>Meetings discussing the IPSFC's role in encouraging industrial action are contained in: NA (Pacific Region), RG 23, Vol 2301, Folder 1, "Proceedings for Meeting, February 2, 1951"; Folder 2, "Proceedings June 20, 1950"

<sup>102</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 5, File 3, SM Rosenberg, Salmon Cannery's Operating Committee, to Premier Johnson, nd [marked September 21, 1950]

<sup>103</sup>Alexander's approach is discussed in: BCARS, GR 1378, BC Commercial Fisheries Branch, Box 5, File 3, GR Clark, Department of Fisheries to Alexander, May 30, 1950; Alexander to Clark, May 25, 1950 (copy).

<sup>104</sup>NA, RG 23, Vol 1223, File 726-11-5[4], George Alexander to Stewart Bates, Deputy Minister of Fisheries, March 15, 1951; Bates to Alexander, March 22, 1951; NA, RG 23, Vol 1223, File 726-11-5[4], Alexander to Bates, March 15, 1951

interior sites, further from established settlements and with greater transmission costs might be cheaper insofar as fish passage facilities would not be required. Using technical survey information supplied by the IPSFC, Alexander proposed an alternative to the existing Lower Canyon site on the north branch of the Quesnel River. A dam at this location would not impose a great burden on the salmon runs of the river, but would supply electricity at cheaper cost than the initial proposal, given the new assumptions about fisheries requirements. Using the knowledge of federal intervention like a lever in discussion, Alexander's alternative became compelling. Subsequent reports provided by the BCPC, factoring in fisheries facilities costs relative to alternative sites, tended to support his position.<sup>105</sup>

Although it is possible to imagine that the inter-departmental committee accepted the logic of the fisheries position, it is also true that the economic aspects of the project were more promotional than perhaps Samuel Weston had originally intimated.<sup>106</sup> Power generation at any of the proposed sites would be substantially higher than in the John Hart development on Vancouver Island, in part because the block of power to be produced relative to the construction costs was small. Furthermore, although it was originally hoped that a power project would attract private investors from the timber and pulp and paper industries in search of cheap power, attempts to attract developers failed.<sup>107</sup> The much-touted development effect of the project appeared to the committee to be overblown. The lack of an established market or prospective consumers could not have failed to impress the otherwise aggressive sponsors of hydro development on the

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<sup>105</sup>BCARS, GR 1222, Box 216, File 1, Weston to Premier, November 13, 1950; Weston to Premier, May 16, 1950; File 2, Weston to Premier, May 2, 1951

<sup>106</sup>And yet, he and colleagues made another report to the Premier in 1950, during the committee's deliberations, stressing the economic values of the project: BCARS, GR 1222, Box 217, File 2, WW Foster, FL Shaw and SR Weston, Commissioners, BCPC to Premier Johnson, May 4, 1950.

<sup>107</sup>This was a major blow to the development. As George Melrose, the Deputy Minister of Lands had instructed Alexander, in the early stages of discussion, the main rationale for such a project would be to supply industrial development. Rural electrification, the original goal of the BCPC, was secondary: BCARS, GR 1378, BC Commercial Fisheries Branch, Box 5, File 3, Melrose to Alexander, March 21, 1949.

committee, such as George Melrose and Richard Farrow. The fisheries argument was compelling, but it also gained strength in light of the project's inherent inadequacies. In June 1951, the committee reported to the Premier and advised no immediate development, but instead an extension of thermal generation in the region as the most economic energy choice at this date. Although this advice did not rule out future development, it did discourage a development on the Quesnel that would needlessly harm the fisheries when concrete alternatives were possible.<sup>108</sup> The coalition government accepted the advice of the inter-departmental committee and decided to post-pone the project indefinitely. The Vancouver Sun, which from the start had described the Quesnel project as a "test case" for the confrontation of fish and power on the Fraser, declared in 1951 "The 'salmon people' seem to have won a distinct victory over the 'power people'."<sup>109</sup>

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The development of new power projects in the upper Fraser basin in the late 1940s produced a mixed legacy: a major dam and diversion on the Nechako River and a postponed project on the Quesnel. These development episodes also provided the impetus for the formation of a loosely unified fisheries coalition.

The battle over fish and power played out on a variety of levels. In terms of jurisdiction, the debate took on a significant federal-provincial emphasis: the provincial government made its jurisdictional concerns known in the Hells Gate fishways case; promoted and facilitated the Alcan project with as little consultation with the federal

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<sup>108</sup>BCARS, GR 1222, Box 217, File 7, George Alexander, Deputy Minister of Fisheries, EH Tredcroft, Comptroller of Water Rights, John F Walker, Deputy Minister of Mines, George P Melrose, Deputy Minister of Lands-- members of the Inter-Departmental Committee on Hydro-Electric Power Development-- Quesnel River Basin to Premier Johnson, June 9, 1951. Earlier reports prepared by the committee in 1951 suggested the direction of their thinking: BCARS, GR 1378, Box, File 4, "Quesnel River Committee Memo Re Proposed Hydro-Electric Development at Little Canyon"; "Minutes of Quesnel River Basin Investigation Committee," April 3, 1951

<sup>109</sup>UBC Special Collections and Archives, BCER CF, "Quesnel Seen as Test Case for Power on the Fraser," Vancouver Sun, May 31, 1950; "Fisheries Interests win Quesnel 'Battle'," Vancouver Sun, April 28, 1951

government as possible; and worked to exclude federal departments and influence from the decision-making process over the BCPC's Quesnel River project. The federal Department of Fisheries, on the other hand, sought to insinuate its influence into provincial water management decisions by employing its authority under Section 20 of the Fisheries Act and through informal political organizing with the provincial fisheries department, the IPSFC and a variety of commercial fisheries interests. The boundaries were not water tight: George Alexander, the deputy minister of fisheries in BC supported provincial jurisdictional concerns in the Hells Gate case, but by the late 1940s served as a firm fisheries defender on the Quesnel project, in close consultation with federal and IPSFC officials.

Jurisdictional disputes sometimes masked and encouraged close relations between industrial interests and the state. In fish-dam conflicts of the early 1940s, the water branch and the IPSFC played an important role in articulating and carrying out the interests of their industrial constituencies. In the Nechako case, Alcan played strong provincial support off against the concerns of the federal Department of Fisheries to extract major gains in the water licensing process and later the negotiations over remedial work. Throughout the late 1940s, the fishing industry benefited from the leadership shown by the IPSFC and the Department of Fisheries in forcing a confrontation over water development and working to organize an industrial defense. State-industrial influence worked both ways.

To some extent the creation of a loose fisheries coalition followed on the inadequacies of the formal procedures for adjudicating disputes over shared resources. The water licensing process provided a hearing for fisheries concerns, but only that; it was controlled by a series of pro-development water comptrollers unsympathetic to fisheries concerns. The legal safeguards against destruction of fisheries habitat proved better as a threat-- as in the Quesnel case-- than as an operational lever to force industrial

compliance-- as in the Nechako case. Only when a conjuncture of circumstances produced the inter-departmental committee in the Quesnel case did the procedural review of a project provide a concrete opportunity for fisheries concerns to shape the provincial planning process. Without clear avenues for appeal and assessment, fisheries interests joined in an attempt to force legislative change (with little effect), lobby all levels of government, including the US federal government, and, court public opinion, even at the risk of personal vilification, as Tom Reid discovered. When all else seemed hopeless some segments of the industry even brokered a private understanding with Alcan to insure the conservation of Chilko Lake. Although, as the last point suggests, the fisheries coalition experienced its own internal stresses and strains, it also held up remarkably well in the public eye as a unified coalition. Such as it existed, this unity was the product of a number of years of crisis-driven political organization.

Despite the attempts of various levels of government to develop legal and policy responses to the conflicting interests of fish and power, each dispute was shaped by particular contexts. There were no test cases. In the Alcan case, a large multinational corporation met a pliant provincial state willing to create the necessary conditions for its arrival and the development of a major industrial project. The fisheries interest organized in response, capitulated, sought mitigation alternatives and bore defeats. In the Quesnel case, on the other hand, the fisheries interest managed to dismantle provincial policy by inserting fisheries representation into the provincial planning process and demonstrating, with the legal authority of the federal Department of Fisheries, that significant mitigation costs would be brought to bear. Large private capital co-opted the provincial state in the first instance, and the fishing industry, supported by the federal state, displaced a provincial commission in the second. The factors of scale and the power of private capital tilted the balance in these fish-power disputes.

In the future, the pro-development agenda of the coalition government would transmogrify into a new form. After the defeat of the coalition government in the 1952 election and the rise of WAC Bennett's Social Credit party, power policy would enter a new era. Fundamental aspects of the fish-power debate would also change. How fish and power would be balanced in this new regime would yet again be up for negotiation and conflict. For while matters were apparently concluded on the Nechako and Quesnel, there was as yet no long term plan to supply the growing electrical needs of BC's metropolitan populations and industries. Bridge River, the solution to this problem after the war, would soon need the assistance of other rivers to turn the province's turbines.

**Chapter 7:****Fish vs. Power**



Pray God our greatness may not fail through craven fear of being great.

-Harry Warren, quoting Tennyson in the Western Miner and Oil Review (June-July 1957)

Here, in this growing province, dreams can come true.

-Province, October 10, 1957

Calling it the "the most momentous announcement I have ever made" Premier WAC Bennett unveiled the Wenner-Gren corporation's plan to develop the hydro-electric powers of the Peace River in October 1957. A year earlier Axel Wenner-Gren, a Swedish multi-millionaire and notorious World War II arms dealer, had impressed Bennett with his proposal to develop the Peace River basin and Rocky Mountain trench in an enormous project coordinating railroads, mining, forestry and water power. Now, after preliminary surveys, hydroelectric development gained emphasis and Bennett foresaw that the project would supply the entire province's energy needs in the future. The advances in transmission technology that would deliver this distant northern power to the metropolitan south, he enthused, were so new that they "aren't even in the books yet." As to the Columbia River-- then under discussion for development with the federal government and the United States-- Bennett sniffed that while "Ottawa and the US hold their pink teas," British Columbia would develop the province. With his characteristic showmanship, that led some observers to mistake brazen behavior for simplicity, Bennett set in motion a series of events that resulted in the development of both the Peace and Columbia Rivers within the next decade and the incidental protection of the Fraser River as a salmon stream.<sup>1</sup>

The announcement of the Peace River program ensured nothing; it was but another in a long string of promotions that the Premier had learned to use in securing immediate and consequential ends. Already during the 1950s, the province had seen a number of larger than life development schemes fail-- one, on the upper Columbia, in

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<sup>1</sup>"Huge Power Plan for Peace River," Vancouver Sun, October 9, 1957

which the Kaiser Corporation, an American aluminum producer, would develop a storage dam in Canada in order to produce greater firm power at existing US facilities downstream, had provoked the concern of the federal government. Against the wishes of Bennett and his government, the federal Liberals passed legislation canceling the project in the name of protecting resources in the national interest. The implication was also clear: a government of dubious ability ruled that BC, willing to sell-out Canadian resources for little return and seemingly no view for the long term. The project, Bennett later suggested, had been merely a strategic lever to establish a principle of downstream benefit payments to be adopted in the broader program of integrated Columbia development with the United States. He had not expected the project to succeed.<sup>2</sup> Whatever the truth behind this claim-- and it would, after all, have required considerable foresight and a high tolerance of risk-- some of the key problems of jurisdiction, international negotiation and compensation had received attention.

Just as the Kaiser promotion had focused attention on the Columbia, so the Peace project announcement strengthened the provincial position: by making the Peace the cornerstone of future power supply, the province effectively removed the immediate need for development on the Columbia, raising its bargaining strength with the US. Substantial sums would now have to be paid to the province in return for the so-called downstream benefits in order to gain BC's agreement. When the federal Conservative government rushed into signing a draft Treaty in 1961 without provincial approval, Bennett called for an end to the federal ban on power exports before lending his support. The ban was subsequently lifted. In the end, the province would seal the entire program and the future of BC's electrical system by using funds secured in the Columbia Treaty

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<sup>2</sup>Neil Swainson, Conflict over the Columbia: The Canadian Background to an Historic Treaty (Montreal-Kingston: McGill-Queen's Press, 1979), p 65; David Mitchell, WAC Bennett and the Rise of British Columbia (Vancouver: Douglas & McIntyre, 1983), p. 286 Swainson is more skeptical of this claim than Mitchell.

from downstream benefits and power sales in the US in order to build both the Columbia dams and the Peace River project. When the major provincial utility, BC Electric, balked at purchasing Peace power, on the assumption that it would be prohibitively expensive, Bennett completed the performance by expropriating both the Peace River Development Corporation (the successor to the Wenner-Gren concern) and BC Electric and establishing a new provincial corporation, BC Hydro in 1961.

The political and diplomatic events leading to the Columbia Treaty and the Peace development-- Bennett's so-called two-river policy—are now well known in their broad outline.<sup>3</sup> The intention of this chapter is to suggest a broadening of the context under examination. Controversy over the Peace and Columbia Rivers developed against the background of the fish-power debate over the Fraser. In 1950, knowledgeable commentators judged the Fraser to possess the most economical power sources for the province; within a decade, the two rivers that had formerly been ranked well below the Fraser in importance would instead be developed and provide the pillars of subsequent electrical development. How that came to be so was not for lack of attempts to develop the Fraser, nor the result of an inevitable political concern for conserving the fisheries.

Fundamentally, the fish vs. power debate on the Fraser helped to displace hydro development into other river basins; once major development occurred on the Peace and Columbia, the Fraser was insulated by implication. Before that time, fisheries defenders,

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<sup>3</sup>The most substantial study of the Columbia Treaty remains Swainson's carefully argued, Conflict Over the Columbia. The Wenner-Gren episode is best explained by John R. Wedley, "The Wenner-Gren and Peace River Power Development Programs," in SA TS'E: Historical Perspectives on Northern British Columbia ed. Thomas Thorne (Prince George: College of New Caledonia, 1989). This paper is a section of his thesis: "Infrastructure and Resources: Governments and Their Promotion of Northern Development in British Columbia, 1945-1975" (PhD thesis, University of Western Ontario, 1986), pp 247-310. The political events that made up the two river policy are treated in Mitchell, WAC Bennett; Paddy Sherman, Bennett (Toronto: McClelland and Stewart, 1966); Martin Robin, Pillars of Profit: The Company Province, 1934 to 1972 (Toronto: McClelland and Stewart, 1973); Eileen Williston and Betty Keller, Forests, Power and Policy: The Legacy of Ray Williston (Prince George: Caitlin Press, 1997), especially chapter 2 "The Two Rivers Policy." These problems are approached from an entirely different angle (and set of sympathies) in: John Swettenham, McNaughton Vol. 3 1944-1966 (Toronto: Ryerson, 1969), chapter 6 "The International Joint Commission." Jeremy Mouat considers these events from the perspective of West Kootenay Power in The Business of Power: Hydro-Electricity in Southeastern British Columbia, 1897-1997 (Victoria: Sono Nis Press, 1997).

power promoters and politicians all understood that the future of the Fraser was up for grabs. The fish-power debate over the Fraser served as both an independent variable, impacting the context of power politics across the province as well as a dependent variable, causing particular groups to adopt positions on the Columbia and Peace question out of their conceptions about Fraser River affairs. In turn, the development of the Peace and Columbia Rivers impacted the context of the fish-power debate by undercutting demand for hydro development and by directly affecting rival projects on the Fraser. The two rivers policy, it will be demonstrated, might better be called a three-river policy.

More than five different hydro development schemes floated momentarily and then sank on the Fraser in the 1950s. The three most important projects-- the Moran plan, a scheme to dam the Fraser north of Lytton, pressed by the Moran Development Corporation; the Columbia to Fraser diversion scheme, that would dam both the Fraser and Thompson Rivers, backed by General Andrew McNaughton, Chair of the Canadian Section of the International Joint Commission (IJC); and the System A plan of the Fraser Basin Board that would place nine multi-purpose dams in the upper Fraser basin-- each fueled widespread debate across the province and impacted the course of negotiations on the Columbia and energy politics in the province more generally. They also posed threats to the protection of the salmon fisheries and inspired a considerable scientific effort to study the consequences of dams on salmon that will form the subject of the next chapter. How these projects arose, who supported and protested them, what debates they produced and impacted, are the questions that shape this chapter.

Besides changing the course of BC's hydro history, these developments also provided grist for British Columbians to debate the meaning of regionalism both in Canada and BC, to ponder the appropriate uses of technology and to wonder at the powers and limits of nature. In debating the problems, British Columbians revealed their mixed impressions of the promise of development, their insecurities about past political

grievances and their anxieties about the cold war. The fish-power debate turned into an open rhetorical field: a contest over resource allocation invited profound questions of meaning, nature, culture and place.

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"The wise exploitation of the Fraser River," Harry Warren began, "represents one of the greatest and most thrilling hazards that lie ahead."<sup>4</sup> The comment from the UBC geographer and geologist signaled a philosophy of wise use-- in which resources are put to utilitarian ends, with a view to perpetual exploitation-- but also an infectious excitement in the challenges of BC's post-war development.

The venue for Warren's presentation was not his university classroom, but a conference. Since 1948, Warren had helped to organize the annual BC Natural Resources Conference that brought together leaders from industry, government and academe to discuss pressing problems of BC's resource economy.<sup>5</sup> On this occasion, in 1952, Warren's subject was the future development of the Fraser River. For many years Warren had pushed the subject of hydropower in BC: during the war he had called on the provincial government to expand hydro facilities and peppered Alcan with encouraging advice. His concern at this stage was neither personal nor financial; he simply believed that British Columbia had water wealth that could be exploited and should be exploited if the province and the west were ever to attain their proper status in Canada, North America and the world.

Warren's talk was not the only one concerning energy and power matters in 1952, nor was it the first at these conferences to discuss the Fraser River as a power source.

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<sup>4</sup>Harry V. Warren, "National and International Implications Involved in the Development of a Portion of the Lower Fraser River," Transactions of the Fifth British Columbia Natural Resources Conference (BC Natural Resources Conference, 1952), p 257

<sup>5</sup>For a useful discussion of the importance of these conferences in BC's conservation debates in the 1950s and 1960s, see: Arn Keeling, "Ecological Ideas in the British Columbia Conservation Movement, 1945-1970," MA Thesis, UBC, 1998, pp 7-23.

Only the year before, a special forum on 'Fish and Power' introduced the problems attending dam development on the Fraser.<sup>6</sup> Speaking on behalf of power, Samuel Weston, the chief of the BC Power Commission, HL Purdy, Vice-President of BC Electric and a group of other prominent individuals in the field asked fisheries representatives to consider the inevitable demand for the river's power and the economic values that hydro power might bring in comparison to the fisheries. In reply, fisheries representatives such as Milo Bell of the International Pacific Salmon Fisheries Commission, and AH Sager of the canners' lobby group, the Fisheries Association of BC, made every effort to distance themselves from an obstructionist position, but called on power developers to dam non-salmon-bearing streams before turning to the Fraser. From the audience, the nature writer and Buttle Lake activist Roderick Haig-Brown, as well as McNeely Dubose, Vice-President of Alcan, rose to make pointed observations and queries. Although each speaker was at pains not to dismiss the rival concern, and called for a re-writing of the forum title from 'Fish or Power' to 'Fish and Power' the conference transactions nevertheless captured the spirit of the engagement in two photographs, showing the 'Fish' and 'Power' speakers in juxtaposition. There was a confrontational tension here that talk of cooperation could not undo.

The air of inevitability that hung over the discussion in 1951, and again in 1952 when Warren spoke to the issue, reflected the growing sense in British Columbia that the development of the Fraser was both unavoidable and necessary. In his portrait of the Fraser River, published in 1950 journalist Bruce Hutchison put the matter tersely, "Not long will [the Fraser] remain unused."<sup>7</sup> In the same year, Premier Byron Johnson said, "The time is coming when the people of the province will have to decide whether they

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<sup>6</sup>"Forum: Fish and Power," Transactions of the Fourth British Columbia Natural Resources Conference (BC Natural Resources Conference, 1951), pp 95- 150

<sup>7</sup>Bruce Hutchison, The Fraser (Toronto: Clarke, Irwin & Co., 1950), p 337

want to develop power, or stay as they are, protecting the fishing industry."<sup>8</sup> At this date, the looming construction on the Alcan project and the possibility of the BCPC's project on the Quesnel forced Tom Reid, chairman of the IPSFC to declare privately that if both projects went ahead, the salmon commission might as well "just fold up"; its mandate to restore the river would be impossible.<sup>9</sup> "A big industrial fight is shaping up in British Columbia," noted the Victoria Times in 1950, "fish vs. power."<sup>10</sup> One critic of this heated rhetoric and the assumptions it masked, wrote in the Vancouver Sun in 1949 that it was impossible to believe that dam boosters understood the threat posed to salmon, or were credible in speaking on the matter: "To entertain any hope of maintaining the salmon run under these conditions," wrote engineer Paul Smith, "is to be optimistic to the point that could be justified only by conviction that help will come from supernatural agencies."<sup>11</sup> Another writer in the same newspaper dismissed Smith's pessimism and called for a "healthy compromise."<sup>12</sup> For all of the confusion about consequences, the promises of technology and the perils of nature that this discussion contained, it turned on a sense of foreboding: a choice was coming, a challenge of self-definition.

"As a source of energy," Warren continued in his 1952 address, "the Fraser may be considered the mainspring of British Columbia."<sup>13</sup> Dammed on its main stem, the river could provide enormous power, captured, gear-like, in a series of integrated projects, the largest of which would be north of Lillooet at a railway siding called Moran. In a stylized drawing of the Moran concept carried in the press the day after Warren's talk, four hulking dams, thousands of times actual size, bore down in relief on the river,

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<sup>8</sup>BCER CF, "Fisheries or Power?" News Herald May 19, 1950. The quotation appeared also in the Sun May 17, 1950 in a slightly different form.

<sup>9</sup>NAC (Pacific Region), RG 23, Vol 2301, Folder 1, Proceedings of IPSFC Meeting, February 2, 1951

<sup>10</sup>BCER CF, "Fish Vs. Power Problem Soon Will Confront BC," Victoria Times May 12, 1950

<sup>11</sup>BCER CF, "You Can't Kid a Salmon," Vancouver Sun April 23, 1949

<sup>12</sup>BCER CF, Roy Brown, "Fish or Industrial Power? BC Can Have Both?" Vancouver Sun, April 25, 1949

<sup>13</sup>Warren, "National and International..." p 257

technology imposing itself on nature.<sup>14</sup> "Here is the site of power development," revealed a journalist, captured by Warren's vision, "that would surpass the St. Lawrence Seaway plan, tower over the Kitimat project like a colossus and known hydro records left and right."<sup>15</sup> The Moran site was the key: the dam here would stand seven hundred twenty feet above the river, flood a vast area and produce massive amounts of energy. The location had first come to light in 1934 when provincial surveyor SH Frame had described its characteristics for the BC water branch.<sup>16</sup> Warren was taking the next step and imagining how Moran could provide British Columbians with the means to realize the river as their progressive mainspring.

The project would be a mainspring, rather than simply a power generator, because the entire Fraser basin, the heartland of the province, would be reconstructed on its basis. Warren rattled off the possibilities: the reduction and stabilization of flow would provide improvements for navigation, and decrease costly dredging on the lower river; the massive reservoir would hold back hazardous floodwaters and make expenditures on dikes obsolete; little timber would be flooded, but the reservoir would provide water transportation to open new areas for forestry development; some land would be lost, yet greater areas would be converted to productive agriculture through the provision of irrigation and cheap power for pumps. Admittedly, fisheries "would suffer a great loss."<sup>17</sup> But technology could improve that problem and in any event the comparative values were incomparable: power, the dam's greatest product, would reach three million HP at the Moran dam alone.

The question that Warren did not address in his talk was how this power would be consumed. He had various uses in mind-- aluminum smelting, iron foundries, irrigation

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<sup>14</sup>BCER CF, Vancouver Sun, October 24, 1952

<sup>15</sup>BCER CF, "Dot on Map Possible Site for Vast BC Power Project," Vancouver Sun, October 24, 1952

<sup>16</sup>BCARS, Add MS 1147, Stanley Howard Frame Papers, Box 1, 1934 Diary. Frame said of Moran: "Site found to be a good one."

<sup>17</sup>Warren, "National and International..." p 260



pumps and electrical heating-- but provided no sense of BC's actual demand for power or the institutional complexities of its sale. He had the booster's faith: if power was provided, consumers would come. And, to judge from the experience of the US Pacific Northwest, which he cited, this assumption had some basis. Electrical consumption in the Pacific Northwest states soared above British Columbia's during and after the war, driven by cheap power from federally subsidized dams. Why could promotional power rates not work a similar magic in BC and create a great industrial development in the process?

Although Warren's optimism knew few bounds in this discussion, his assumption of sharply rising demand paralleled forecasts of BC's power scene conducted by major institutions, governments and private agencies in the 1950s.<sup>18</sup> One Department of Trade and Commerce study found that between 1945 and 1955, BC's actual increase in electrical energy consumption more than doubled from 3.4 billion KWH in 1945 to 8.2 a decade later. Most of this growth occurred in the 1950s: 3.5 billion KWH were added between 1950 and 1955 alone. Although part of a general North American expansion, BC's annual rate of growth for electrical consumption in the first half of the 1950s ran at 12%, or around four per cent greater than the national average. How demand would increase in the future was a complicated guessing game, conditioned by unknown sources of supply (and therefore possible production and transmission costs), and the various institutional, industrial and locational factors that segmented and conditioned BC's power markets. The Department of Trade and Commerce estimated the need for a maximum of 35.6 extra billion KWH by 1975; the Crippen Wright Engineering firm (on contract to the provincial government in cooperation with a number of federal departments) estimated a

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<sup>18</sup>I have depended on a synthetic treatment of these studies produced by federal civil servants in 1959; the report usefully summarizes the key estimates that I cite: BCARS, GR 1427, BC Water Rights Branch, Box 6, File 364, GR Knight and WRD Sewell, "Evaluation of Forecasts of Electric Power Requirements in British Columbia," Prepared for the Inter-Governmental Technical Committee on British Columbia Power Problems, April 1959.

maximum of 50.2 billion KWH for the same period.<sup>19</sup> Because industrial consumption accounted for over 70 per cent of BC's total consumption in these years, differing estimates of industrial growth could swing the maximum figures in a variety of directions.<sup>20</sup> One Department of Fisheries economist, noting the importance of industry and particularly mineral smelting for electrical demand forecasts, observed in 1957 that "we see the fish vs. power question as one of fish vs. large metallurgical or chemical plants rather than fish vs. residential or commercial power."<sup>21</sup> Yet, even if the actual figure of growth fell closer to the minimum estimates of these studies (in the range of 32 billion KWH), the growth of electrical consumption after the war gave credence to boosters like Warren. Different estimates suggested more than a tripling of electrical consumption by 1975. Where would the power come from?

The sense of inevitability surrounding a Fraser River development was also a function of decreasing alternatives. In the metropolitan regions of the province, the expansion programs of the late 1940s at Campbell River on Vancouver Island and at Bridge River on the mainland, used up the best available sites for development within affordable transmission. Although such sites, and others on southern Vancouver Island and near Vancouver could and would be expanded somewhat with generation upgrades, a new and large block of power appeared necessary by the mid-1950s both to the private BC Electric and the provincial power commission.<sup>22</sup> The lower mainland market in particular seemed on the verge of major electrical demand growth according to various

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<sup>19</sup>Department of Trade and Commerce, Electric Power Demand and Supply, British Columbia, 1929 to 1980 (Ottawa: April 1957); Crippen Wright Engineering Ltd., Electric Power Requirements in the Province of BC (Vancouver: April 1958).

<sup>20</sup>Crippen Wright, Electric Power Requirements, Section VII, p 3 "Industrial usage accounted for 77% of the total in 1955, and it is estimated to account for 71% of the total in 1975."

<sup>21</sup>NAC, RG 23, Vol 1230, File 726-11-13, IS MacArthur (Economic Intelligence Branch?) to Deputy Minister of Fisheries, December 12, 1956

<sup>22</sup>Premier Bennett was kept abreast of the BC Power Commission's fears of a supply shortfall: SFU Archives, WAC Bennett Papers, Box 8, File 4-6, TH Crosby, Chairman of the BCPC to Premier, January 12, 1956; "Notes on BC Power Commission on Vancouver Island for the Honourable Premier," May 16, 1956

estimates. Studies by BC Electric beginning in the early 1950s on the engineering and economic aspects of long-distance transmission led the company to believe that affordable power for the metropolitan regions of the province would have to be within a range of two to three hundred miles distance from Vancouver, based on past European and American experience, and an accounting of the construction costs. Power sites on the Columbia and Peace Rivers were, respectively, four and six hundred miles distance. A dam at Moran, however, would be in the range of 166 to 206 miles, depending on the transmission route.<sup>23</sup> "The Fraser," stated BC Electric Vice-President WC Mainwaring to shareholders in 1956, "is the natural next source of hydro for the Lower Mainland and Southern Vancouver Island."<sup>24</sup>

Warren's initial statement about the future of the Fraser River in 1952 resembled his wartime interventions in BC hydro debates: he wanted to spur public policy, raise the interest of private industry, but play no direct role. That changed in the mid-1950s. The professor turned promoter. Starting around 1955 Warren acted as one of the directors of the Moran Development Corporation. The Canadian directors included Russell Potter, an engineer and formerly executive assistant to the Fraser Basin Board, who had helped Warren with the technical detail of his first Moran paper, as well as Harry Swinton, a Vancouver lawyer. The financial backers were Americans, principally Hans Eggerts, formerly an executive with the Continental Can Corporation and Alfred Vang, whom journalist Ben Metcalfe describes as a "twentieth century alchemist": an inventor of dubious ideas, but spectacular promotions.<sup>25</sup> The corporation aimed to develop a dam at

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<sup>23</sup>JH Steede, "The Long Distance Transmission of Energy," *BC Professional Engineer* 3(5) (May 1953): 16-20. On the problems of long-distance transmission, see also: WM Walker, "The Cost of Electrical Energy Generation and Transmission," *BC Professional Engineer* 5(12) (December 1954): 20-24

<sup>24</sup>SFU Archives, WAC Bennett Papers, Box 8, File 3, "Address to Shareholders of British Columbia Power Corporation, Limited, March 29, 1956" ["Mainwaring, BCE" written at top]

<sup>25</sup>E Bennett Metcalfe, *A Man of Some Importance: The Life of Roderick Haig-Brown* (Seattle and Vancouver: James W Wood Publishers, 1985), p 197 Metcalfe provides a curious and interesting account of the Moran promotion based on a late-in-life interview with Alfred Vang. I have used this source sparingly because I think Vang's perspective must be judged to be a highly partial one.

the Moran site and produce multiple use developments along the lines that Warren had earlier outlined. Of all of the individuals involved, Warren took the greatest public role, speaking, it seemed, to any group that would listen and publishing numerous articles in the Engineering, Mining and Business press.<sup>26</sup>

Promotion, however, did not equal possession. While the provincial government granted the Moran Development Corporation rights to explore the site for drilling and engineering studies in 1955, no reservation was granted, as had been the earlier practice in the Alcan case. Within months, BC Electric, acting to displace its new competitors, also received provincial permission to examine the site, thus removing whatever priority the Moran interests had once hoped to gain.<sup>27</sup> The attempts to secure financial backing appeared equally illusory. In planning meetings with provincial civil servants, Warren and his Canadian colleagues gestured about forthcoming financial backing, if only some agreement could be resolved as to dam design and the fish-power problem.<sup>28</sup> The chief American backer, Hans Eggerts provided little help in this respect. He had recently been dismissed as an executive by the Continental Can Corporation for extravagant research expenditures, paid out to prove (unsuccessfully) the heterodox metallurgical ideas of

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<sup>26</sup>This is a sampling, rather than an exhaustive list: "The Power Potential of the Fraser River," BC Professional Engineer 3(4) (April 1952): 19-23; "Power, Population and Politics" BC Professional Engineer 3(10) (Oct 1952): 25-32 and another paper under same title BC Professional Engineer 3(11) (November 1952): 22-28; "Energy for Everyman" BC Professional Engineer Vol 4 (Nov 1953): 19-23; "Hydroelectric Potentialities of the Upper Fraser" Western Miner and Oil Review 29(3) (1956): 32-37; and reprinted in BC Professional Engineer 7(7) (July 1956): 16-24; "Background for Crises," Western Miner and Oil Review June-July issue, 1957; "Moran Dam Holds Key," Western Business and Industry Vol 32(8) (August 1958): 56-60; "Moran Dam," Northwest Digest 12(4) (July-August 1956): 9, 30-35; reprinted in Canadian Mining Journal 80(3) (March 1959): 63-68.

<sup>27</sup>BC Water Management Branch, Ministry of the Environment, Lands and Parks, Microfilms of the Department of Lands 'O' File correspondence, File 0188688, Roy Williston, Minister of Lands to Tom Ingledow, Vice President, BCE, July 16 1956 (copy); Williston to A Hans Swinton, Moran Development Corporation, July 25, 1956 (copy). BCE management, nevertheless, feared that priority might be granted to the upstart concern. In a 1955 letter to Premier Bennett, WC Mainwaring responded to what he believed was a radio announcement suggesting that permission to proceed had been granted; he hoped the site would be reserved for the needs of the lower mainland: SFU Archives, WAC Bennett Papers, Box 6, File 8, Mainwaring to Bennett, August 9, 1955

<sup>28</sup>BCARS, GR 1118, BC Marine Resources Branch, Box 3, File 1, "Notes on Meeting with Moran Power Development Ltd. held in the offices of the Chief Supervisor of Fisheries on May 24, 1956 at 11:00 am"

Alfred Vang.<sup>29</sup> These reputed "American financial backers" could provide only the status and mystery of outside capital, without any of the financial clout. The best that the Moran Development Corporation could have hoped for in 1955 was to be bought out by BC Electric, and this may well have been the intention. This, at any rate, would have suited Warren's purposes: Moran was the goal, the corporation a vehicle. If the three pillars needed to hold up the Moran plan were promotion, politics and finance, only the first appeared steady in 1955.

The promotion, nevertheless, continued. The Moran idea gathered a disparate collection of supporters and worried competitors in the mid-1950s.<sup>30</sup> In 1954, writers in both the Labour Progressive (Communist) party paper and the Vancouver Sun wrote approvingly of Warren's plans. Before the demise of the coalition government in 1952, Minister of Public Works, EH Carson committed himself to the project.<sup>31</sup> In 1954, Social Credit Minister of Lands and Forests Robert E Sommers, who would later fall into disgrace for taking bribes from forestry companies, made a speech extolling the idea of Fraser dams and looked to the region above Lytton for future development.<sup>32</sup> Not only BC Electric, but also the federal-provincial Fraser Basin Board rushed to catch up with the Moran Development Corporation, and pursued a series of feasibility studies.<sup>33</sup> The International Pacific Salmon Fisheries Commission focused on the consequences of the project and began to compile documents assessing impacts.<sup>34</sup> The Moran concept

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<sup>29</sup>Ibid.

<sup>30</sup>Including a substantial MA thesis, in part funded by the Corporation: Walter Hardwick, "The Effect of the Moran Dam on Agriculture within the Middle Fraser Region, British Columbia" (MA thesis, UBC, 1954)

<sup>31</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 5, File 5, Cariboo Observer June 7, 1951; Williams Lake Tribune, June 7, 1951

<sup>32</sup>BCER CF, Hal Griffin, "Harness the Fraser? A People's Government Would Do It" [nd. Pacific Tribune?] The article mentions Warren's plan; Alf Dewhurst, "Harness the Fraser," Pacific Tribune, June 4, 1954; "Damming the Fraser," Columbian, March 4, 1954; TA Myers, "Hydro Potential Hardly Touched," Victoria Colonist March 3, 1954. The last two articles mention Sommers' views.

<sup>33</sup>NAC, RG 89, Box 674, File 2516, "Preliminary Study of Moran Canyon Project on Fraser River," Prepared for Fraser River Board by Crippen Wright Engineering Ltd., Engineering Consultants, Vancouver, BC, April 1956

<sup>34</sup>International Pacific Salmon Fisheries Commission, Annual Report (1956), p 28

appeared in the press of BC's interior, where its merits relative to earlier dam proposals on the Quesnel were weighed, in metropolitan papers, where the trade-offs of power and fish commanded attention and even in the international press, where the New York Times announced the project to the world.<sup>35</sup> From its early beginnings at the Natural Resources Conference, the Moran idea had taken on promotional, if not material, form by the mid-1950s.

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If the Fraser figured in public discourse as the river of inevitable development, then the Columbia did so as the river of perpetual delay. Since the mid-1940s Canada and the US had cooperated through the International Joint Commission (IJC) in the investigation of storage possibilities in the upper Columbia basin. The river rose in BC's southeastern section before crossing the border and joining with the Snake and its other tributaries in its headlong drive through the Pacific Northwest to the sea. Coordinated development in Canada, it was believed, could increase power development downstream on the American portion of the river and produce flood control benefits. By 1954, however, disputes within the IJC over the appropriate means to compensate Canada for turning the upper basin into American storage ruled out a rapid development schedule. Outside the IJC, five different groups proposed upper basin projects--with no concern for basin-wide coordination-- and failed to receive the necessary bi-national support. It was in this atmosphere of stalled development and international complication that a new Columbia plan emerged.

What if the Columbia were diverted into the Fraser? asked General Andrew McNaughton in late 1954. Unlike Professor Warren, who was influential in BC's

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<sup>35</sup>BCARS, GR1378, Commercial Fisheries Branch, Box 5, File 5, editorial, Cariboo Observer, June 7, 1951; editorial, Williams Lake Tribune, May 31, 1951; editorial carried from Prince George Citizen in Cariboo Observer, June 14, 1951; BC Electric CF, "US Northwest to Gain from Projects to Develop British Columbia Water Power," New York Times, January 6, 1954

resource economy but held no discernible political power, General Andrew McNaughton approached promotion from a position of authority with important allies. The Chair of the Canadian Section of the IJC since 1950, McNaughton held influence through his office; his reputation earned in the war and as the head of the National Research Council in the 1930s gave him a national profile. In his annual reports to parliament, McNaughton cut such a distinguished profile that numerous commentators assumed that he not only represented, but also established Canadian policy on the Columbia, and the assumption held some truth.<sup>36</sup> Before the mid-1950s the federal government (to the province's annoyance) remained aloof from the Columbia negotiations, leaving McNaughton considerable room to make decisions. When in 1954, the BC government sought to press forward Columbia development with the Kaiser project, McNaughton's appeal to the federal government that the scheme contradicted the national interest held sway. On his advice, CD Howe pursued the cancellation action.<sup>37</sup> It was because of this elevated authority, well placed and politically connected, that McNaughton's proposal for the Columbia in 1954 did not face the immediate death of so many other post-war Columbia schemes. In lesser hands, with weaker political allies, it is difficult to imagine that a plan of such magnitude, indeed hubris, would have appeared so possible.

Whereas the pressure for development on the Fraser grew out of BC's soaring electrical demand and forecasts of continuing growth, on the Columbia, the pressure came ultimately from American interests. The IJC's investigations began in 1944 on the request of the US government with a view to future power needs and transnational coordination. After the flood of 1948 and the continued rise in power demand in the Pacific Northwest States after the war, the lure of the Columbia only increased in American eyes. While no Canadian developers proposed projects on the Canadian

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<sup>36</sup>On the importance of McNaughton's reputation to the conduct of his work, see: Swainson, Conflict over the Columbia, pp 50, 53-54, 64

<sup>37</sup>Swainson, Conflict over the Columbia, p 59

Columbia in the first decade of IJC studies, five American groups did.<sup>38</sup> There were, of course, considerable rewards to be reaped by Canada in a coordinated development program and this is what inspired the active involvement of the provincial government in Columbia negotiations after 1950 and its support of the Kaiser proposal in 1954. The provincial position, however, was premised on the understanding that Columbia development would only proceed with American investment and involvement.

General McNaughton's proposal envisioned an entirely different scenario. His idea was to keep Canadian water for Canadian power development and dispense with the complications of international coordination. In late 1954, he made his views known in confidence to a select group of politicians and power company executives. By capturing the upper Columbia at Mica Creek, he explained, storage could be created. Instead of releasing this water for downstream purposes, it could be diverted via pipeline through the Eagle Pass into Shuswap Lake and thence into the Thompson River, the Fraser's largest tributary. Skimming the Columbia's high flows during the spring, the diversion would place this excess into the Fraser during the low flow season, evening out the Fraser's fluctuations and making for a steady power stream. Low level dams on the Thompson and Fraser, perhaps ten in all, would catch this extra flow and provide BC with its future energy needs. Because the dams would be small in scale, below one hundred feet in height, McNaughton believed no damage would come to the salmon fishery. By a confluence of continental flows, the General argued, continentalism in water planning could be abandoned, and Canada's national ambitions realized.<sup>39</sup>

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<sup>38</sup>A Canadian project sponsored by Consolidated Mining Co. on the Pend Oreille River, however, did impact IJC discussions on the Columbia.

<sup>39</sup>SFU Archives, WAC Bennett Papers, Box 5, File 4, AGL McNaughton, Chairman, Canadian Section, IJC to the Secretary of the Treasury Board, November 2, 1954 (marked confidential) (copy). Although McNaughton's initial statement of the plan made no reference to it, he would later include a diversion from the Kootenay River into the Columbia as another aspect.



One of the General's key supporters in this revised plan for Columbia development was Jean Lesage, Minister of Northern Affairs and National Resources.<sup>40</sup> Before the plan became public, Lesage committed his department to fund surveys in the Columbia basin examining diversion points and other feasibility aspects in the amount of \$200,000. Although Lesage appeared to find the plan intriguing and promising, he no doubt understood the political pay-offs that would result even from the investigation of such a scenario. Throughout negotiations, Americans had sought to point out that Canada's alternatives to coordinated development appeared minimal and that American compensation payments to Canada should reflect this point. By proposing to divert the Columbia, Canada's argument for alternatives gained substance and so too its calls for compensation. The other attractive aspect of the diversion proposal from a federal perspective was that it offered British Columbians an impressive alternative to the provincially backed Kaiser project. Whereas the provincial plan would afford development rights to an American interest at a low cost, the McNaughton plan would keep Columbia power in Canada for British Columbia's purposes. At a time when the province was bemoaning the federal intervention into the Kaiser proposal-- Premier Bennett called it "a cheap political trick"-- the new plan could show that the federal government was concerned not with delaying development, as the province contended, but with making Columbia development as propitious as possible for the province and the nation.<sup>41</sup>

McNaughton linked his plan not only with federal interests, but also with the province's major utility, BC Electric. Whereas Harry Warren's Moran plan sought to compete with the established utilities, McNaughton sought to involve them. In November 1954, McNaughton met with Dal Grauer and Tom Ingledow, respectively the

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<sup>40</sup>Swainson, *Conflict over the Columbia*, p 61; "Fraser Harnessing for Hydro Probed," *Vancouver Sun*, December 20, 1954

<sup>41</sup>BCER CF, "Bennett Blasts Fisheries Minister," *Victoria Times*, November 24, 1954

President and Vice-President of BC Electric, and asked them to consider the diversion idea. At the time, BC Electric was busily trying to examine development prospects for power growth over the next two decades. Sites on the Fraser below Lytton were being considered, as well as an extension at the Bridge River facility and power-sharing agreements with rival utilities. The diversion concept, and its promise of major power potential, caught their immediate attention. Before the end of the meeting they had secured McNaughton's agreement to allow their company to carry out confidential survey work on contract and made it clear that they wished to cooperate with the General in pursuing the plan. The project, they explained, could deliver BC's metropolitan electrical needs both in the short and long term. The initial development at Mica Creek would be used to meet the current rise in demand over the next seven years. The Thompson-Fraser dams to follow would satisfy the company's need for the next two decades. The two-stage nature of the project also promised to allow additional time to solve the fish-power problem on the Fraser. The unstated benefit to be gained was that BC Electric would have, by virtue of its early involvement, a *de facto* privilege and priority over other power concerns.<sup>42</sup>

McNaughton's ambitions, nevertheless, ran headlong into provincial plans. The provincial government remained disappointed by the actions of McNaughton and the federal government in the Kaiser affair and saw the diversion as yet another form of federal interference. Instead of embracing McNaughton's option, even as a short term political maneuver to enhance Canada's bargaining position, the provincial government gave it a wide berth and cast aspersions to the press through the medium of anonymous

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<sup>42</sup>SFU Archives, WAC Bennett Papers, Box 5, File 4, "Memorandum Re Meeting with Representatives of British Columbia Electric Company" [November 1, 1954]; Dal Grauer spelled out the company's interest in a follow-up letter: NA, RG 23, Vol 1229, File 726-11-10[1], AE Grauer, President of BC Electric to McNaughton, December 19, 1954. Bennett, however, tried to make it clear to the BC Electric that they should make no assumptions about priority, as BC Electric Vice President, Tom Ingledow informed Jean Lesage: Box 9, File 4, Ingledow to Jean Lesage, June 5, 1956 (copy to Bennett)

leaks. The diversion was described as "impractical, unnecessary and too costly"; and "[c]ompletely fantastic, pure sheer nonsense."<sup>43</sup> These anonymous provincial critics pointed to the potential losses to the fishing industry and said that the move would only stall development. When Attorney General Robert Bonner testified before a House of Commons committee concerning the Kaiser project cancellation in 1954, he let it be known that the BC government held "only academic interest" in the diversion proposal.<sup>44</sup> Although, in an amusing reversal during the 1957 federal election, WAC Bennett would attack federal Liberal James Sinclair for diminishing Canada's bargaining position by criticizing the diversion plan, there was no mistaking the provincial opposition in late 1954.<sup>45</sup>

Another voice of opposition arose from within the federal government, upsetting the easy assumption of federal support and provincial opposition to McNaughton's plan. Despite its attractiveness to Canada's negotiating position and the promise it held for BC development, BC MP and federal minister of fisheries James Sinclair soon registered his department's unease at the proposal.<sup>46</sup> The International Pacific Salmon Fisheries Commission, who informed McNaughton confidentially of the enormous risks to the salmon fisheries, seconded him in these concerns.<sup>47</sup> Sinclair was in a difficult position publicly; he had been the BC Liberal to announce the federal opposition to the province's Kaiser proposal; now he would have to choose between supporting the federal solution to the Columbia problem and advocating the fisheries concerns in keeping with his ministerial obligations. Initially, he managed a delicate balance, supporting

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<sup>43</sup>BCER CF, "The Wasted Water," Victoria Times, December 23, 1954; "Ottawa Plan for Fraser River Power Derided by Provincial Authorities," Victoria Colonist, December 19, 1954

<sup>44</sup>Quoted in Swainson, Conflict over the Columbia, p 62

<sup>45</sup>Ibid, p 75

<sup>46</sup>Swainson, Conflict over the Columbia, p 68

<sup>47</sup>NA, RG 23, Box 1229, File 726-11-10, part 1, "Confidential Statement by the Chairman of the IPSFC, on Behalf of that Commission, to General AGL McNaughton, Chairman, Canadian Section, IJC, and to the Governments of Canada and the United States of America," June 3, 1955

investigations presumably to enhance Canada's negotiating hand, but establishing the potential losses to the fisheries through inter-departmental committees and prevailing upon fishing interests in BC to prepare for a political battle. It was a balance that could last only so long as the diversion remained a concept and not a pressing reality.

From an American perspective, the diversion proposal inserted an entirely different view of Columbia development than had existed previously and threatened a variety of national interests. If the diversions went ahead, not only would coordination vanish, and potential harm come to downstream projects, but America's fishing interests and involvement in Fraser River restoration would also be affected. Senator Richard Neuberger of Oregon State brought out these possibilities publicly in the US in 1955 after touring BC on a fact-finding mission on the request of Senator James E. Murray of Montana, the Chair of the US Senate's Interior and Insular Affairs Committee. Neuberger had long taken an interest in Columbia affairs; in his former career as a journalist he had penned some of the most enduring stories of the river, encapsulated in his book, Our Promised Land, a tract of New Deal dreams with the Columbia playing the role of regional savior.<sup>48</sup> He found the diversion plan disturbing and all too possible. "That this is not merely an empty gesture," he later informed members of the Senate Committee, "is verified by the fact that Gen. AGL McNaughton-- the illustrious soldier-general who is Chairman of the Canadian Section of the International Joint Commission-- thoroughly believes in the engineering feasibility of the diversions, and that the Canadian Parliament last year voted a very substantial appropriation to follow through on the engineering studies of the diversions and to try to establish their economic feasibility."<sup>49</sup> Further, unlike other American commentators who questioned the legal basis of diverting an

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<sup>48</sup>Richard L. Neuberger, Our Promised Land introduction by David L. Nicandri (Moscow, Idaho: University of Idaho Press, 1989 [1938])

<sup>49</sup>"Joint Hearings Before the Committee on Interior and Insular Affairs and a Special Subcommittee of the Committee on Foreign Relations United States Senate Eighty-Fourth Congress Second Session, March 22, 26, 28 and May 23, 1956" (Washington, DC: Government Printing Office, 1956), p4

international river, Neuberger argued that Canada was within its rights: the International Waterways Treaty of 1909, the legal basis of the IJC, set out the priority of the upstream nation in water development.<sup>50</sup> Unless the US could convince Canada of the benefits of coordination, and decided to compensate Canada appropriately, the future of the Pacific Northwest states would be hindered: "it means," Neuberger stressed, "the difference between economic progress or stagnation."<sup>51</sup> Interestingly, Neuberger laid most of the blame for this situation with the bargaining stance of the US negotiators within the IJC, particularly the American Section Chair, Leonard Jordan, formerly the Senator from Idaho. He accepted the Canadian claim for substantial compensation, on the other hand, as eminently reasonable. Neuberger's forthright explication of the issues raised the profile of the problem and inserted the strong regional concerns of the Pacific Northwest in the conduct of the US position within the IJC.<sup>52</sup> The diversion plan had at last brought the matter of downstream benefits before American legislators.

Harry Warren's Moran concept and General McNaughton's diversion scheme were two of the most prominent plans to dam the Fraser aired in the mid-1950s. But they were exemplars of a movement rather than its only driving forces. In these years, BC Electric investigated the Moran site, the Columbia diversion dams, and other sites on the Fraser's main stem. At Seton Creek, the company extended its earlier Bridge River project and dammed a pink salmon run in the process.<sup>53</sup> The BC Power Commission examined the possibility of damming Taseko and Chilko Lakes-- formerly the site of intense fisheries

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<sup>50</sup>Neuberger expressed his views on the legal question of diversion in a 1957 Harper's article reported in BC Electric CF, Vancouver Sun, "BC Neighbors alarmed in Border Power Fight," December 11, 1957. On the general legal discussion on diversion, see: Swainson, Conflict Over the Columbia, pp 65-67.

<sup>51</sup>Ibid, p6

<sup>52</sup>Swettenham, McNaughton, p 257 Swettenham claims that the reaction to Neuberger's claims in the US Senate was "near panic." This strikes me as a clear over-statement, given the record of the hearings: and Swettenham provides no other evidence to support his claim.

<sup>53</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 45,File 45-11, CH Clay, "The Seton Creek Project"

opposition during the Alcan surveys-- and applied for water rights at the location.<sup>54</sup> As discussions on the Columbia stalled, the BCPC also investigated the Clearwater River, a Thompson tributary.<sup>55</sup> Throughout the upper basin, the Fraser Basin Board conducted studies for multiple purpose dams to stem future flood threats and generate power. The river, in short, was under active scrutiny by engineers and power concerns, and the oft-stated warning or threat that the river would soon be dammed appeared undeniable. What remained for British Columbians to determine was the shape and scope of such development. Would there be fish or power? Could there be both?

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The fish vs. power debate of the 1950s proved to be an expansive discussion. The narrow problem of articulating conflicting resource interests in particular instances turned into a debate over the future of society and its relations with nature. It invited British Columbians to consider the merits of development and growth, as well as their costs; to determine how favouring fish or dams would shape BC as a region both internally and in relation to external influences; and to ask whether alternatives existed-- coordinated development, alternative energy sources, scientific panaceas. British Columbians shared with Harry Warren the belief that damming the Fraser would forever transform the river and themselves. In academic conferences, the legislature, in kitchens, high school debates and letters to the editor, British Columbians anxiously considered this transformation. And in seeking to imagine and shape the future, they revealed much about their present condition and predicament.

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<sup>54</sup>NA RG 23, Box 842, File 719-9-92[1], AW Lash, Consulting Engineer, BC Power Commission to AJ Whitmore, October 23, 1956; Loyd Royal, IPSFC to Whitmore, January 11, 1957; JM Buchanan, Chairman, Fisheries Association of BC to Whitmore, February 1, 1957; "Notes on Meeting with BC Power Commission to the Fisheries Problems Associated with the Chilko-Taseko Project," March 4, 1957. IPSFC, Annual Report (1956); Williston and Keller, Forests, Power and Policy, p 181

<sup>55</sup>Wedley, "The Wenner-Gren..." p 526; Vancouver Sun, February 4, 1957

Although the fish vs. power debate involved more than industrial interests, it was also the case that these interests dominated debate. On the fisheries side, the Fisheries Association of BC and the United Fisherman and Allied Workers Union (UFAWU) played the most prominent roles, while politicians and officials attached to the federal Department of Fisheries and the International Pacific Salmon Commission worked to organize the industry and combat indiscriminate water development policies within government. Together these groups and others formed a 'fisheries protection and development committee' in 1956 under the auspices of the Department of Fisheries to coordinate their actions.<sup>56</sup> This committee provided a forum for the dissemination of information and the coordination of political tactics between different groups from the Native Brotherhood to the UFAWU, to the IPSFC and sports fishers.

The power side of the debate, on the other hand, was less well organized, in part because its various elements were competitive with one another. Corporations weighed heavily in the discussions: BC Electric, the BC Power Commission and the Moran Development Corporation made parallel, but distinct interventions. At the government level, the federal Department of Northern Affairs and national resources, the International Joint Commission and the provincial Ministry of Lands and Forests generally favoured power positions, but played no role like the Department of Fisheries to organize a power bloc. The only coordinated lobby group to appear on the power side was the Fraser River Multiple Use Committee, started in Vancouver in 1958 to consider the many different demands on the Fraser and foster cooperation. However, it was closely associated with the Moran proposal and this limited its appeal. The only group that could be said to bridge the divide between fish and power interests--and then only barely-- was the Fraser

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<sup>56</sup>This group changed its name over time to the Fisheries Development Council. The origins of the group are described in the preface to "Summaries of Research on the Fish-Power Problem and Related Work by Fisheries Agencies in British Columbia" (Vancouver: Department of Fisheries, Revised December 1961)" contained BCARS, GR 442, BC Energy Board, Box 52.

Basin Board; it contained both water development and fisheries representation in planning flood control measures.

Despite the influence of the fish and power groups on the broader discussion, it is important to recognize the extent to which the fish vs. power issue transcended traditional party lines, and fractured political interests. The neat division apparent in the title of the debate, and seized upon by participants and the media alike, masked a range of possible positions on these issues and much public confusion about the choices. One newspaper reporter observed in 1957, using an extended boxing metaphor, that the fish vs. power fight was "the strangest industrial dispute in BC history"; it was so unpredictable in its twists and turns and involved so many unexpected entrants, that a program would be necessary to follow the confrontation.<sup>57</sup> At the federal and provincial levels no governing parties could demonstrate caucus consensus on the issue; nor could parties in opposition. Federally, the Department of Northern Affairs and National Resources funded surveys for Fraser dams, while the Minister of Fisheries organized the fishing industry to protest them. Provincially, prominent cabinet ministers, such as Minister of Lands and Forests Ray Williston intimated support for Fraser dams, while the Premier studiously avoided making strong commitments.<sup>58</sup> All parties, one journalist argued, "[are] split on power for the Fraser."<sup>59</sup> This level of political confusion only stoked the fires of possibility in the broader discussion: nothing was decided, the political discussion was unresolved, and the problems forcing discussion forward-- looming power demand, and Columbia River negotiations-- only heightened the tension.

Power promoters promised many things of Fraser River dams, but perhaps the most intangible reward offered, and also the most often cited, was 'progress'. Since the

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<sup>57</sup>BC Electric CF, "First Round Over in Power Dispute," Vancouver Sun May 28, 1957

<sup>58</sup>BC Electric CF, "Fraser Dams Being Studied," Vancouver Sun, February 26, 1958; "Dams and Fish May Mix," Victoria Colonist November 9, 1958; "Fraser Dams a Must," Chilliwack Progress June 16, 1961

<sup>59</sup>BC Electric CF, "Parties Split on Power for the Fraser," Province, December 18, 1957



earliest days of spectacular lighting in the late nineteenth century, electricity evoked a futuristic language of new beginnings in North America. "In the 1930s," American historian David Nye writes, "electricity was still a new technology that suggested radical change. Most could still recall the pre-electric world, and advertising abetted historical memory with images suggesting how the electric present differed from the past, and which predicted even greater, immanent transformations."<sup>60</sup> British Columbia in 1950 held to the idea of electricity's newness and promise. After the brown-outs and electrical restrictions of the war years, the creation of the BC power commission and the start of BC Electric's expansion projects in the late 1940s, British Columbians waited expectantly for progress to arrive. Newspapers greeted hydro development as a "source of progress," "of future strength," a "step forward," the unlocker of "future's door," the "modern means to industrialization," "and a modern and efficient prime mover."<sup>61</sup> In 1954, the Province imagined a future made possible by the Columbia-Fraser diversion, in which a doubling of "the industry and population of BC" would occur "in 15 to 20 years." "It would fulfill the dream of a new industrial empire in this province."<sup>62</sup> Not coincidentally, the BC Power Commission's advertising slogan was 'power means progress'.

The ubiquitous association of these two words was also conditioned by the particular contexts of time and place. The assertion of power as progress in BC of the 1950s contained a sometimes explicit, often times implicit pairing: fish, the obstruction to power, represented the past, stagnation. In 1957, for example, Diana Davidson, a North Vancouver high school student, wrote to the editor of the Province, instructing her fellow

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<sup>60</sup>David E. Nye, Electrifying America: Social Meanings of a New Technology, 1880-1940 (Cambridge: MIT Press, 1990), pp 339-340; see also, HV Nelles, The Politics of Development: Forests, Mines and Hydro-Electricity in Ontario, 1849-1941 (Toronto: Macmillan of Canada, 1974), chapter 6.

<sup>61</sup>BC Electric CF, "Whatashan: Source of Progress, Prosperity," Vernon News, June 28, 1951; "Rural Electrification Takes a Step Forward," Province, Jun 28, 1951; "Great Day Dawning," Kamloops Sentinel, January 17, 1949; "Electricity is 'Open Sesame' to Okanagan Valley Growth," Vancouver Sun, March 28, 1950; "Interlocking Pattern of Power Transforms Island's Economy," Victoria Colonist, October 26, 1949

<sup>62</sup>BC Electric CF, "Power for an Empire or for Peanuts?" Province, December 30, 1954

citizens to "See that you know the facts of the Fraser River power issue and then support power and progress." This confident advice sprung from Davidson's recent triumph over her suburban West Vancouver rivals in a "Fish vs. Power" debate sponsored by the federal Minister of Fisheries and local MP, James Sinclair. In her advocacy of the power position, Davidson drew an implicit comparison between power as progress and fish as past.<sup>63</sup> This meaning was drawn more explicitly in Premier Johnson's 1950 statement that British Columbians must choose between power development and "remaining as they are protecting the fisheries."<sup>64</sup> The pairing also opened a rhetorical space for critics of dam development to be represented as opponents of progress. "There is a growing suspicion," wrote the editor of the Cariboo Observer "that hydro is just plain unpopular with certain interests that are willing to stand in the way of progress."<sup>65</sup> To believers in the inevitability of power and progress, this opposition, of course, stood against the unstoppable. "Irresistible forces of unfolding history," said General Victor Odium, a veteran and former Canadian diplomat, to the Industrial Development Commission in 1954, "will sweep us on anyway to a key position in the great Pacific civilization of the future." A key force, he said, would be the Fraser: "probably the greatest single potential power producer on the continent."<sup>66</sup> Thus the statement of power as progress contained a barbed edge: its optimism discounted the fisheries claim for legitimacy.

While fish could be dismissed as 'past', however, they could also be celebrated as an enduring connection with tradition, heritage and nature. By the 1950s, salmon had become an evocative symbol of regional identity. BC's most famous author in this period, Roderick Haig-Brown, had made a career out of writing about the pleasures of

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<sup>63</sup>BC Electric CF, letter to editor by Diana Davidson, Province, May 23, 1957

<sup>64</sup>BC Electric CF, "Fisheries or Power?" News Herald May 19, 1950

<sup>65</sup>BC Electric CF, "Hydro Seems Unpopular," Cariboo Observer, nd

<sup>66</sup>BC Electric CF, "BC Too Timid to Pursue Destiny," Province, February 19, 1954

fishing and the life histories of different fish for a leisured middle class readership.<sup>67</sup> In The Fraser, journalist Bruce Hutchison entitled his chapter on the fisheries, 'the first inhabitants.' Rhetorically eliding a native claim to this status, Hutchison constructed salmon as subjects of history, 'our' connection to an organic, primordial BC past.<sup>68</sup> In his criticisms of indiscriminate power development in the late 1940s and 1950s, IPSFC chairman Tom Reid railed against the "steal[ing] of our heritage" on the Fraser River.<sup>69</sup> At the end of the decade, during the 1958 BC centenary celebrations, the provincial fishing industry collaborated to produce 'Salute to the Sockeye' festivals, events that attempted to remind British Columbians of the historic qualities of the fisheries and the importance of salmon in the past and the present.<sup>70</sup> Much of this propagandistic effort played on an anthropomorphized representational strategy. A pamphlet produced by the UFAWU in the mid-1950s, for example, invited British Columbians to protect salmon as the victims of progress: a cartoon fish on the pamphlet's cover nervously eyed a dam in its path as it sprang from the river, crying "Well I'll be dammed!" The image was meant to amuse but also encouraged readers to sympathize with the salmon's anxiety.<sup>71</sup> In an amusing send-up of the fish vs. power debate in 1958, one ironic Vancouver Sun reader penned a short letter, signed "Samuel Sockeye" that assumed the voice of an individual sockeye, speaking on the power issue for "all finny denizens of the Fraser."<sup>72</sup> Imagining the private lives of salmon provoked laughter, but it also signaled the extent to which

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<sup>67</sup>Arn Keeling and Robert McDonald, "'The Profligate Province': Roderick Haig-Brown and the Modernizing of British Columbia," Paper presented to the BC Studies Conference, Simon Fraser University, 13 November, 1999; and Metcalfe, A Man of Some Importance

<sup>68</sup>Bruce Hutchison, The Fraser (Toronto: Clarke, Irwin & Co., 1950), chapter 19

<sup>69</sup>NA, RG 23, Vol 1570, File 784-3-3, part 3, Minutes of a Meeting of the IPSFC held at Vancouver, BC, December 8 and 9, 1955

<sup>70</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 23, File 23-8, Minutes of Fisheries Protection and Development Committee, April 7, 1958; Annual Report, 1957

<sup>71</sup>UBC Special Collections and Archives, United Fisherman and Allied Worker's Union Papers, Box 137, File 137-2, Pamphlet, "Well I'll Be Dammed: A Fish Story," nd

<sup>72</sup>BC Electric CF, "From a Fish," Province, January 28, 1958

British Columbians represented salmon as subjects worthy of sympathetic moral imagination.

The value of salmon was pressed further by asserting the materiality of fish as food against the ethereal promise of electricity as progress. In a speech to the BC Natural Resources conference in 1951, AH Sager of the BC Fisheries Association stressed the renewable quality of salmon: "The fishing industry was the first industry, it was the means of livelihood for the Indians long before the white people came. It fed the people of Galilee. I think it probably fed the cavemen. And I believe... that the fisheries of our coast will be feeding British Columbians and Canadians 100, 200, 300 years from now, when, perhaps, hydro-electric installations have become obsolete."<sup>73</sup> For a society that held unpleasant memories of the depression and the sacrifices of the war years, this statement of salmon's value as food had important meaning. Numerous letters to the editor in the 1950s stated that it would be wrong to destroy food in a world filled with want; the Victoria Times called the destruction of salmon as food a "moral crime."<sup>74</sup> Fisheries supporters sought to harness this attitude with the slogan, "You can't eat a kilowatt." Employed in propaganda literature by the UFAWU and by the federal minister James Sinclair, the phrase underlined Sager's point that an electrified future would never provide food.<sup>75</sup> As to the future, the importance of salmon as food would only increase. Facing the challenges of the cold war, the Columbian imagined the prospect of nuclear annihilation in 1954. "In such a disaster, stricken peoples cannot get food from broken machinery. Land yields food, but it has to be tilled. Fisheries may save countless lives."<sup>76</sup> In order to counter such connections, power promoters felt forced to explain how electricity would create more to consume, not less. Harry Warren declared in 1960

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<sup>73</sup>"Forum: Fish and Power," Transactions of the Fourth British Columbia Natural Resources Conference (February 22, 23, 1951, Victoria), p111

<sup>74</sup>BC Electric CF, "Both Fish and Power," Victoria Times, December 17, 1957

<sup>75</sup>BC Electric CF, "Silly Slogan Imperil Salmon," Vancouver Sun, September 12, 1958

<sup>76</sup>BC Electric CF, "Damming the Fraser," Columbian, March 4, 1954

that for every pound of salmon lost to dams, there would be two pounds of beef created.<sup>77</sup> In a televised appearance in 1959, Gordon Shrum, a UBC physicist and recently appointed head of the BC Energy Board dismissed "salmon romanticism" and drew an analogy between the clearing of bison on the plains to make way for wheat and the removal of salmon on the Fraser to allow for power development.<sup>78</sup> The best that power promoters could say in response to the kilowatt slogan was, "You can't burn a fish."

Beyond celebrating salmon 'heritage' and the moral significance of salmon as food, fisheries defenders sought to portray the industry as restored, future-oriented and growing. Thus Loyd Royal, the director of scientific investigations for the IPSFC, stated to the BC Natural Resources Conference in 1954:

The 1953 run was the largest cycle run since 1912 and the catch in 1951 was the greatest in the cycle year since 1903. The value of the catch of the last three years exceeded that of the preceding three year cycles by almost \$18,000,000. This is a considerable sum but it is only a start toward the foreseeable goal of re-establishing the original economy of the Fraser River sockeye fishery. The once great Quesnel run is firmly re-establishing itself. The Stuart system of the far north produced over 2,500,000 sockeye in 1953 yet the total escapement in 1941, only three cycles previous, was less than 12,000 fish. The rebirth of the Fraser sockeye in dollars and sense has truly commenced.<sup>79</sup>

This rebirth, fisheries scientists and officials assumed, would continue. "If currently known methods of conservation were fully applied," a provincial report stated in 1955, "the total catch of salmon could probably be doubled."<sup>80</sup> The actual experience did not bear out these predictions, but throughout the late 1950s, salmon numbers continued to climb. Dianne Walsh reported in the Columbian that five hundred times the numbers of fish as the same cycle twenty years ago would return to the Fraser in 1961. "Fish," the headline claimed, are "proving their own case in [the] Fraser River power fight."<sup>81</sup> The

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<sup>77</sup>BC Electric CF, "Fraser Dam Held Gain Despite Fish," Vancouver Sun, February 24, 1960

<sup>78</sup>BC Electric CF, "Of Buffalo and Fish," Vancouver Sun, November 6, 1959

<sup>79</sup>Loyd A Royal, "The Rebirth of the Fraser Sockeye in Dollars and Sense," Transactions of the Seventh British Columbia Natural Resources Conference February 14, 25,26, 1954 (Victoria, 1954)

<sup>80</sup>BCARS, GR 1378, BC Commercial Fisheries Branch, Box 8, File 4, "Preliminary Report on the Fishing Industry of British Columbia (Gordon Commission Study), 1955"

<sup>81</sup>BC Electric CF, "Fish Proving Their Own Case in Fraser River Power Fight," Columbian, July 27, 1961

growth prospects for the fisheries, argued one fisherman in 1958, should make British Columbians reconsider the relative economic values of fish and power.<sup>82</sup>

If a reassessment of relative values was in order, then fisheries supporters also wondered at the appropriateness of labeling power as progress in view of new technological advances. Was there a need to move quickly in dam development, they asked, when nuclear energy might soon be available? One letter to the Vancouver Sun looked to the future in 1958 and judged that "hydro power begins to look mighty old-fashioned." "Or is there a move on foot," continued the nom-de-plume, 'puzzled,' "merely to protect big financial investments already made?" In an inversion of the current rhetoric, the writer concluded that water development "could hold back Canadian progress."<sup>83</sup> One UFAWU local accused General McNaughton of "talking horse and buggy policy in an age of Sputniks."<sup>84</sup> Other prominent fisheries advocates such as Roderick Haig-Brown and James Sinclair similarly looked to atomic energy for a future solution.<sup>85</sup> After Dal Grauer, President of BC Electric gave a speech in 1958 that suggested the revolutionary consequences of energy development in the coming century, John L Pitman of Coquitlam commented wryly that "We could raise our standard of living so high that we wouldn't have a piece of BC left-- it would be sold down the river."<sup>86</sup> Power promoters insisted, in response to such criticism, that water development would create industry and thus the need for future nuclear power development. With or without atomic energy, argued Charles Nash, President of the BC Power Commission, sooner or later all of BC's streams would be needed.<sup>87</sup> Harry Warren claimed to the

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<sup>82</sup>BC Electric CF, "Fish vs. Power," Province, January 21, 1958

<sup>83</sup>BC Electric CF, letter to editor, signed 'puzzled', Vancouver Sun, December 8, 1958

<sup>84</sup>NA, RG 23, Box 1225, File 726-11-5, part 13, Harold Wilcox, Secretary of the New Westminster Local of the UFAWU to Angus MacLean, Minister of Fisheries, December 27, 1957

<sup>85</sup>BC Electric CF, "Fisherman Urged to Oppose Dams," Vancouver Sun, March 28, 1957; "A-Power to End Fish-Power Feud Sinclair Predicts," Victoria Times, February 20, 1957

<sup>86</sup>BC Electric CF, John L. Pitman to editor, Vancouver Sun March 6, 1958

<sup>87</sup>BC Electric CF, "River Guards Imperil Salmon," Vancouver Sun, February 25, 1958

Vancouver Board of Trade in 1957 that because of the delay in starting the Moran project, six European states and NATO had canceled plans to establish a plant in the province manufacturing U-235, a uranium by-product.<sup>88</sup> Both sides in the debate claimed to embrace the atomic energy future, but disagreed over whether it would provide deliverance from the bonds of hydro or merely industrialize the province that much more.

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Any discussion of BC's future, and especially one that put it in such stark and divided light as did the fish vs. power debate, raised questions of self-definition, identity and British Columbians' many experiences of regionalism. Because so many of the proposed power projects of the 1950s promised to develop the interior and spread industry throughout the province, numerous small town politicians, editors and boosters seized on power's opportunity and identified a regional interest with dam development. From this perspective, the opposition of fisheries interests to interior projects on the basis of protecting spawning ground habitat appeared to be just one more form of metropolitan dominance meted out to an under-appreciated and striving hinterland. When fishing interests took a prominent role in discrediting the Quesnel River dam in the late 1940s and early 1950s, for example, interior newspaper editors were quick to identify how these actions benefited 'the coast' against 'the interior.'<sup>89</sup> In other words, the fish vs. power debate had a clear regional delineation from an interior vantage point. Saul Rosenberg, representing the Salmon Cannerymen's Operating Committee responded by pointing out that the fishing industry not only benefited 'the coast' but also contributed through taxes to the entire province. He sent his views to local newspapers in Prince George, Williams Lake,

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<sup>88</sup>BC Electric CF, "Moran Dam Delay Loses Atom Plant," News Herald, January 29, 1957

<sup>89</sup>Editorials, Cariboo Observer, January 25, 1951, February 1, 1951, February 15, 1951, March 1, 1951; BCARS, GR 1378, BC Commercial Fisheries Branch, Box 5, File 5, "Still a Good Case for Hydro," Cariboo Observer, April 6, 1951

Quesnel and Vanderhoof.<sup>90</sup> In a private response, WL Griffith, editor of the Cariboo Observer explained that as a former resident of 'the coast', he understood the importance of the fishery. "However," he continued, "the central interior of this province is a treasure trove that is far beyond the conception of most people residing in BC. It needs, essentially, power to bring it to full production."<sup>91</sup> Implicit in this comment, and in the episode, was the frustration of interior boosters with the slow pace of extending the electrical benefits of the provincial power commission. Against the promise of the late 1940s when interior boosters and provincial politicians extolled the possibilities of spreading industry and integrating the hinterland, the present paled. "Swivel-chair tacticians in Victoria," complained a Kamloops Sentinel editorial in 1953, are more concerned with financing than "imperative needs." "Indecision, however, is a poor start for any venture. The plans are there. Let the commission proceed. Now."<sup>92</sup> 'The coast'-- some amalgam of fishing interests, the government and metropolitan power-- acted as the arbitrary and ill-informed force blocking interior aspirations. The Social Credit government, itself heavily weighted towards the interior in terms of support and policy goals, sought to break these divisions between southwestern BC and the rest of the province in the 1950s. In its first six years, for example, Bennett's government spent more on road building in BC than all previous twentieth century administrations combined.<sup>93</sup> Throughout the fish vs. power discussion, the anticipation and ambition of interior elites in pressing for development added the aspect of internal regionalism to discussion.

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<sup>90</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 45, File 11, SM Rosenberg, Chairman of the Salmon Cannery's Operating Committee to editor of Cariboo Observer, February 20, 1951 (copy)

<sup>91</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 45, File 11, WL Griffith, editor of Cariboo Observer to RE Walker, Salmon Cannery's Operating Committee, April 3, 1950

<sup>92</sup>BC Electric CF, "The Glory of Power," Kamloops Sentinel, July 10, 1953

<sup>93</sup>Mitchell, WAC Bennett, p 260; Martin Robin, Pillars of Profit, p 192



Of course, the emphasis could be reversed. In his 1957 portrait, Canada: Tomorrow's Giant, Bruce Hutchison described an encounter with an old-timer on the highway's edge above Moran. After explaining that the site would be dammed, the old timer "snorted": "What fer? Why for Vancouver of course. They're a-gonna drowned half Cariboo to make elec-tricity fer Vancouver, and Vancouver's no good to nobody. Let 'em drowned Vancouver and let us be."<sup>94</sup> Hutchison's highly stylized reportage represented old man interior as a critic of development for substantially the same reasons as interior boosters decried fisheries interference and the influence of the coast. Hutchison's own bias, portraying the interior as opposed to development through this form of anecdotal caricature, suggests the conditioning effect of his own metropolitan perspective.

The politics of water development played on established regional definitions within BC, but also helped to reinforce notions of BC's separateness from without. British Columbians compared their planned advances in dam development or fisheries conservation to outside rivals: Canada's industrialized East and the US Pacific Northwest. When McNaughton's diversion plan gained public attention in late 1954, for example, it was routinely linked in public discussion to the St Lawrence Seaway: as if it were western Canada's reply to eastern development. There was both rivalry and resentment implicit in the comparison. Resentment, in part, because the view was widely held that 'eastern' interests had delayed or denied western development during the war, as in the case of BC Electric's failed expansion bids at Bridge River. Such views grew out of a broader tradition of western regionalism that posited a pernicious power imbalance based on Central Canada's financial dominance and influence in federal affairs, but also gained specific expression in BC political culture of the 1950s. Interestingly, BC's bid to develop the upper Columbia in cooperation with the American Kaiser Corporation gained wide scorn from the provincial press, while the federal initiative embodied in

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<sup>94</sup>Bruce Hutchison, Canada: Tomorrow's Giant (Toronto: Longmans, Green & Co., 1957), p 295

McNaughton's diversion proposal received praise.<sup>95</sup> The perceived contrast between the two choices was well summed up in a questioning Province editorial headline in 1954, "Power for an Empire, or for peanuts?"<sup>96</sup> Regional interest thus could adhere to plans proposed from elsewhere so long as they spoke to the perceived interests of British Columbians.

Of course, the praise for McNaughton's plan was also linked to another aspect of BC's identity: its distinction from the US Pacific Northwest. The defensive nationalist overtones of the Columbia Treaty negotiations muddy to some extent the active desire of British Columbians to emulate and best their southern neighbours. Harry Warren's statement of the promise of Moran in 1951, for example, explained its potential vastness through continual comparison with American projects: Moran would develop as much capacity as a quarter of all US projects built between 1930 to 1950; the reservoir lake would be longer than Mead Lake behind Hoover dam; Moran would have possibly three times the storage of Grand Coulee dam; its height would almost equal that of Hoover dam.<sup>97</sup> Warren's claims of BC's coming rise contrasted the poor comparisons of the past. From the early 1930s when the Columbia River dams gained continental attention, individuals and promoters repeatedly compared BC's lack of development with the gains of the Pacific Northwest states, despite a parallel or even superior provincial resource endowment. British Columbians, the claims went, paid more for electricity than

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<sup>95</sup>Swainson discusses the press reception of the Kaiser project in Conflict over the Columbia, p 59. The following is a sampling of the vast outpouring on these issues: BC Electric CF, "US Interests Would Finance Mica Dam," Cranbrook Courier, September 30, 1954; "The Penalty of Mistakes on the Columbia," Province, September 24, 1954; "Canada Plans Her Own Columbia Hydro Empire," Vancouver Sun, January 30, 1954; "Hydro Men Propose Great River Merger," Vancouver Sun, December 31, 1954; "Columbia Diversion May Provide New Irrigation," Vernon News, December 30, 1954; "Columbia Power Development Still Big News," Revelstoke Review, December 30, 1954; "Ottawa Power Control?" Columbian, December 29, 1954; "Columbia Power Plan Staggering in Scope," Province, December 29, 1954; "The Wasted Water," Victoria Times, December 23, 1954; "Ottawa Moves to Block BC-Kaiser Power Deal," Province, December 22, 1954; "Keeping Our Power at Home," Vancouver Sun, December 31, 1954

<sup>96</sup>BC Electric CF, "Power for an Empire or for Peanuts?" Province, December 30, 1954

<sup>97</sup>Warren, "National and International..." p 258

Americans but used less of it, commanded fewer dams and had, as a result, less industry. The spirited defense of Canadian and BC interests contained within McNaughton's diversion plan, however, appeared to provide an opportunity to wrench BC from a position of inferiority and provide a sense of control over American development as never before. When in the late 1950s Columbia negotiations continued to drag, newspapers reveled in the fact that "we can still divert" and that BC "holds the high cards."<sup>98</sup> "The US state department experts," the Vancouver Sun reported in 1957, "view this threat with great trepidation."<sup>99</sup> The power of the diversion idea as a combination of national and regional self-assertion gained meaning through the ability to deny the US its wants.

When questions turned to the fate of fish under water development, the counter-point of the US experience also suggested itself. As DA McGregor wrote in the Province in 1953 concerning the fish vs. power problem, "The shadow of the Columbia's unhappy fate hangs over the Fraser and adds to the gravity of the Fraser problem."<sup>100</sup> This fact provided cause for self-congratulation at Canadian foresight and raised the question of American indebtedness to Fraser fisheries preservation. A Province editorial in 1958 drew a parallel between the Columbia controversy over downstream benefits: "To obtain power the Americans have ruined their Columbia salmon fisheries. To save salmon we have so far resisted power dams on the Fraser. Perhaps we should begin to ask for upstream salmon benefits on the Fraser as a bargaining point for a greater share of downstream benefits on the Columbia."<sup>101</sup> Dam supporters, on the other hand, saw the preservation of Fraser fisheries and the international division of the resource as a scandalous resource give-away to the Americans. William Ryan, writing in 1959,

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<sup>98</sup>BC Electric CF, "Who is Stalling Downstream Benefits?" Province, March 12, 1958; "Sharing Columbia Hydro," Columbian, April 28, 1958

<sup>99</sup>BC Electric CF, "Big Stick Hidden at Columbia Dam Talks," Vancouver Sun, May 21, 1957

<sup>100</sup>BC Electric CF, "Fraser and Columbia Power Versus Fish," Province, December 11, 1953

<sup>101</sup>BC Electric CF, "Upstream, Downstream Benefits," Province, May 20, 1958

suggested a cause-effect relationship in the building of the Columbia dams and the negotiation the Pacific Salmon Convention: the first had led to the second.<sup>102</sup> In a 1957 letter to the editor, John Green of Aggasiz asserted that "[W]e are keeping ourselves poor to raise salmon for power rich Pacific Northwest states."<sup>103</sup> General McNaughton in confidential documents explaining the diversion plan in 1954 expressed a similar frustration at the power of the US in Fraser fisheries matters: "[V]ery unfortunately, the United States has been permitted to spend money on the remedial measures for the Fraser River slide and the like and we face claims that a servitude has become established."<sup>104</sup> The Columbia fisheries could thus play the role of the cautionary tale and evoke a sense of injustice at the supposed US control of Canadian resources. If regionalism suggested internal coherence against outside forces, it also produced division. Although regionalism accented the fish-power debate in sometimes surprising ways, it could not overcome this resource conflict, or convince British Columbians that all citizens shared a single interest in either fish or power. Power, the emblem of progress and salmon, the symbol of regional heritage, remained suspended in tension.

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The search for solutions to the fish-power problem led to a period of creative problem solving in which both sides of this debate attempted to address the interests of the other. Fisheries supporters sought to promote alternative sites for development on non-salmon-bearing streams. Fisheries scientists studied the passage of fish over high dams and developed fishways to pass low dams. Power promoters looked to the prospects of transferring salmon runs to new areas, to artificial propagation and fish farming. BC

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<sup>102</sup>BC Electric CF, William E. Ryan, "Our Neighbours Always Drive a Hard Bargain," Province, March 14, 1959

<sup>103</sup>BC Electric CF, John Green, "Develop Power Before It's Lost to Fraser Valley," Province, December 21, 1957

<sup>104</sup>SFU Archives, WAC Bennett Papers, Box 5, File 4, AGL McNaughton, Chairman, Canadian Section, IJC to Secretary of Treasury Board, November 2, 1954 (copy)

Electric funded research on the fish-power problem and examined thermal energy as an alternative to water development in the short term. The Fraser Basin Board integrated different approaches to river management and sought to create a multiple use plan for Fraser development. All of these solutions seemed to speak to the oft-stated goal of working "in coordination and not in conflict."<sup>105</sup> Yet, to a considerable extent, proffered solutions did not escape the goals of their makers to grant priority to one resource over the other. The bearers of solutions more frequently sought to position themselves politically than to compromise. This was as true of the scientific studies of fish-power problems (to be considered in the next chapter) as of the locational and institutional solutions offered by either side.

Despite Charles Nash's claim that one day all of BC's rivers would be needed for development, fisheries supporters placed emphasis in searching out and promoting alternatives to the Fraser in the interior and north. They believed that if power development occurred elsewhere, the Fraser would be protected. This strategy was first deployed, with modest success, in the Alcan and Quesnel River disputes of the late 1940s. In the 1950s, the IPSFC began a special research program to survey BC waterpowers on non-salmon bearing streams in order to be able to offer alternatives to Fraser sites when needed.<sup>106</sup> More centrally, the organized sections of the fishing industry began to lobby in favour of a Columbia development program in order to create the political and economic conditions thought necessary to defend the Fraser. At meetings of the fisheries protection committee in 1958, representatives of different fisheries groups and agencies reflected on the best solution to the Columbia conflict from the perspective of fisheries conservation. The mutual conclusion was to see the McNaughton plan by-passed in favour of a cooperative development with the US in

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<sup>105</sup>BC Electric CF, "In Co-ordination, Not in Conflict," Province, May 7, 1948

<sup>106</sup>NA (Pacific Region), RG 23, Vol 2301, Folder 2, Proceedings of IPSFC meeting, June 20, 1950

which some portion of the power created would revert to Canada and be sold by the provincial power commission.<sup>107</sup> A new block of power would thus arrive, minus any diversions and Fraser dams. To support the goal of Columbia development, fisheries groups spoke in favour of international development, encouraged American fisheries groups to lobby on its behalf, and met with American section members of the IJC.<sup>108</sup> The UFAWU went so far as to sign up the support of thirty provincial labour groups, including the BC Federation of Labour and the IWA Convention in support of the resolution, "No dams on the Fraser and Development on the Columbia by the BC Power Commission."<sup>109</sup> From this Columbia-centered perspective, even the promised Peace River development was feared initially by fisheries defenders as a distraction from the Columbia development and a possible source of delay that would produce nothing but promotional hype.<sup>110</sup> When it became apparent that the Peace River development might prove feasible after all, fisheries defenders added the Peace to their list of possible 'solutions' to damming the Fraser and urged the Premier to proceed.<sup>111</sup> Thus behind the complex politics of the Columbia River Treaty was a strong and organized fisheries lobby, pressing for a particular development pattern, primarily with a view to sparing the Fraser sockeye. Not surprisingly, General McNaughton appealed on more than one occasion for the fishing industry to refrain from intervening in the Columbia negotiations, lest Canada's position be undermined.<sup>112</sup> Fisheries supporters ignored these requests and

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<sup>107</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 23, File 23-8, Minutes for Fisheries Development and Protection Committee, June 4, 1958; United Fisherman and Allied Worker's Union Papers, Box 138, File 138-3, "Facts on Fish," July 3, 1956

<sup>108</sup>*Ibid.*, Minutes for January 2, 1958

<sup>109</sup>UBC Special Collections and Archives, United Fisherman and Allied Worker's Union Papers, Box 138, File 138-3, Tom Parkin to Walley O'Keefe, April 8, 1958 (copy) In this letter, Parkin explains the success of the resolution.

<sup>110</sup>*Ibid.*, Minutes for April 7, 1958

<sup>111</sup>BCARS, GR 1414, Premiers' Papers, Box 37, File 1, JM Buchanan, Fisheries Association of BC to Premier, October 10, 1957.

<sup>112</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 23, File 23-8, Minutes for Fisheries Development and Protection Committee, September 3, 1958; Box 45, File 45-39,

continued to state the view that both fish and power could be possible in BC. "Let's have our kilowatts," went a UFAWU pamphlet, "and eat our salmon too."<sup>113</sup>

Power promoters would have replied to this slogan, let's have our kilowatts and make salmon adapt to change. While fisheries supporters proffered alternatives in order to keep any development off the river, power promoters adopted the rhetoric of 'coordination,' 'multiple use' and 'associated development.' Power promoters believed that dams would deliver such enormous wealth to the province that they could not be resisted. They could, however, be planned for and accommodated by those pre-existing interests who would be affected. Thus, the challenge was to create organizations able to plan multiple use for development, fund research on the passage of fish around dams and lobby the public about the possible flexibility of salmon, the views of fisheries scientists notwithstanding. That this push for accommodation was substantially one-sided in its intent is apparent in the stated goals of the Fraser River Multiple Use Committee, written to Prime Minister Diefenbaker in 1958, by committee chairman and securities dealer JE Kania: "It is our belief that [the fish vs. power] conflict is more apparent than real and that it does not constitute a problem without solution. We are of the opinion that the multiple purpose development of the Fraser River would not harm the fisheries but would, on the contrary, assist in the realization of their full potential."<sup>114</sup> When fisheries representation was invited to this committee dominated by engineers, financiers and professors, committee members agreed that the move was "fraught with dangerous possibilities..."<sup>115</sup> The committee spoke favorably about the Moran plan, considered

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"Memorandum of Meeting of General McNaughton with Honourable James Sinclair in Vancouver BC, August 5, 1958"

<sup>113</sup>UBC Special Collections and Archives, United Fisherman and Allied Worker's Union Papers, Box 137, File 137-2, pamphlet, "Well I'll Be Dammed: A Fish Story," nd

<sup>114</sup>SFU Archives, WAC Bennett Papers, Box 11, File 3, Kania to Bennett, October 2, 1958 with enclosure, Kania to Prime Minister Diefenbaker, October 2, 1958

<sup>115</sup>UBC Special Collections and Archives, Fisheries Association of BC, Box 45, File 45-34, "Minutes of Fraser River Fact-Finding Committee," April 1, 1958

calling themselves the Moran Dam Fact-Finding Committee and included Harry Warren in their membership.<sup>116</sup> Multiple use for these advocates was shorthand for dam development. At another level, BC Electric made efforts to overcome the fish-power problem and its attendant political entanglements by spending its way out of the trouble. In 1956, the corporation organized an inter-disciplinary team of researchers at UBC from physics to fisheries biology to 'solve' the technical problem. The grant-in-aid of \$50,000 was the largest yet received in the area of fisheries at the University and gained considerable publicity.<sup>117</sup> Through an intensified program of science, it was hoped, salmon and dams could be adapted to one another. Power promoters who held a firm belief in the practical capacities of applied science never doubted this outcome. If fish could not be passed around dams, then new spawning grounds could be created artificially, or salmon could be farmed. Happily, reported Russell Potter, a principal of the Moran Development Corporation, in the BC Professional Engineer in 1957, sockeye salmon "has a wonderful homing instinct and will fight to the death to return to his home stream. If it is possible to design a dam so that natural instincts of the fish are exploited in every way, and they are kept away from harm, it should be possible to take them past a dam with little, or no loss, on either of their migrations. This is the principle followed in the design of the Moran dam."<sup>118</sup> If dams could not meet salmon needs, then salmon could meet their own. "I am sure salmon can be re-educated," said Social Credit Mines Minister, Kenneth Kiernan in 1960. "We'll be raising salmon the way we raise

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<sup>116</sup>UBC Special Collections and Archives, Fisheries Association of BC, Box 45, File 45-34, "Minutes of Fraser River Fact-Finding Committee," February 20, 1958; "Minutes of Third Meeting of the Fraser River Multiple Use Committee," March 7, 1958; "Minutes of the Fourth Meeting of the Fraser River Multiple Use Committee," March 15, 1958

<sup>117</sup>This project will be discussed in the next chapter: "The Fraser River Hydro and Fisheries Research Project Final Report," (Vancouver: UBC, 1961)

<sup>118</sup>RE Potter, "Moran Dam— Fish and Power," BC Professional Engineer 9(10) (October 1958): 24



chickens."<sup>119</sup> "After all," seconded Gordon Shrum, Chairman of the BC Energy Board, "we don't depend on wild chickens for our eggs or wild buffalo for our meat."<sup>120</sup> Power promoters thus displayed a strong faith in the promise of technology and the pliability of nature; they also had a firm sense of their interest.

The efforts of fisheries supporters and power promoters generally treated coordination as a set of trade offs, bargains to be struck, sometimes in cooperation, sometimes by establishing priority for one use over the other. The only serious attempt to develop coordination, as both a means to river management and an end was the Fraser Basin Board, formed after the Flood of 1948. This institution joined together civil servants from both the federal and provincial governments and from a wide range of backgrounds, including fisheries, public works, lands and other relevant ministries and departments. The goal was to overcome problems of jurisdiction and contrasting resource interests in order to evolve a higher form of multiple use development led by experts from different resource fields, in keeping with such precedents of integrated planning as the Tennessee Valley Authority. Throughout the late 1940s and 1950s the Board worked toward a steady accumulation of studies on possible Fraser River flood control measures, particularly with a view to dam development. Like a dark horse, the Board quietly undertook its tasks, out of the spotlight of media scrutiny, and without the self-promotion of the Warren or McNamara variety. While fish and power camps railed against one another in public over the Moran and diversion proposals, the Board integrated the advice of fisheries representatives with surveys of possible dam sites and their design.

The impetus to overcome barriers of political and sectoral interest, however, could not erase the problems of jurisdiction and the resource priorities of the Board's members.

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<sup>119</sup>BC Electric CF, "We'll Raise Fish as We Do Chickens," *Columbian*, April 9, 1958; "'Educate the Fish' in Fraser-- Kiernan," *Province*, April 11, 1960; editorial, *Chilliwack Progress*, March 25, 1960

<sup>120</sup>BC Electric CF, "Tame Fish, Dam the River-- Shrum," *Vancouver Sun*, March 19, 1960

From the beginning, the Board was tethered by its inability to act: it was an ad hoc body, with only advisory capacity. Unlike formidable river institutions in the US, such as the Bonneville Power Administration or the Bureau of Reclamation, the Board could only study and recommend. The distance between federal and provincial officials and the fact that their primary responsibilities lay elsewhere made the operation of the Board difficult. The different perspectives brought to bear on the research and planning priorities also created divisions within the institution that limited the ability to act jointly. In 1958, Arthur Paget, BC's Water Comptroller wrote to Ray Williston, the Minister of Lands and Forests, concerning his experience on the Board and his ideas for its redesign. In the future, he argued, the problems to be faced would be largely of an engineering variety and thus the contributions of the federal Department of Fisheries, "whose approach in matters of this kind is essentially negative by reason of their particular interest," could be abandoned. Better, he argued, for the Board to hire its own biologists to carry out fisheries studies according to engineering needs than to allow for the interference of the federal department.<sup>121</sup> To some extent, Paget's claim was fair: the fisheries department did wish to block dam projects on the Fraser's main stem, and organizations such as the IPSFC lobbied the federal department to monitor the board's activities.<sup>122</sup> As Tom Reid said on one occasion, although the Board was ad hoc, its members "can make themselves very obnoxious, all the same."<sup>123</sup> It should also be remembered, however, that the Board members representing other areas of government concern were similarly interested parties. The Board's first executive assistant, the engineer Russell Potter, for example, left the Board in the mid-1950s to pursue his primary passion: promoting the Moran dam

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<sup>121</sup>BC Water Management Branch, Department of Lands 'O' File Correspondence, File 0207956, AF Paget, Comptroller of Water Rights to Ray Williston, November 25, 1958

<sup>122</sup>NA, RG 23, Box 1225, File 726-11-5, part 17, Tom Reid to GR Clark, Deputy Minister of Fisheries, February 9, 1960

<sup>123</sup>NA (Pacific Region), RG 23, Vol 2301, Folder 2, Proceedings of IPSFC meeting, June 20, 1950

with Harry Warren. Following its 1958 preliminary report, the Board increasingly dispensed with fisheries participation in its operations, favouring engineering studies.<sup>124</sup>

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The sense of inevitability that surrounded Fraser River dam development in the early 1950s began to crumble in the latter half of the decade. The fish vs. power debate signaled this change by entertaining discussions from both sides about the possibility for alternatives. By 1957 some of these alternatives gained political momentum. The federal government suggested its commitment to coordinated development on the Columbia by moving negotiations beyond the IJC to the formal diplomatic level. The provincial government promoted the potential of the Peace River as BC's major power source for the future. And BC Electric, judging that the fish-power problem would not be solved quickly, began an expansion of its thermal capacity to bridge the company's power supplies until a major hydro program could be entertained.<sup>125</sup> As the editors of the Province put it in 1959, "The projected developments of the Columbia and the Peace have taken the heat off of the Fraser argument."<sup>126</sup>

With neither the federal or provincial government, nor BC Electric backing a Fraser River development program, power promoters became increasingly isolated. Although the appearance of the Multiple Use Committee in 1958 seemed to demonstrate the emergence of a new power coalition backing the Moran proposal, the committee failed to raise political or financial support and fell apart after two years. The committee's goal to inspire a royal commission on Fraser River development was rejected

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<sup>124</sup>WR Derrick Sewell, Water Management and Floods in the Fraser River Basin (Chicago: Department of Geography Research Paper No. 100, 1965), especially Chapter 4 and 5

<sup>125</sup>BCARS, GR 1427, BC Water Rights Branch, Box 6, File 353, Department of Northern Affairs and National Resources, Water Resources Branch, WRD Sewell, "Prospects of Large Scale Thermal Power Development in the Lower Mainland of BC," April 1958. Concerning the Moran Development Corporation's attempt to block the company's expansion application before the BC Public Utilities Commission, see: BC Electric CF, "'Hysteria' Charged in Dam Fight," Vancouver Sun, November 15, 1957

<sup>126</sup>BC Electric CF, "Fraser: Fish, Floods and the Future..." February 13, 1959; on the post-ponement of a Fraser project in light of the shift of policy, see: "BC Electric gives up Fraser Power Plan, Ends Bitter Fight," Financial Post, May 18, 1957

out of hand by the federal Conservative government in 1958.<sup>127</sup> General McNaughton's diversion idea similarly lost support. Although the federal government remained publicly committed to the diversion as late as 1958, behind the scenes the attitude was different: in 1956, Jean Lesage advised Premier Bennett that he now judged the diversion unfeasible; henceforth it would be just "a card-in-the-hole for use in international negotiations."<sup>128</sup> Increasingly, the federal government diminished McNaughton's negotiating authority on the Columbia file, while Premier Bennett tried to force McNaughton to admit that the diversion would not proceed. BC Electric's shift to thermal power also spoke to the company's view that the diversion plan had run into too many political obstacles.

Although the conditions that would have allowed for major developments on the Fraser began to change in the late 1950s, the fish vs. power debate did not subside. In part this was because there was no end to the Moran and diversion promotions: the Multiple Use Committee pledged to end the fisheries hold on the river, the federal government did not back away publicly from the diversion plan and General McNaughton became increasingly strident in his advocacy of a diversion, declaring before a committee of the House of Commons in 1957 that "We are entirely masters of our own destiny."<sup>129</sup> Added to these continuing questions was the looming possibility that the Fraser Basin Board might convince the federal and provincial governments to proceed with flood control dams. The Board's 1958 preliminary engineering report laid out a blueprint for development, the so-called System A plan: a series of dams in upper basin tributaries that would help to ward off the threat of floods and pay for this service

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<sup>127</sup>NA, RG 23, Box 1225, File 726-11-5, part 14, Kania to MacLean, November 14, 1958; MacLean to Kania, December 3, 1958

<sup>128</sup>SFU Archives, WAC Bennett Papers, Box 11, File 3, "Federal-Provincial Discussion on International Waters" [July 4, 1956]

<sup>129</sup>BCARS, GR 1427, BC Water Management Branch, Box 3, File 92, "House of Commons First Session--Twenty Third Parliament 1957, Standing Committee on External Affairs, Minutes and Proceedings, Statement by General AG McNaughton, Chairman, Canadians Section, International Joint Commission (Ottawa, 1958), p 294

by creating small blocks of power in some of the multiple use structures. There would be power and storage dams north of Prince George on the McGregor River, and at Olson Creek; further south, two dams would be placed on the Cariboo River, a tributary of the Quesnel, and another five on the Clearwater, feeding the North Thompson. A total of ten dams were envisioned with the option of another on Stuart Lake if the fisheries problem were not too severe.<sup>130</sup> The report received favourable comment from the provincial government in a major speech by Ray Williston on hydro policy in 1959.<sup>131</sup> Although the Department of Fisheries expressed pleasure at the apparent efforts of the Board to avoid damming spawning grounds in their plans, other fisheries organizations made their fears known: the UFAWU, the Prince Rupert Fisherman's Cooperative, and the Native Brotherhood all lobbied the federal government to block the proposed dams.<sup>132</sup>

"Nowhere can we find reference to the problem of food supply for the Interior Indians," wrote Ed Nahanee of the Native Brotherhood, in reference to the Fraser Board's report, to Minister Angus MacLean in 1959.<sup>133</sup> The System A proposal would eventually unravel in the mid-1960s because of fisheries concerns and the high costs of flood control dams relative to dyking in the Lower Fraser Valley. But before that time, the Board's activities kept the controversy of fish and dams on the Fraser alive.

Nor did fisheries defenders feel safe to rest on their laurels in the late 1950s, despite a number of strategic victories: the fish vs. power debate thrived on a paranoid style of politics. Indeed, one federal economist described the fish vs. power debate as its

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<sup>130</sup>"Preliminary Report of the Fraser River Board," (Victoria, 1958)

<sup>131</sup>NA, RG 23, Vol 1225, File 726-11-5[15], Roy Williston, "Hydro-Electric Power in Canada," An Address by the Hon. RG Williston, Minister of Lands and Forests, delivered during the Debate on the Speech from the Throne, Legislative Assembly, January 27, 1959

<sup>132</sup>NA RG 23, Vol 1225, File 726-11-5, part 15, "Memorandum: Fisheries Aspects of the Preliminary Report on Flood Control and Hydro-Electric Power in the Fraser River Basin," AL Pritchard, March 19, 1959; UFAWU Press Release, December 19, 1958; part 19, KF Harding, Secretary for the Board of Directors, Prince Rupert Fisherman's Cooperative Association to MacLean, June 8, 1962

<sup>133</sup>NA RG 23, Vol 1225, File 726-11-5, part 15, Ed Nahanee, Secretary- Business Agent, Native Brotherhood of BC to Angus MacLean, Minister of Fisheries, January 12, 1959; MacLean to Nahanee, January 20, 1959 (copy)

own 'cold war.'<sup>134</sup> Ever since the late 1940s when fisheries supporters found their interests trampled on in the Alcan case, the potential of a repeat remained a concern. After BC Electric committed itself to fund studies of the fish-power problem at UBC in 1956, for example, HR Macmillan, the timber baron and, after 1952, commissioner of the IPSFC, wrote to UBC fisheries biologist, Peter Larkin: "Peter: Don't let them put the fish people to sleep. Their tactic could be to act like they don't need [the] Fraser, then find [the] Columbia too slow and costly. Put on a few brown outs, say the only cure would be couple of quick low dams on [the] Fraser. And the girl would be only a weeny teeny bit pregnant."<sup>135</sup> In response to the Fraser Basin Board's conciliatory approach to the fish-power problem that sought sites beyond harm to fish, Tom Reid suspected nefarious intentions, or at least an historical logic: once these dams appeared on the Fraser, others would inevitably follow.<sup>136</sup> Tom Parkin, a publicist for the UFAWU, similarly charged that the Fraser Basin Board's plans were a "backdoor" for development to enter the Fraser Basin.<sup>137</sup> In 1958, well after the diversion had commanded central attention in Columbia discussions, the fisheries protection and development committee was planning means to discredit it. In 1961, Tom Reid suggested that BC Electric had a "secret plan" to dam the Fraser.<sup>138</sup> Even the Peace development, thought to be a partial solution to the Fraser fish-power problem, could be viewed, from a certain perspective, as a looming threat. What if the real intention were to divert the Peace into the Fraser? Or what if upper Fraser tributaries were diverted into the Parsnip River to provide extra flow for a Peace dam? Not only would the Fraser's hydrology be affected, but also as one UBC biologist argued,

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<sup>134</sup>NA, RG 23, Vol 1230, File 726-11-13, IS MacArthur, Economic Staff, to Deputy Minister of Fisheries, December 21, 1956

<sup>135</sup>Quoted in Ken Drushka, *HR: A Biography of HR MacMillan* (Madeira Park, BC: Harbour Publishing, 1995), p 305

<sup>136</sup>NA, RG 23, Box 1225, File 726-11-5, part 17, Reid to GR Clark, deputy minister of fisheries, February 9, 1960

<sup>137</sup>BC Electric CF, "Power Without Harm to Fish 'Possible'," *Province*, March 14, 1959

<sup>138</sup>BC Electric CF, "Reid Charges BCE Seeks Fraser Dam," June 9, 1961

there was a risk of releasing new fish predators into the Fraser basin from this northern watershed.<sup>139</sup> Although some fisheries supporters became increasingly triumphant in public when signs of the Peace and Columbia programs appeared to clear the way for fisheries conservation on the Fraser, others refused to accept that the threat had passed or could be ruled out in the future.

That this suspicion had foundation became apparent in the early 1970s. As the development program on the Peace and Columbia came to completion in the late 1960s, the BC Energy Board, established under the chairmanship of Gordon Shrum in 1959 to advise the province on energy policy, turned again to the question of power development on the Fraser. Shrum's views on the fish-power problem were put bluntly to the retired canner Henry Doyle in 1956: "I think even the most ardent commercial fisherman in British Columbia realizes that eventually the Fraser River will have to be used for power."<sup>140</sup> Over a decade later those views appeared not to have changed. Under Shrum's direction, the Energy Board launched a major feasibility study to examine the possibility of developing the Moran dam.<sup>141</sup> Helicopters, as Richard Bocking writes, hung ominously above the site in 1971, taking drilling samples to test the foundations for a major dam footing, while a team of biologists, economists and engineers considered costs and benefits.<sup>142</sup> "Gathered in offices in the BC Hydro building and at the universities," wrote one reporter in the idiom of a new age, "the high priests of our technocratic society, engineers and scientists, are performing mystic rites to determine whether or not to dam the Fraser River." The priests, the reporter continued, were trying

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<sup>139</sup>BC Electric CF, "Professor Says Peace Dam Threat to Fish," *Vancouver Sun*, November 14, 1958; UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 45, File 45-16, CC Lindsey, "Possible Effects of Water Diversions on Fish Distribution in British Columbia," nd.

<sup>140</sup>UBC Special Collections and Archives, Henry Doyle Papers, Box 1, File 1-8, Shrum to Doyle, May 9, 1956

<sup>141</sup>Minutes of meetings, memos and correspondence concerning this prospect are contained in BCARS, BC Energy Board, GR 442. UBC Special Collections and Archives, Warren Family Papers, Box 4, File 12, "Moran Dam Study asked for Fraser River," *Vancouver Sun*, January 28, 1971

<sup>142</sup>Richard Bocking, *Mighty River: A Portrait of the Fraser* (Vancouver: Douglas & McIntyre, 1997), chapter 6

to turn the river from a "strong brown god" into an "electric generator."<sup>143</sup> The public response to the plan was overwhelmingly negative.<sup>144</sup> In addition to the fisheries protest, an emergent environmental movement expressed astonishment that the pristine river would be thus violated. EH Vernon, a member of the BC Fish and Wildlife Branch, evoked the sensibilities of this reaction in a private letter considering the development of the Fraser in 1970: "Any element in our society that grows by doubling every 10 years quickly must reach the stage of being ridiculous or impossible or both...Must we turn the world into a Los Angeles before we stop talking stupidly of unending growth?"<sup>145</sup> Premier Bennett, quick to sense the direction of discussion, disavowed the plan. Social Credit highways minister, the flamboyant evangelist 'Flyin' Phil Gaglardi was one of the few defenders of the approach. When one journalist prodded him, saying that Bennett had claimed that no dam would be built on the Fraser while he was Premier, Gaglardi replied, "Yes, it won't be built while he's Premier-- but you've got to remember he's 71 years old now."<sup>146</sup> Within months, Bennett's government would go down to defeat to the New Democratic party under Dave Barrett, and with that, BC's big dam era would come to a close. In his memoirs, Gordon Shrum threw up his hands and said that he had "become resigned that the Fraser River fish/power problem will not be resolved on a dollars-and-cents basis. It is mainly a political issue."<sup>147</sup>

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<sup>143</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 46, File 11, "High Priests vs. the Raging Fraser," Vancouver Sun, June 1, 1971

<sup>144</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 46, File 11, "More and More on Moran," Province, March 29, 1972; "Ottawa Holds Dam Veto: Davis," Province, April 26, 1972; "Now Why Would He Go to All of that 'Dam' Trouble," Columbian, February 12, 1972; "Haig-Brown Raps Moran Dam Idea," Sun, April 10, 1972; "A Peaceful Corner of the World," Province May 29, 1971; "The Great Demand...Electricity," Province, February 17, 1971

<sup>145</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, EH Vernon, Chief Fisheries Management, BC Fish and Wildlife Branch to KM Campbell, Secretary Manager of the Fisheries Association of BC, November 17, 1970

<sup>146</sup>UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 46, File 11, "More an' More Opinions Flow from BC Ministers," Vancouver Sun March 29, 1972

<sup>147</sup>Gordon Shrum with Peter Stursberg edited by Clive Cocking, Gordon Shrum: An Autobiography (Vancouver: UBC Press, 1986), p 131



The fish-power problem on the Fraser River in the 1950s forced a new politics of electrical development in BC. Although numerous interests and governments sought to create political programs to develop the river and coalitions to sway public support, fisheries interests managed to hold off dam projects until new alternatives became possible. Those alternatives on the Peace and Columbia came about in part because of the political pressure to conserve the Fraser as salmon spawning habitat. The two-river policy thus operated as both a political outcome and a solution to the fish-power conflict on the Fraser.

The content of the debate revealed its context. It spoke to British Columbian's regional aspirations, their dreams for the future as well as their fears. It was not an environmental debate in a modern sense of that term: its major disputants spoke a utilitarian idiom, not a romantic language; resources were the objects of concern, not wilderness. Unlike fisheries politics on the Columbia River, where sports fishers played an important historic role, on the Fraser, the fisheries defenders were predominantly fishers and canners, with an eye to their livelihood, not their leisure.<sup>148</sup> However, it would be exaggerating the point, as Jeremy Wilson does in an excellent recent survey of wilderness and forestry politics in BC, to assume that there was a 'barren debate' over the conservation of resources in the 1950s.<sup>149</sup> A dispute dominated by utilitarian values did not preclude the consideration of sentiment, tradition and the needs of others. In the view of some of its participants, the fish vs. power debate was indeed unpleasantly robust.

Historians of this period in BC's political and economic development have underestimated the importance of the Fraser River and the fish vs. power debate as a driving force in the evolution of BC's electrical system. Just as American historians have

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<sup>148</sup>Joseph Taylor, III, Making Salmon: An Environmental History of the Northwest Fisheries Crisis (Seattle: University of Washington Press, 1999), chapter 6

<sup>149</sup>Jeremy Wilson, Talk and Log: Wilderness Politics in British Columbia, 1965-1996 (Vancouver: UBC Press, 1998)

come to view the damming of the Columbia as an inevitable outcome of industrial development, so too Canadian historians have assumed the conservation of the Fraser without questioning how this condition came to be. The name of the two-river policy fosters this inattention to Fraser River politics in BC's dam-building era. It ought to be renamed the three river policy.

**Chapter 8:****The Politics of Science**

Before a gathering of business people in 1960, UBC fisheries biologist Peter Larkin reflected on the dynamics of the fish vs. power debate and broke the dispute into four “technical ingredients”: “the fish, fisheries biologists, engineers and dams.” With self-deprecation, Larkin described the purpose of the fisheries biologist thus:

The first characteristic of the fisheries biologist must be slipperiness. Recognizing that fish and their environment are variable, and that even with the best of observations, he has only a general understanding of what's going on, he is forced to approach every problem with a becoming caution. Things are never so, they seem to be, are apparently, they are indicative, it is suggested, maybe they are true. And always from a biologist expect lots of adjectives and adverbs, slightly, moderately, reasonably, average. Fishery biology is largely the art of saying ‘probably’ in 1000 ways.

If a fisheries biologist is known as an expert, it is probably because he says nothing or because everything he says can be construed as a completely satisfactory prediction regardless of what happens.

The poor fisheries biologist on the other hand is characterized by his over-confidence. Fancying himself as something of a jet age scientist, and feeling compelled by our scientifically minded society to put up or shut up—he recklessly tries to put up—promising the moon, hoping memories are short, and looking for scapegoats at the hour of disenchantment...

Confronted with the fish-power problem the fisheries biologist can call on a fairly healthy experience, can promise to do his best, largely playing by ear, making ad hoc arrangements and as the English say ‘muddling through.’ To his critics he can always throw out the challenge ‘let’s see you do any better.’<sup>1</sup>

This tongue in cheek assessment came from one of the leading fisheries biologists involved in the fish-power discussions of the 1950s. A Rhodes Scholar, an ecologist trained under Charles Elton, a professor in the emerging Institute of Fisheries at UBC, a veteran of the BC Fish and Wildlife Branch and a future member of the Fisheries Research Board of Canada, Larkin knew whereof he spoke. He had conducted impact assessments of the Alcan project in the late 1940s, written programmatic statements on the best means for the university to respond to the fish-power problem and led a number

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<sup>1</sup> BCARS, GR 442, BC Energy Board Papers, Box 52, Peter Larkin, “Fisheries and Water Resources Development,” Pacific Northwest Trade Association, Sun Valley, Idaho, September 26, 1960

of studies in search of a solution.<sup>2</sup> Far from being slippery, his views were remarkably frank and, as we shall see, perceptive.

Fisheries scientists played a prominent role in the fish vs. power debate. They studied the effects of dams on fish, launched research programs in the areas of basic and applied biology, advised politicians, joined lobby groups and spoke to the press. In a variety of ways, they changed the public profile of science as a disinterested pursuit, faced questions of the boundaries between common and scientific knowledge and debated their appropriate mission. In turn, the politics of fish vs. power shaped science. It directed institutional research agendas, impacted individual careers, and produced a new vision of salmon and their environmental limits. This chapter seeks to explain the many ways in which scientists engaged in the public debate over the environment and how that intervention changed their knowledge as well as their pursuit of knowledge.

In chapter 6 on the remaking of Hells Gate, the analysis sought to evaluate the intersections of research practice and institutional and national politics. The role of fisheries scientists in the making and resolution of disputes pointed to the importance of science more generally in the debate over fish and power. This chapter follows that earlier lead, focussing less on questions of practice and the substantive content of science and more on the problems of institutional research patterns and the politics of scientific authority. Drawing on sociological literature concerning the politics of 'big science' and 'invisible colleges', the chapter considers the changing institutional patterns of fisheries

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<sup>2</sup> Peter Crowcroft, *Elton's Ecologists: A History of the Bureau of Animal Populations* (Chicago: University of Chicago Press, 1991), p 49; UBC Special Collections and Archives Finding Aid, Peter Larkin Papers, biographical statement

research in BC and the initially elevated and later threatened status of fisheries biologists in public discourse.<sup>3</sup> Two key themes emerge: first, that institutions underwent a period of remarkable growth, marked by increased funding, industrial and political influence, and a shift to greater cooperation within and between institutions; and second that the status and authority of fisheries science was made and remade by supporters and detractors of this field. Pairing institutional change with the politics of authority may not appear the most likely or obvious manner of approaching the shifting role of science in this era. I argue that the two themes were linked and inseparable. The rising authority of fisheries science in the early 1950s set the conditions for the expansion of institutions and research; the reaction against the results of this research aimed squarely at the reputation of fisheries science; in turn, fisheries scientists defended their work by bolstering their own authority and questioning that of others. Science changed the fish-power debate, and in turn the debate changed science.

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Fisheries scientists began the 1950s in a position of unprecedented authority. Public commentators marvelled at the power of expertise to overcome problems of resource conflict; editorialists and politicians praised scientists' abilities to conquer the unknown at Hells Gate; and new means of institutional and financial support appeared. Fisheries

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<sup>3</sup> The classic texts on 'big science' and 'invisible colleges' are Derek J De Solla Price, Little Science, Big Science... And Beyond (New York: Columbia University Press, 1986 [1968]) and Diana Crane, Invisible Colleges: Diffusion of Knowledge in Scientific Communities (Chicago: University of Chicago Press, 1972). I have also found useful a recent collection of essays reflecting on the heuristic of 'big science' in concrete empirical investigations: Peter Galison and Bruce Hevly, eds. Big Science: The Growth of Large Scale Research (Stanford: Stanford University Press, 1992).

scientists enjoyed heightened prestige, but felt challenged and threatened by the burdens of high expectations. Their new status rested on assumptions that could not last.

Whereas before the 1940s, scientists played a more peripheral role in public debates over resource development in BC, in the postwar period they commanded the role of experts in public discourse. Representations of scientists as experts were but one expression of a more general shift in attitudes towards science and institutionalized authority emerging from the war years. Science and scientists were deemed to be impartial adjudicators, and subtle blenders of nature and technology; they were granted a new authority to decide the best means of resource development for the general interest. On the issue of fish and power, instructed a Province editorial in 1949 “Let the Experts Decide.”<sup>4</sup> Editors of the Columbian in the same year judged the fish-power issue to be too complex for the “laymen” and asked for an expert solution.<sup>5</sup> Advocates of different persuasions-- from nature writer Roderick Haig Brown to the most aggressive dam promoters— shared the belief that many complex political problems in water development could be solved through the application of expertise.<sup>6</sup> The headline of the Columbian’s lead editorial in 1960—“Let’s Leave BC Power Fate to Experts—Not Politicians”—expressed the sentiment that expertise could overcome the vagaries of interest and political expediency.<sup>7</sup> Such views envisioned a peculiar democratic responsibility for scientists cum experts as the scientific-moral conscience in matters of social and environmental planning.

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<sup>4</sup> BCER CF, Vancouver Sun, January 27, 1949

<sup>5</sup> BCER CF, “Hydro and Salmon,” Columbian, January 21, 1949

<sup>6</sup> “BC Seeks Way to Waterpower Without Sacrifice of Salmon,” Pacific Fisherman 49(5) (April 1951)

<sup>7</sup> BCER CF, “Let’s Leave BC Power Fate to Experts—Not Politicians,” Columbian, February 13, 1960

Local conditions also influenced ideas of the place of science and scientists in the emerging problems of fish and power. The accomplishments of fisheries scientists at Hells Gate convinced some scientists and editorialists that the looming problem of fish and dams could be overcome by the extension of existing knowledge. "In view of the inevitable encounter between dams and fish on the Fraser," wrote Richard Van Cleve, Chief Biologist of the IPSFC in 1947, "it is most fortunate that much of the work accomplished so far by the staff of the International Pacific Salmon Fisheries Commission has been devoted to the study of the effects of obstructions on migratory fish." The Hells Gate episode, he continued, provided a "pilot experiment" in the future of fish and dams.<sup>8</sup> "Fishery engineers have learned a lot about the practical side of fish conservation at Hell's Gate," stated an editorial, echoing Van Cleve's argument, in the News Herald in 1949. "The lessons learned are now available to be applied generally."<sup>9</sup> Throughout the 1950s Hells Gate played a symbolic function representing past accomplishment and present readiness in fish-dam cases. In 1953, during the construction of the Seton-Bridge River project, a Province journalist suggested that no harm would be done to the Seton fish runs because the project's fishways had "already been proven a success at Hell's Gate, Farewell Canyon and other danger spots in the Fraser system."<sup>10</sup>

Besides this celebrated example, American development on the Columbia provided numerous opportunities for comparison and optimism. Harry Warren and his fellow Moran dam promoter Russell Potter both claimed in numerous public

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<sup>8</sup> University of Washington (UWA) Richard Van Cleve Papers, "Paper Presented at Symposium of the Western Division Association of Fish and [?] San Diego, June 18, 1947"

<sup>9</sup> BCER CF, "Hydro and Fisheries," News Herald, November 22, 1949

<sup>10</sup> BCER CF, Norm Hacking, "Afloat and Ashore," Province November 25, 1953



engagements that American advances had solved the problem once and for all.<sup>11</sup> Val Gwyther, a Vancouver engineer and dam enthusiast claimed that American advances in artificial propagation offered a new opportunity to maximize watershed values.<sup>12</sup> Numerous scientists and government officials visited the Columbia during the 1950s, hoping to learn how BC could profit from the American example.<sup>13</sup> Rather than question dam development, argued Alcan Vice-President McNeely Dubose, scientists should look on fish-dam cases as providing new natural 'laboratories' for their scientific curiosities.<sup>14</sup> Such pronouncements could sometimes tweak the pride of even the most cautious fisheries scientist. In 1956, in a planning meeting considering the Moran dam proposal, IPSFC director, Lloyd Royal said that in earlier times there could be no scientific answer to the problem of fish passing high dams, but in the current fisheries science "renaissance" he felt that the Moran project should be given "every consideration."<sup>15</sup>

While some scientists embraced public enthusiasm and spoke of their capacity to solve the fish-power problem, many more tried to explain the nature of the challenge. There were no miracles, they argued, only messy problems without clear solutions. At a meeting of the IPSFC with representatives of the fishing industry in 1950, for example, Milo Bell, one of the designers of the Hells Gate fishways with wide experience on

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<sup>11</sup> Russell Potter, "Moran Dam—Fish and Power," BC Professional Engineer 8(3) (March 1957): 21-28;

"Moran Dam and the Fraser River," Engineering Journal 43(12) (December 1960). 43-46

<sup>12</sup> Val Gwyther, "Multiple Purpose Development of the Fraser River Basin," BC Professional Engineer 9(10) (October 1958): 13-19

<sup>13</sup> BCARS, Box 4, File 6, George Alexander to Master Fish Warden, Fish Commission, Oregon, February 9, 1951. Alexander's request for information was one example of a stream of correspondence and visits from BC and federal officials.

<sup>14</sup> RG 23, Vol 1822, File 726-11-6, part 1, Milo Bell to GR Clark, October 14, 1949 Bell reports Dubose's statement.

<sup>15</sup> BCARS, GR 1118, BC Marine Resources Branch, Box 3, File 1, "Notes on Meeting with Moran Power Development Ltd. Held in the Offices of the Chief Supervisor of Fisheries on May 24, 1956 at 11:00 AM"

Columbia dams, sought to instill in the audience a respect for the lack of knowledge of salmon tolerance to obstructions. “[I]f I told you how little we knew when we built the Hell’s Gate fishways,” he said, “...you might not have given us authorization to build.”<sup>16</sup> At a BC Natural Resources Conference in 1953, Bell and others argued to the mixed audience of scientists, government officials and industrial representatives that no solutions existed to the fish-power problem.<sup>17</sup> Many of the potential problems had yet to be defined. “[T]he biologist is working with all of the complexities of a living creature,” said JR Brett of the FRBC, “not wholly unpredictable in behaviour, but far from a mechanical horse.”<sup>18</sup>

Recent experience suggested the need for caution. Despite the sanguine press reception of the Columbia dam projects and their fishways, fisheries scientists working at Bonneville and Grand Coulee frankly admitted the level of their ignorance in the 1950s. The fishways were not solutions so much as they were experiments in action. Harlan Holmes, a Stanford biologist involved with the design and construction of the Bonneville dam fishways recalled that the fishways had “evolved” as the construction of the dam proceeded, with changes from “day-to-day”.<sup>19</sup> Much of the research of the Army Corps of Engineers on fishways after the 1930s sought to determine basic questions such as how many fish survived their passage over dams. Whether the fishways actually worked with

<sup>16</sup> NAC (Pacific Region) RG 23, Vol 2301, Folder 2, Record of Proceedings of IPSFC, June 20, 1950

<sup>17</sup> CH Clay, “Problems Associated with Upstream Migration Over High Dams,” Transactions of the Sixth British Columbia Natural Resources Conference (Victoria: BC Natural Resources Conference, 1953): 91-93; Roy I Jackson, “Measurement of Losses of Fingerling Salmon at High Dams,” Ibid: 93-96; JH Brett, “The Nature of the Biological Problem,” Ibid: 96-102; Milo C Bell, “Fisheries Research at High Dams in Washington State,” Ibid: 102-104

<sup>18</sup> Brett, “The Nature of the Biological Problem,” p 98

<sup>19</sup> Quoted in Lisa Mighetto and Wesley J Ebel, Saving the Salmon: A History of the US Army Corps of Engineers’ Efforts to Protect Anadromous Fish on the Columbia and Snake Rivers (Seattle: Historical Research Associates, 1994), p55

any consistency was still a matter of debate and research.<sup>20</sup> In Canada, the looming threat of dam projects on the Nechako and Quesnel Rivers in the late 1940s and early 1950s forced Canadian fisheries scientists to admit that they did not yet have even an accurate sense of the scale of the annual migrations to these rivers, let alone clear ideas about how best to perpetuate runs with the addition of dams.<sup>21</sup>

The problems involved were fundamental. Dam development posed a variety of as yet unanswerable questions: What would happen to salmon, of all species, different stocks and local runs, when dams from one hundred to seven hundred feet in height were placed in their migratory path? Could salmon climb ladders around these dams? Could they pass only one dam or many dams? Would they find the reservoirs behind dams disorienting? What would happen to fry migrating to the Ocean? How would dams affect salmon behaviour, physiology and ecology?

These were questions asked of a science that had but fifty years experience on the BC coast, that had only determined in the past forty years that salmon return to their natal streams to spawn, and which had just recently concluded that obstructions at Hells Gate proved injurious to migrating salmon. “It is useless to search the biological literature for the answer [to the fish-power problem],” instructed JR Brett in 1953, “though much of the background and methods of study will be found there. The fish have not been examined sufficiently under conditions imposed by large reservoirs, submerged outlets, rapid fluctuations in flow, and catastrophic pressure changes, to provide answers. Nor is there any good knowledge of the physical conditions which the fish actually face. No

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<sup>20</sup> Mighetto and Ebel, *Saving the Salmon*, pp 103-107

<sup>21</sup> See chapters 6 and 7.

excuses are necessary for this lack of knowledge. The changed water conditions are a product of our times. Solutions to the problems created are the task of our times.”<sup>22</sup>

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Searching for solutions required more than new ideas. It also required an enhanced institutional framework, and greater levels of cooperative research with a view to a coherent provincial research program. In the post war period, research agencies expanded and gained greater funding. Formerly distinct agencies overlapped in new ways. A framework amenable to larger cooperative research emerged, partly in response to the politics of fish and power. The previously dominant Fisheries Research Board of Canada now shared pride of place in advanced fisheries research with the International Pacific Salmon Fisheries Commission. Both agencies cooperated in environmental assessments of water development projects and sponsored extensive research programs.<sup>23</sup> Beyond the Research Board, the federal Department of Fisheries maintained a source of expertise in matters of habitat restoration in the fish culture and development branch, an agency devoted in part to assessing dam projects and devising fishways. The previously important provincial Fisheries Branch that had spearheaded salmon biology at the beginning of the century waned in influence, while the provincial Fish and Wildlife Branch gained new importance. Unlike the industry-oriented Fisheries Branch, the Fish and Wildlife Branch focused on questions of the sports fishery and recruited a new

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<sup>22</sup> Brett, “The Nature of the Biological Problem,” pp 96-96

<sup>23</sup> Kenneth Johnstone, The Aquatic Explorers: A History of the Fisheries Research Board of Canada (Toronto: University of Toronto Press, 1977), p 200

generation of fisheries scientists to implement programs and study resource problems.<sup>24</sup>

At UBC, a small biology research program expanded and gained a special institute devoted to fisheries. Continuing the previous links between the department and the government research agencies, the UBC Department of Zoology drew on government scientists to teach courses, sent students to field schools at the Fisheries Research Board station in Nanaimo, hired government staff and in turn lost scientists and sent former students to the research agencies in a developing pattern of institutional cross-fertilization.<sup>25</sup> Peter Larkin, for example, began to teach in the UBC department while an employee of the provincial Fish and Game Branch in the 1950s, became a full-fledged member of the department in the mid-1950s and later joined the Fisheries Research Board in the mid-1960s, only to return to the university three years later. As in other jurisdictions like Ontario and the US Pacific Northwest, fisheries research operated with porous boundaries between state agencies and the academy.<sup>26</sup>

Industrial and client groups exerted a significant influence over the course of research conducted at these institutions. The Fisheries Research Board, although a major developer of basic research, also pursued a range of applied problems to enhance

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<sup>24</sup> BCARS, GR 1027, BC Fish and Wildlife Branch, Box 1, File 12, J Hatter, "The Function of the Provincial Wildlife Biologist," Paper presented to the first meeting of the Canadian Wildlife Biologists, Ottawa, January 20-21, 1958

<sup>25</sup> UBC Special Collections and Archives, Peter Larkin Papers, Box 11, File 11-1, WA Clemens, "A Review of Work in Fisheries at the University of British Columbia" [stamped received, January 31, 1952]; WA Clemens, *Education and Fish* (Nanaimo: Fisheries Research Board of Canada Station, Manuscript Report Series No. 974, May 1968), pp 56, 65-66; Clemens, "Some Historical Aspects of the Fisheries Resources of British Columbia," *Transactions of the Ninth British Columbia Natural Resources Conference* (Victoria: BC Natural Resources Conference, 1956): 119-130

<sup>26</sup> On the Ontario experience, see: Stephen Bocking, "Fishing the Inland Seas: Great Lakes Research, Fisheries Management and Environmental Policy in Ontario," *Environmental History* 2(1): 52-73; *Ecologists and Environmental Politics: A History of Contemporary Ecology* (New Haven: Yale University Press, 1997), Chapter 7, "Ecology and the Ontario Fisheries"; on the Pacific Northwest see, Mighetto and Ebel, *Saving the Salmon*.

fisheries productivity and the commercial development of fish products.<sup>27</sup> The IPSFC incorporated industrial advice into its corporate structure through advisory committees and maintained a close liaison with fisheries groups over political problems of habitat protection. The Fish and Wildlife Branch organized some of the most active wilderness protection groups during the 1940s and 1950s and kept in close touch with sports fishers and recreational users.<sup>28</sup> The UBC department emerged with the support of the fish processing industry. In 1945, BC Packers made a \$45,000 gift to help establish an Institute of Fisheries; in the late 1940s and 1950s, all of the major fish processing firms as well as the United Fishermen and Allied Workers' Union provided funds for operations, a library, new staff and student scholarships; and HR MacMillan made annual donations and major one-time contributions in the aid of hiring new staff and supporting research.<sup>29</sup> MacMillan's individual contributions arose from his growing interest in fisheries biology spurred in part by his professional experience and appointment to the IPSFC in 1952, but also derived from the conviction, stated to JM Buchanan of the Vancouver Foundation in 1959, that "A strong Fisheries Institute here, staffed by able men of wide background, will assist in keeping the truth before the public... Work of this nature will enable the Institute to hold a higher grade of men than otherwise, and will also

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<sup>27</sup> Johnstone, Aquatic Explorers

<sup>28</sup> Jeremy Wilson, Talk and Log: Wilderness Politics in British Columbia, 1965-1996 (Vancouver: University of British Columbia Press, 1998), pp 98-99

<sup>29</sup> UBC Special Collections and Archives, Peter Larkin Papers. Box 2, File 1, Paul Bullen, UBC Accountant to G Peter Kaye, executive director, Vancouver Foundation, July 8, 1963 (copy); Institute of Fisheries, "HR MacMillan Expeditions Grant" 1959; File 2, "Summary of Circumstances Concerning HR MacMillan Expeditions Grant," nd; "Report on HR MacMillan Grants for Fisheries Work at the University of British Columbia," nd; Box 11, File 11-1, WA Clemens, "A Review of the Work in Fisheries at the University of British Columbia" [stamped received January 31, 1952]; UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 23, File 23-10, "The Institute of Fisheries University of British Columbia," nd; Ken Drushka, HR: A Biography of HR MacMillan (Madeira Park, BC: Harbour Publishing, 1995), pp 256, 351-352

build for the Institute a broad international reputation... When such men speak in the years to come concerning factors that might be detrimental to British Columbia fisheries, their opinions will have earned respect here and elsewhere.”<sup>30</sup> MacMillan’s particular interest in supporting fisheries science as a means of defending the fisheries was but one example of a broader trend: industrial support fed the growth of fisheries science in the postwar period with a view to sustainability and commercial growth.<sup>31</sup>

The expansion of research funding for fisheries biology in BC gained impetus from the fish-power problem. MacMillan was not the only interest to support research with a view to political or practical outcomes. In 1956, JM Buchanan, Chair of the Fisheries Association of BC, pressed Federal Fisheries Minister James Sinclair to double the personnel of the fish culture and development branch in order to speed up investigations of power projects. “We feel it vitally important,” he wrote, “that under no circumstances should the industry appear as an obstructionist to progress.” Speeding research, he implied, would aid this goal.<sup>32</sup> From the other side of the debate, BC Electric also sponsored a major cooperative study at UBC between engineers and biologists starting in 1956 with the particular goal of considering the feasibility of low level dams on the Fraser. Its grant of \$50,000 was one of the largest yet received by

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<sup>30</sup> UBC Special Collections and Archives, Peter Larkin papers, Box 2, File 2, MacMillan to JM Buchanan, Secretary, Vancouver Foundation, April 24, 1959 (copy)

<sup>31</sup> Richard A Rajala, Clearcutting the Pacific Rain Forest: Production, Science and Regulation (Vancouver: UBC Press, 1998), pp 70-71 Rajala notes the drive for expanded forestry research at UBC during this same period, propelled by industrial needs.

<sup>32</sup> UBC Special Collections and Archives, Fisheries Association of BC Papers, Box 75, File 1, JM Buchanan to Sinclair, August 21, 1956 (copy)

fisheries biologists at the university.<sup>33</sup> At the federal level, spending on fish-power research was estimated at \$60,000 annually after 1949.<sup>34</sup> Over the 1950s, all research agencies in BC devoted just under five million dollars to fish-power research. To put that figure in context, the Hells Gate fishways program, including capital costs, reached just over 1.2 million dollars.<sup>35</sup> By way of comparison, fish-power research on the Columbia in the 1950s carried out by the US Army Corps of Engineers, US Fish and Wildlife Service and the States of Washington and Oregon more than doubled the Canadian research in terms of dollars spent.<sup>36</sup> Thus while fish-power research spending in BC dwarfed past efforts, it did not nearly match the American program, which was driven by larger budgets and more immediate problems. Increased funds nevertheless allowed for new research projects and a reorganized institutional effort.

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In response to the public call for intensified fish-power research, fisheries scientists began to develop a focused research agenda. They identified past accomplishments and present lacunae. They imagined future directions. Leaders in research advocated a cooperative program and organized areas for team research. In different research agencies, scientists attempted to set out the particular contribution that they could make to solve the fish-power problem.

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<sup>33</sup> UBC Special Collections and Archives, Fraser River Hydro and Fisheries Research Project Papers, File 3, ES Pretious et al., "Fish Protection and Power Development on the Fraser River" (UBC, February 1957)

<sup>34</sup> NAC, RG 23, Vol 1230, File 726-11-14, part 2, CH Clay to Whitmore, May 15, 1958

<sup>35</sup> BCARS, GR 442, Box 52, "Summaries of Research on the Fish-Power Problem and Related Work by Fisheries Agencies in British Columbia," Prepared by Research Sub-Committee, Fisheries Development Council (Department of Fisheries, Vancouver, Revised December 1961). [Hereafter "Summaries of Research"].

<sup>36</sup> "Summaries of Research, p ix; Mighetto and Ebel report that fish passage facilities at US Army Corps of Engineers facilities (exclusive of research) cost an estimated "\$130 million, with an annual maintenance cost of \$1 million in 1956." Saving the Salmon, p104.



In every major programmatic statement on fish-power research needs in the 1950s, fisheries scientists emphasized the importance of fundamental research. Fish-power research, they argued, must not be assumed to be a technical exercise, but a problem of basic science. Federal fisheries scientist JR Brett put the point succinctly in a widely distributed paper in 1956: “Since the problem is both multiple and complex, no delusions should be entertained concerning the possibility of some quick or simple solution. Any new mechanical contrivance expected to aid salmon at some point in their migration will create new biological problems. It is the lack of knowledge of salmon that is the great handicap. This handicap can only be surmounted by a thorough program of research directed at the fish first, from which the problems may then be resolved.”<sup>37</sup> Making the same point in 1957, WS Hoar, a UBC zoologist, stated that it would be “impossible” to make sound predictions about the effects of water development without first establishing the “critical biological data.”<sup>38</sup> Rather than be lead by a problem-oriented agenda, where fisheries scientists tried to solve any given dam problem when and if it arose, fisheries scientists argued for the necessity of a broader vision that would help to establish baseline knowledge from which specific decisions could be made.

Fundamental research remained, nevertheless, an imprecise goal. Different scientists believed that some problems required more or less attention. In Brett’s detailed schema of future research, he identified three broad fields of concern: physiology, stress

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<sup>37</sup> NAC, RG 89, Vol 672, File 2558A, JR Brett, “Salmon Research and Hydro Power Development,” Fisheries Research Board of Canada, Biological Station, Nanaimo, BC, July 15, 1956, emphasis in the original

<sup>38</sup> UBC Special Collections and Archives, Fraser River Hydro and Fisheries Research Project, File 4, William S Hoar, “Power Development and Fish Conservation on the Fraser,” Technical Report—Biological, September 15, 1956, emphasis in the original.

and migratory aspects. Within these three fields, he identified twelve topical areas of investigation.<sup>39</sup> Unlike the opening emphasis on fundamental research, however, some of them focused on applied problems such as how to handle fish passage during the construction phase of a dam or how to entice salmon into bypasses and around dams. The line between fundamental and applied research blurred when specific topics were entertained. Other researchers, such as Peter Larkin and WS Hoar suggested the priority of other kinds of research. Larkin, with a strong research background in limnology, argued for close attention to impacts of dams on lakes, water temperatures and water quality issues.<sup>40</sup> Hoar, a zoologist, drew his brief on the basis of his reading of problems in ecology, physiology and fish behavior: he advocated a broad approach drawing from and linking each of these fields.<sup>41</sup> More than Brett, who had applications in mind, Hoar had a vision of a wide field of investigation, lasting over at least three to four sockeye life cycles, or fifteen to twenty years. Fundamental research branched out into a variety of directions for Hoar: from long-term studies of the evolutionary shifts in salmon after the last ice age to close studies of salmon behaviour. What went without saying from all of these students of the problem was that their ideas of fundamental fisheries science were nevertheless directed: towards the river, its tributaries and lakes and away from the ocean. Fundamental science, in these readings, contained a spatial bias.

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<sup>39</sup> These were: delay, changes in water quality, diversion, blocked passage, passage upstream through reservoirs, final upstream migration, passage downstream through reservoirs, passage over dams, bypass entrance and transportation, condition of young salmon in tailraces, changes in water quality in terms of downstream migration, and problems during the construction phase.

<sup>40</sup> Peter A Larkin, Power Development and Fish Conservation on the Fraser River (Vancouver: Institute of Fisheries, UBC, May 1956)

<sup>41</sup> UBC Special Collections and Archives, Fraser River Hydro and Fisheries Research Project Papers, File 4, William S Hoar, "Power Development and Fish Conservation on the Fraser River" Technical Report—Biological, September 15, 1956

Apart from the fact that no single vision of research needs could organize fisheries science on the fish-power issue, institutional differences imposed different kinds of restraints, obligations and possibilities on researchers. Brett's prospectus for fundamental research grew out of earlier studies conducted in the Fisheries Research Board labs and field studies; his perspective developed out of a particular context. Larkin and Hoar's programs, on the other hand, arose from discussions surrounding the BC Electric research grant to UBC for fish-power research. Their positions were framed by the question put to the university by BC Electric President Dal Grauer: could there be low level dams on the Fraser and still be healthy fish runs?<sup>42</sup> They imagined their research programs in terms of the mandate of the University, as opposed to government research, and wondered how research contracts might limit academic freedom.<sup>43</sup> Fundamental research and the appropriate research directions accordingly had different meanings for both groups. Beyond these institutions, other active research agencies pursued applied programs, in keeping with their mandates: the Fish and Game Branch focused on lake productivity and limnology studies with a view to the sports fishery; the IPSFC investigated dam proposals on the Fraser on a case by case basis, in order to contain projects that might infringe upon the Pacific Salmon Convention; and the fish culture and development branch of the Department of Fisheries pursued mitigation work at existing and prospective dams and carried out research on the possibilities of artificial spawning

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<sup>42</sup> UBC Special Collections and Archives, Fraser River Hydro and Fisheries Research Project Papers, File 2, ES Pretious, LR Kersey and GP Contractor, "Fish Protection and Power Development on the Fraser River" (UBC, February 1957). These authors quote Grauer's question to the researchers as part of their terms of reference.

<sup>43</sup> Peter A Larkin, Power Development and Fish Conservation on the Fraser River (Vancouver: UBC Institute of Fisheries, May 1956), p 38

channels and hatchery production. Thus the call for fundamental research was in some sense not only an attempt to organize and redirect research in progress but also a demand for an expansion in the capacity of fundamental research. In his review of fish-power research, WS Hoar wrote of the necessity of “funds commensurate with the magnitude of the proposed changes...”<sup>44</sup>

Yet if not all fisheries research on the west coast could feed into a single coherent fundamental research program, there was much work of value contained in the different institutional spheres and applied programs. Over the 1950s, research on fish-power topics and related matters blossomed in terms of research effort and the number of projects. When fisheries scientists compiled an index of their work—both fundamental and applied-- at decade's end, they recorded a steady growth in projects. By the middle of the decade, researchers scrambled to keep up with the pace of the work and the range of new findings.

**Table 4: The Growth of Fish-Power Fisheries Research Measured by Project Starts**<sup>45</sup>

Research Project Start Dates	Total Projects of All Fisheries Research Agencies
Before 1950	34
1951-1953	31
1954-1957	68
1958-1960	51

\*NB Because the table measures research starts, it hides the number of projects extending over more than one time period. It should be noted that on an aggregate level, the number of total projects in operation grew over time. Fifty-nine projects extended into the final research period that had begun before that time.

<sup>44</sup> UBC Special Collections and Archives, Fraser River Hydro and Fisheries Research Project, File 4, William S Hoar, “Power Development and Fish Conservation on the Fraser River” Technical Report—Biological, September 15, 1956

<sup>45</sup> Based on information contained in the “Summaries of Research.”

In order to shape this evolving program, scientists engaged in new forms of cooperation within and between institutions. Marked formally by inter-agency committees and joint research projects, cooperation also operated informally as scientists shared expertise, research findings and future plans. Although a hallmark of much past fisheries science in BC, cooperation took a qualitative shift in scale and significance under the political pressures of the fish-power problem. Fisheries scientists operated on the belief that time was of the essence and that the pooling of expertise and research funds and the creation of a synergistic research environment provided the most direct route to a 'solution'.

The most concrete expression of this new cooperative impulse revealed both the desire to enhance cooperative research outcomes and the problems of political pressures. Formed in 1957 under the auspices of the federal Department of Fisheries, the research sub-committee of the Fisheries Development Council brought together representatives from all five of the major fisheries research institutions in BC: the federal department, Fisheries Research Board, the provincial Fish and Game Branch, the IPSFC and the UBC Institute of Fisheries. It aimed to provide a forum for the sharing of research findings, the exchange of ideas and the creation of joint projects. The connection of the sub-committee to the broader Council, however, suggested the second aim of the federal department in convening the committee: to advise the Council's industrial and union representatives on the course of fish-power research, provide technical background positions on current disputes and engage with the fisheries interest in planning a defense

to the power threat. One of the sub-committee's practical achievements spoke to both its research and political mandates: a summary document, created in the late 1950s that provided briefs on all fish-power research projects or related projects carried out in BC since the late 1930s. This document proved useful both to active researchers as a way of linking projects and keeping tabs on a burgeoning field, but also gave the fisheries department and industrial concerns a sense of the direction of research effort and some of the basic findings. For purposes of analysis, it also contains a good deal of useful, if uneven evidence, from which to draw conclusions about the organization and course of research in these years.<sup>46</sup>

In summarizing their work, fisheries scientists found it noteworthy to record the extent of cooperation between institutions in the course of any single investigation. Cooperation was both a practice and a matter of observation. Of one hundred eighty-five projects summarized by the research sub committee, numerous of them were cooperative in design. Based on the listings of the primary investigator institution and their research partners, it is possible both to weight the importance of cooperative projects to different institutions and identify the range and importance of research linkages.

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<sup>46</sup> NAC, RG 23, Vol 1230, File 726-11-14, part 2, AJ Whitmore, Director, Pacific Area to Deputy Minister of Fisheries, December 10, 1958; BCARS, GR 442, BC Energy Board, Box 52, "Summaries of Research on the Fish-Power Problem and Related Work by Fisheries Agencies in British Columbia," Prepared by Research Sub-Committee, Fisheries Development Council (Department of Fisheries, Vancouver, Revised December 1961) [Hereafter "Summaries of Research"] In interpreting this document I have followed the committee's definition of research relevant to the fish-power problem. Some of the research listings are incomplete, or do not follow a consistent pattern (for example in terms of project cost reporting). I have attempted to account for such difficulties as far as I am able.

**Table 5: Research Institutions and Cooperative Projects<sup>47</sup>**

<b>Primary Investigator Institution</b>	<b>Research Projects</b>	<b>Co-operative Projects</b>	<b>Co-op Projects as % of Total</b>
Department of Fisheries, Canada	76	41	54
BC Fish and Game Branch	24	10	42
Fisheries Research Board of Canada	20	11	55
International Pacific Salmon Fisheries Commission	51	22	43
University of British Columbia	14	12	86

Table 5 suggests the wide extent of cooperative projects across the institutional landscape, with the strongest cooperative emphasis appearing in the work of the UBC Institute of Fisheries and the federal Department of Fisheries. In these cases, access to research facilities and field locations proved important for university researchers, while matters of jurisdiction and technical expertise drove the federal department's cooperative needs. The fact that the majority of research projects on fish and power were conducted within the Fraser basin, for example, drew the federal department into cross-jurisdictional relationships with provincial authorities and the IPSFC.<sup>48</sup>

Turning to the emphasis of cooperation between institutions, however, one finds stronger linkages between certain key groups. The Department of Fisheries, with the greatest number of cooperative projects, recorded fifteen separate cooperating agencies, from the US Fish and Wildlife Service to the BC Power Commission to the UBC Institute of Fisheries. Its greatest links were with the provincial Fish and Game Branch (eighteen cooperative projects) and the IPSFC (twelve cooperative projects). For other agencies, the Department of Fisheries proved to be the most important cooperating partner: it

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<sup>47</sup> Based on information contained in the "Summaries of Research."

ranked as the lead cooperator for the Fish and Game Branch, the Fisheries Research Board of Canada, and the IPSFC. Only the Fisheries Institute at UBC did not maintain strong research cooperation linkages with the federal department; its major cooperating agency was the National Research Council, in keeping with its academic orientation. Thus in parallel with the important coordinating function carried out by the federal department through the research sub-committee of the Fisheries Development Council, the department also acted to connect different institutions on a practical, research project level.<sup>49</sup>

If cooperation was crucial to the expansion in research and the conduct of a more unified program, it did not solely define the institutional nature of research in this period. Over the 1950s, there was a rough fifty-fifty balance maintained by institutions between cooperative and individual projects. Cooperation occurred at what might be described as a middling band of research funding. Projects with budgets under ten thousand dollars recorded a majority of individual projects, and over fifty thousand the balance was almost equal. Between those posts, however, the majority operated with a cooperative element. Smaller projects, such as individual stream surveys, for example, did not require cooperation. The biggest projects, on the other hand, tended to have some mitigation aspect, specific to a particular agency, which may not have been of great import for research, but generally had high capital costs. The major research effort, in the middle band, however, was squarely cooperative. It tended to involve more personnel, extended over longer periods and involved two or more cooperating agencies. Thus while

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<sup>49</sup> Based on information contained in the "Summaries of Research."



individual institutional projects continued and increased over the period, the cooperative projects proved of particular importance to expanding research horizons.<sup>50</sup>

Cooperation meant different things in different contexts. In the case of the UBC BC Electric research grant, for example, there was a strong emphasis on blending the work of engineers with fisheries biologists so that the different insights of both might be brought to bear on the problem and help to sharpen the weak sides of both disciplinary approaches. Yet, despite this attempt to create inter-disciplinary cooperation, little effort was made by the UBC research team to link their projects with other fisheries agencies. In part this was conditioned by the nature of the grant donor. BC Electric was not interested in hiring or funding government scientists or science, but looked to the university as an impartial research institution, elevated from the politics of fish-power disputes in which government agencies were presumably embroiled. Peter Larkin in a preliminary planning document for the project stated that the university was looked upon as a disinterested observer; its pronouncements on the fish-power issue were neither invited nor desired.<sup>51</sup> Where the university did play a cooperative function that is not observable in the figures of cooperative projects was in playing host to a number of research conferences on the fish-power issue. One such conference, funded by a special grant from HR MacMillan, included scientists from the federal and provincial fisheries agencies.<sup>52</sup> In this case, the donor hoped to integrate results and expand the discussion.

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<sup>50</sup> Based on information contained in the "Summaries of Research."

<sup>51</sup> Peter Larkin, Power Development and Fish Conservation, p 38

<sup>52</sup> The conference was held April 29 and 30, 1957 and will be discussed below.

Cooperation could thus operate at a variety of levels and with different emphases depending on the nature of the political and institutional contexts.

Cooperation had a transnational element, but not as strong as one might have expected. Some general sharing of research results occurred between scientists and agencies in both Canada and the US, and transnational cooperation remained a cornerstone of the IPSFC mandate and program. Joint research projects also proceeded where sharing personnel or facilities made sense. One project, for example, pooled the skills of scientists from the IPSFC, Department of Fisheries and the Washington State Department of Fisheries to investigate the survival rates of downstream migrants through dam turbines at a suitable American facility, Baker dam in Washington State.<sup>53</sup> Yet beyond such examples, cooperative research with American agencies did not become a major priority, despite the similar concerns and problems of American researchers. In part, Canadian researchers hoped not to duplicate American projects needlessly and so envisioned their work in conscious distinction from American precedents. More critically, some Canadian scientists believed that American research remained mired in an overly applied phase. In his review of fish-power research, for example, JR Brett criticized American research on the Columbia as overwhelmingly focused on local technical problems relating to particular dam structures rather than on general questions of fish physiology and ecology.<sup>54</sup> Canadian research displayed a more fundamental element, in his view. While this conceit is questionable, given the scale of applied work

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<sup>53</sup> JAR Hamilton and FJ Andrew, "An Investigation of the Effect of Baker Dam on Downstream-Migrant Salmon," Bulletin VI (New Westminster: IPSFC, 1954)

<sup>54</sup> NAC, RG 89, Box 672, File 2558A, JR Brett, "Salmon Research and Hydro Power Development," Fisheries Research Board of Canada, Biological Station, Nanaimo, BC, July 15, 1956, foreword.

in Canada in the same period, it is also true that much American research funding remained tied to mitigation work at the Columbia dams in the 1950s for the very pressing reason that salmon numbers were falling and scientists wanted to know why and how the situation could be improved. It should also be remembered that Canadian and American research grew out of different political and institutional contexts. Joseph Taylor argues, for example, that artificial propagation research dominated American research over the first half of the twentieth century, while it played almost no role in Canada following the cancellation of federal hatcheries in 1935. American research remained tied to hatcheries and mitigation work, while Canadian research followed a more flexible course.<sup>55</sup> Thus while the nature of the problem of fish and power could have provided a basis for much transnational research cooperation, the conduct of fish-power research proved to be much more focused on the integration of national, provincial and international institutions, rather than American or stated-based counterparts.

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In the early 1950s, fisheries scientists had called for more research to solve the fish-power problem. They had attempted to manage expectations and explain the extent of their ignorance. By the closing years of the decade, however, granting agencies, governments, public commentators and dam developers called for answers. The research money had been spent, now where were the results and lessons? Fisheries scientists faced, in some sense, only the same dilemma in more heightened form by the late 1950s as they had encountered before. They understood the demands for answers and they

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<sup>55</sup> Joseph E Taylor III, "Making Salmon: The Political Economy of Fishery Science and the Road Not Taken," *Journal of the History of Biology* 31 (1998): 33-59

responded in kind with conferences, special synthetic reports-on-progress, academic papers and commentaries. In general, it might be said that fisheries scientists offered no panaceas and spoke cautiously about the capacity of technical contrivances to overcome the fish-power dilemma. There would be no miraculous discovery as at Hells Gate and no immodest predictions of the capacity of fishways to domesticate dams. Instead, scientists came to a fuller appreciation of the limits to remaking salmon under new environmental conditions. This was hardly the ringing response that promoters and power companies had hoped for and various challenges to scientific authority and knowledge occurred. In response, fisheries agencies and institutions confronted critics and policed the boundaries of scientific authority.

A conference held at UBC in 1957 to explore the problems of fish and power demonstrated the reticence of fisheries scientists to declare a solution and their desire to underline the extent of the difficulties. Introduced by the distinguished UBC fisheries biologist Wilber Clemens, the conference proceeded with a sense of gravity about the role of fisheries biology in public policy. Clemens expressed the concern thus:

...[T]he biologist is asked whether or not salmon may be passed over or around dams; if they can, how; and if not, why not; and in the latter case whether there is any method of maintaining the salmon stocks and having hydro-electric dams. Upon his answers hang very important engineering, economic and social consequences. Upon his answers rest decisions that will affect the lives of very many people for very many generations to come.<sup>56</sup>

Evaluating the many dam proposals before the public, Clemens rattled through the solutions aired in the press: trucking salmon around dams, massive fish passing devices

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<sup>56</sup> WA Clemens, "The Fraser River Salmon in Relation to Potential Power Development," in The Investigation of Fish-Power Problems ed Peter Larkin (Vancouver: UBC Institute of Fisheries, 1958), pp 3-10

and lift machines. He wondered how any such plans could cope with the massive scope of passing up to tens of thousands of fish per hour in main stem dams during peak migration times, or whether the imaginable changes in water temperature and quality, current and diversion would impose too great a burden on salmon. He did not say that these problems could never be solved, but his menu list of difficulties suggested his current pessimism.

In subsequent lectures speakers addressed the problems awaiting solution. EH Vernon, a biologist with the BC Game Commission, analyzed the impacts on lakes of reservoir flooding. WR Hourston, Chief Biologist with the Department of Fisheries, Pacific Area, followed Clemens in a general assessment of the many problems attending changed water and passage conditions. Stream ecology came under scrutiny from Ferris Neave of the FRBC, problems of lactic acid build up in delayed fish from Edgar Black, a UBC physiologist. JR Brett of the FRBC outlined a general theory of stress effects, while G Collins of the US Fish and Wildlife Service described the course of experiments in existing Columbia River dam fishways. FE Fry of the Ontario Fisheries Research Laboratory discussed how to measure performance in fish, and William Hoar of UBC, how to analyze behavior.<sup>57</sup> Here then was a summary of much of the on-going work of a variety of different agencies, concerned with related, but different scientific and

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<sup>57</sup> EH Vernon, "Power Development and Lakes in British Columbia," pp 11-14 in *Ibid*; WR Hourston, "Power Development and Anadromous Fish in British Columbia," pp 15-24 in *Ibid*; Ferris Neave, "Stream Ecology and Production of Anadromous Fish," pp 43-48 in *Ibid*; Edgar C Black, "Energy Stores and Metabolism in Relation to Muscular Activity in Fish," pp 51-67 in *Ibid*; JR Brett, "Implications and Assessments of Environmental Stress," pp 69-83 [check original]; G Collins, "The Measurement of Performance of Salmon in Fishways," pp 85-91 in *Ibid*; FE Fry, "Approaches to the Measurement of Performance in Fish," pp 93-97 in *Ibid*; William S Hoar, "The Analysis of Behaviour in Fish," pp 99-111 in *Ibid*.

regulatory problems. These were reports-on-progress, but also statements of concern about the possibility of answering the questions posed. DS Rawson, a fisheries biologist at the University of Saskatchewan, introduced a self-critical reference in the course of a general discussion of limnology that revealed the level of doubt about answering the problems, or of even asking the right questions:

Another obstacle to the solution of our problems is that we are not too much concerned with the primary biological production but rather with the production of fish; and not even the total production of fish, but in the production of certain kinds of desirable fish. Biologically speaking, the fisherman takes a very narrow and prejudiced view of productivity. Thus, if we cannot predict productivity in a natural lake, should we try it in a disturbed lake, where in any case, we are only interested in a very special kind of production?<sup>58</sup>

Rawson's question might be said to summarize well the concerns held by these biologists, not only about the ability to maintain fish runs in the event of dam building, but also about their capacity to understand those changes in their full significance. They offered their best answers to the pressing public demands, outlined initially by Clemens. What they could not do was offer final answers or imagine their possibility in the short term.

During the 1950s supposed advances in fisheries science commanded newspaper copy, and this conference was no exception. In the midst of the event and for days afterwards, metropolitan newspaper articles and editorials reported the scientists' findings and tried to make sense of them. In contrast to the skepticism evident in the text of the lectures, editorialists found much to suggest optimism. Indeed most newspapers reported that a solution to the fish-power problem loomed. As the News Herald enthused "Fish

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<sup>58</sup> DS Rawson, "Indices of Lake Productivity and Their Significance in Predicting Conditions in Reservoirs and Lakes with Disturbed Water Levels," pp 27-42 in Ibid.

Doctors work out lines to put Salmon in the Pink.”<sup>59</sup> The lecture presented by Ferris Neave of the FRBC attracted considerable attention and dominated coverage to the exclusion of the keynote address and other major papers. Its subject—stream ecology—was not the reason, but a casual remark Neave offered to the effect that dams as dams are not necessarily harmful to fish, but can in some instances help to protect spawning grounds from floods. When pressed on the point during questioning, Neave stated that not all dams performed this function, certainly not hydro dams, but he playfully imagined that dams could be made with a view to regulating flow to enhance salmon production.<sup>60</sup> Transmogrified into newspaper print, however, this idea became a statement that fish and dams could co-exist. Better still: dams could benefit fish. Headlines extolled “Beneficial Dams” and remarked that “Proper Dams Help Fish.”<sup>61</sup> The only articles that engaged scientists’ skepticism used their views as an argument for expanded research to solve the problem and quickly. The Sun reported “the frank confession of man’s ignorance about the ways of Pacific salmon,” and concluded that the conference “raises the need for salmon research almost in the crisis category.”<sup>62</sup> What research had been done and what its implications were for the fish-power problem remained matters of less comment.

The range of newspaper coverage in this instance—its emphasis and optimistic selectivity—found parallels in the general public discussion of fish-power research. Like the focus on the beneficial effects of dams, numerous optimists suggested that, fisheries

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<sup>59</sup> BCER CF, News Herald, May 1, 1957

<sup>60</sup> Ferris Neave, “Stream Ecology and Production of Anadromous Fish,” in The Investigation of Fish-Power Problems ed. Peter Larkin (Vancouver: UBC Institute of Fisheries, 1958), pp 43–48

<sup>61</sup> BCER CF, “Proper Dams Help Fish, Says Expert,” Sun, April 30, 1957; “Power Versus Fish Problem Solved by ‘Beneficial Dams’,” News Herald, April 30, 1957; “Salmon Aren’t Smart But They Puzzle Us,” Sun, May 1, 1957;

<sup>62</sup> BCER CF, “Salmon Research Urgent,” Sun, May 2, 1957

scientists to the contrary, the fish-power problem was virtually solved. One of the most vocal proponents of this view was Val Gwyther, a Vancouver consulting engineer, member of the Fraser River Multiple Use Committee and self-educated expert on the fish-power issue. On a number of occasions during the late 1950s, Gwyther attracted publicity for his heterodox views on solutions to the fish-power problem. He was described in private by one fisheries lobbyist as “either a mental case or a confirmed ‘time-waster’” for the simple reason that his views ran utterly contrary to the skepticism of fisheries scientists and that he received considerable attention for those views.<sup>63</sup> Gwyther’s central contention was that an engineered river would prove more beneficial to salmon production than the ‘natural river’.<sup>64</sup> He had read and mastered much recent American research on fish passage techniques and presented it in digested form for Canadian engineers; he had made calculations of the monetary value of the Fraser River per acre foot according to different industrial uses; he had also become much impressed by the artificial propagation methods employed by US fisheries regulators to perpetuate runs lost to dams.<sup>65</sup> Dams and fish could live together, he concluded, and salmon runs could be expanded once natural spawning “with its random and inefficient yearly production,” was improved by the scientists’ helping hand.<sup>66</sup> In newspaper articles, the

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<sup>63</sup> UBC Special Collections and Archives, Fisheries Association of BC Papers, File 45-34, unsigned statement dated June 8, 1958 concerning Gwyther’s paper *Some Facts—Fish and Other Resources*”

<sup>64</sup> Val Gwyther, “Watershed Resource Value: The Associated Development of Fish and Power,” Engineering Journal 44(11) (November 1961): 49-56

<sup>65</sup> UBC Special Collections and Archives, Fisheries Association of BC Papers, File 45-34, Val Gwyther, “Multiple Development of the Fraser River Basin: The Solution to the Conflict of Fish and Power,” BC Professional Engineer 9(10) (October 1958): 13-19; and “Some Facts—Fish and Other Resources” unpublished ms.

<sup>66</sup> BCER CF, “Fraser Dams Could Prove Salmon Boon,” Sun, January 8, 1959



engineering press and to the chagrin of UBC fisheries scientists, even in the UBC Alumni Chronicle, Gwyther's ideas received wide public notice.<sup>67</sup>

If the attention to Gwyther's ideas suggests the eagerness of the press to latch on to notes of optimism, the counter-reaction to his ideas offered by fisheries scientists speaks to the anxieties of established scientific authority when dominant conclusions received widely reported criticism and opposition. In order to stem the positive press reports of Gwyther's ideas, fisheries scientists and officials systematically worked to destroy his reputation. American scientists knowledgeable about artificial propagation wrote public declarations condemning Gwyther's interpretation of their work and asked him privately to cease his declarations; Tom Reid of the IPSFC publicly decried Gwyther's work as "trash"; and fisheries officials privately contacted Gwyther criticizing his views.<sup>68</sup> To all of this Gwyther could only reply that fisheries scientists did not have privileged access to the truth. "I suggest to you," he wrote to Dr AL Pritchard of the federal Department of Fisheries, "that developments of any kind can only be evolved with a broad logical approach to the problem; an approach that must take in and analyze all data that is available from any standpoint and resolve impartial conclusions."<sup>69</sup> In the most substantial critique, CH Clay, a federal fisheries engineer and Peter Larkin of UBC co-authored an article later distributed to MPs, MLAs, the press and radio, with a bold title intended to stop Gwyther's ideas in their tracks: "Artificial Propagation is NOT the

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<sup>67</sup> For example: BCER CF, "Fish and Power Can Co-exist for Benefit of BC Economy," Columbian October 24, 1958; "Fraser Dams Could Prove Salmon Boon," Sun, January 8, 1959

<sup>68</sup> BCER CF, "Dams Won't Aid Salmon, Official Says," Province January 10, 1959; "Senator Hits Power Dam Advocates," Sun, January 22, 1959; "Engineer's Fish Claims 'Incorrect'," Sun March 19, 1959

<sup>69</sup> NAC, RG 23, Vol 1225, File 726-11-5[14], Gwyther to AL Pritchard, December 2, 1958

Answer.”<sup>70</sup> The concern of fisheries interests not only to attack Gwyther’s ideas, but also to label him as a non-expert without the capacity to judge, is suggested in the authorial background to this critique. CH Clay of the federal Department of Fisheries wrote the piece independently. Members of the Fisheries Development Council, however, believed that the power of the rebuke would be strengthened if another respected scientist, beyond the federal department, appeared as the paper’s co-author. Peter Larkin was approached as a result and agreed.<sup>71</sup> This addition, as well as Larkin’s willingness to have his name used in this way, suggests how ‘cooperation’ could mean working hard to exclude others as well as joining together. It also demonstrated the direct links between supposedly disinterested scientists and the unabashedly interested fisheries lobby.

Gwyther suffered considerable public shaming at the hands of these fisheries scientists, but he shared company with others. Harry Warren, long one of the most vocal, and, from a fisheries point of view, reckless dam promoters, faced considerable and sustained public and private attacks on his integrity. Labeled publicly as “a geologist who knows nothing about fish,” in Tom Reid’s dismissive phrase, Warren also suffered attacks within the university.<sup>72</sup> In 1958 after a series of public speeches on the Moran dam, federal Fisheries Minister James Sinclair warned UBC President Norman Mackenzie of looming public criticism of the university if he did not rein in Warren.

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<sup>70</sup> BCER CF, “Engineer’s Fish Claims Incorrect,” Sun March 19, 1959; “Dams Won’t Aid Salmon, Official Says,” Province January 10, 1959; “Senator Hits Power Dam Advocates,” Sun January 22, 1959; UBC Special Collections and Archives, Fisheries Association of BC Papers, File 45-34, Milo E Moore, Director of Fisheries, State of Washington, to Val Gwyther, February 13, 1959 (copy); CH Clay and Peter Larkin, “Artificial Propagation is NOT the Answer to the Problem of Fish and Power on the Fraser,” BC Professional Engineer 10(3) (March 1959): 20-23

<sup>71</sup> NAC, RG 23, Box 1225, File 726-11-5, part 15, AJ Whitmore to Deputy Minister, March 4, 1959. Whitmore discusses the meeting and decision in this letter.

<sup>72</sup> BCER CF, “Senator Hits Power Dam Advocates,” Sun January 22, 1959

I write this letter to advise you that while the spokesmen of the fishing industry have so far been restrained in commenting on the foolish utterances of Professor Warren in this field which is foreign to his training, restrained mainly out of respect for the University, you cannot expect this restraint to be maintained if the Professor continues to use his standing as a Professor of a great University to advance the interests of American promoters.<sup>73</sup>

In a parallel episode, engineering professors Eugene Ruus and JF Muir came under attack from fisheries defenders for their views and supposed links to power interests. Both professors were members of the Fraser River Multiple Use Committee and authors of an optimistic review of engineering research on fish-power matters that proposed, amongst other things, that hydro development in the Fraser canyon would solve the Hells Gate problem by flooding it under a reservoir.<sup>74</sup> Tom Reid, chair of the IPSFC, claimed (incorrectly) to the press that the two engineers were apologists for BC Electric because the company funded their research. Although the engineers received research funds from the UBC President and the Fraser River Multiple Use Committee, they in fact had no connection to BC Electric.<sup>75</sup> It is difficult to imagine that Tom Reid, with close connections at UBC and in fisheries science more generally did not know this point, but was attempting instead to discredit opponents however he could. In a related and extraordinary act, Loyd Royal, scientific director of the IPSFC wrote to UBC President Norman Mackenzie and without naming Ruus and Muir called for the President to

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<sup>73</sup> UBC Special Collections and Archives, Fisheries Association of BC Papers, File 75-1, James Sinclair, Minister of Fisheries to NAM Mackenzie, President, UBC, February 28, 1957 (copy).

<sup>74</sup> BCER CF, "Hydro Dam Scheme at Spuzzum Won't Impress Fishery Experts," Columbian, June 3, 1961; "BC Engineers Solve Fish-Power Problem," Victoria Colonist, June 2, 1961; JF Muir and Eugen Ruus, "Engineering Research on the Fish Power Problem," Engineering Journal 44(10) (October 1961): 98-108

<sup>75</sup> BCER CF, "2 Professors Deny Influence of BCE," Sun, June 12, 1961; "Reid Charges BCE Seeks Fraser Dam," Sun, June 9, 1961. Fisheries biologists also made public statements questioning their research: BCER CF, "Biologists Say Fishway Proposals are Fanciful," Province June 6, 1961. A grant of \$500 to support Muir's research and his acceptance of said amount is recorded in the minutes of the Committee: UBC Special Collections and Archives, Fisheries Association of BC Papers, File 45-34, "Minutes of the Seventh Meeting of the Fraser-River Multiple Use Committee, June 3, 1958"

intervene and redirect the research programs of certain professors engaged in areas beyond their area of expertise. "It is my personal request," wrote Royal, "that you give serious consideration to eliminating the current trend of activity by these men and give personal support to an expansion of activity by them limited to their respective fields of endeavor."<sup>76</sup> Apart from searching for a solution to the fish-power problem, fisheries scientists and officials made considerable efforts to police the boundary of their authority and denounce individuals who offered contrary views, whether they held scientific credentials or not.

A different challenge to scientific authority emerged from the many unsolicited solutions proffered by amateur tinkerers and inventors to the fish-power problem in the 1950s. Originating from outside any formal educational or professional setting, various designs for miraculous fish passage devices made their way into newspaper pages and landed on the desks of bemused scientists engaged in fish-power research. The total number of designs of this kind is unknown, but it was sufficient to cause complaint from the scientists who were asked to assess them and led former federal Fisheries Minister James Sinclair to remark in 1958, "Almost every inventor in Canada seems to have had a crack at trying to devise some way to pass fish around high level dams."<sup>77</sup> The problem of passing fish over dams proved irresistible to a wide range of backyard inventors, who included, for example, Cecil Wilkinson of Victoria, an estimator for a moving firm, who developed a massive water wheel with "six pivoting blades, which swing open on one

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<sup>76</sup> NAC, RG 23, Box 1224, File 726-11-5, part 11, Loyd Royal, Director, IPSFC to Dr Mackenzie, President, UBC, December 6, 1956

<sup>77</sup> BCER CF, "Develop Power Resources on Non-Salmon Rivers," West Coast Advocate April 23, 1959

side and remain rigid on the other as the wheel turns.”<sup>78</sup> Such offers of assistance were in one sense entirely innocuous, genuine, sometimes ingenious and frequently bizarre. But the manner in which such solutions were judged by scientists and handled by the press spoke to broader issues of defining expertise.

One of the most widely publicized designs, the so-called ‘Devlin fishway’ invented by Powell River machine superintendent, AG Devlin, quickly became a minor cause celebre for small town dam promoters critical of scientific studies of salmon conservation. Following a demonstration of the device at UBC in 1959 that led scientists to judge it wanting, numerous local newspapers carried articles on the fishway and its inventor, complete with a crude line drawing showing a model dam with angular passages, full of arrows and small penned salmon swimming through effortlessly. Harry Taylor, writing in the Ashcroft Journal noted the unhelpful response of UBC scientists to this remarkable design (“All the fisheries experts can say is ‘it won’t work.’”), despite positive reactions from some unnamed engineers. He ended his article by asking “what more do the experts demand?”<sup>79</sup> Similar articles followed in newspapers as diverse as the Whalley Herald, the Powell River News and the socialist paper Western Advocate.<sup>80</sup>

After some of these reports, IPSFC representatives penned replies that spoke to some of the difficulties of fish passage.<sup>81</sup> In the Western Advocate, Tom Parkin of the United Fisherman and Allied Workers’ Union wasted no time in explaining the Devlin design as

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<sup>78</sup> BCER CF, Jack Fry “Hydro ‘Water Wheel’ Might Save Salmon,” Victoria Colonist, March 13, 1960

<sup>79</sup> BCER CF, Harry Taylor, “Hydro Power on the Fraser or Salmon or Both?” Ashcroft Journal March 26, 1959

<sup>80</sup> BCER CF, Harry Taylor, “Hydro Power on the Fraser or Salmon or Both?” Whalley Herald March 12, 1959; Powell River News, January 22, 1959; “Develop Power Resources on Non-Salmon Rivers,” West Coast Advocate, April 23, 1959

<sup>81</sup> BCER CF, Tom Reid, “The Case for Fraser Salmon,” Whalley Herald March 12, 1959

an ideological tool of the power establishment: “Despite the claims of self-styled experts who speak for the power people, trained fishery biologists and engineers both in the US and Canada claim there is no solution to the problem even in the foreseeable future.”<sup>82</sup> This condemnation accepted the authority of science as impartial and ideologically neutral, and categorized lay inventors as pawns of power. Although the Devlin design led nowhere, the debates over its efficiency suggest the frustration of certain interests with the seeming intransigence of ‘experts’ to common sense designs and the importance to fisheries interests of insuring that those designs were understood as amateurish.

Despite much criticism from the likes of Harry Taylor, UBC scientists involved in fish-power research showed remarkable patience in taking time out from their primary responsibilities to play host to a variety of amateur demonstrations.<sup>83</sup> On one such occasion, UBC engineering professor Edward Pretious hosted three visits from one Albert E Dane, a Canadian First World War Veteran and California resident, who had developed theories about fish passage. “My background,” Dane explained in a preliminary letter, “is non-academic, yet for many years I have been engaged in what may be termed a hobby, having primary significance wherever the term ‘fluid’ has meaning. Apart from other developments, I have applied my understanding to the problem of fish passing ‘at any desired angle and under varying conditions of flow

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<sup>82</sup> *Ibid*

<sup>83</sup> UBC Special Collections and Archives, Fisheries Association of BC Papers, File 45-33, “The Fraser River Hydro and Fisheries Research Project Progress Report” (Vancouver: UBC, July 21, 1958). This reports states that both Peter Larkin and Edward Pretious have fielded numerous public ‘solutions’ to the fish-power problem.

etc.”<sup>84</sup> Dane’s letter first reached General McNaughton, following on the much publicized proposal to divert the Columbia into the Fraser. It then passed to the Department of Fisheries and from there to Edward Pretious at UBC, who said he believed in the importance of remaining open to ideas, no matter their source.<sup>85</sup> But Dane’s presentations to Pretious did not impress. Reporting on the meetings to federal fisheries officials, Pretious explained that

Mr. Dane was anxious to impress me at first with the fact that he is not particularly concerned with fish as such, but only in the behaviouristic responses of all living creatures to the fluid medium in which they live, whether it be air or water. This rather general treatment of animal creation made me cautious and I subsequently discovered that his knowledge concerning the characteristics of anadromous salmon was rather hazy. I say this because, recently I have had the rather onerous task of corresponding with members of the public at large, who feel very confident that they can solve the fish-passage problems of salmon migration much better than all the conservationists, engineers and biologists who have spent so much time, money and talent on these problems. Maybe they can, but until their ideas are put to the test the world will never know, because unfortunately no one is willing to gamble on these ideas. Furthermore, these well-meaning individuals put me in mind of people who are quite prepared to perform an intricate and delicate surgical operation without even the benefit of an introductory course in first aid. They personally do not stand to lose anything which makes them very confident.<sup>86</sup>

Monitoring the ideas of amateur inventors, giving them a hearing and explaining their faults drew both from a sincere willingness to accommodate ideas from unexpected places, but also a concern to nip naive suggestions in the bud. The expert bore responsibility and obligations, Pretious argued; the amateur did not.

Despite the many such challenges presented to fisheries scientists and their authority, the opposite condition of an uncritical acceptance of fisheries scientific expertise imposed a different set of difficulties. During the late 1950s after an initial stage of fisheries research suggested the sheer complexity of the problem, numerous

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<sup>84</sup> NAC, RG 23, Vol 1229, File 726-11-10[2], Albert E Dane, to General AGL McNaughton, Canadian Chairman, International Joint Commission

<sup>85</sup> NAC, RG 23, Vol 1229, File 726-11-10[2], Edward Pretious to CH Clay, Department of Fisheries, October 29, 1956

<sup>86</sup> *Ibid.*

interests, from widely different political perspectives, joined in calling for an expansion in researching funding. It seemed to many interests that funding for fish power research had now reached a 'crisis stage,' as the Sun declared following the UBC fish-power research conference in 1958. "Unless Canada is prepared to accelerate its research for a solution to the growing problem of fish and their peaceful co-existence with power," stated BC Electric executive director Harold Merilees, sounding like a cold warrior, "it may be too late—BC's economy may demand commencement of hydro development on the Fraser."<sup>87</sup> Harry Warren supported more research, so did John Deutsch, chair of the UBC economics department; the Western Fisheries Magazine, the Fisheries Association of BC and former federal fisheries deputy minister Donald Finn all made it known that more research funding would go a long way to overcoming the current difficulty.<sup>88</sup> Gordon Shrum, Chair of the BC Power Commission and a public supporter of developing the Fraser, proposed a government led \$10 million research program in 1958 to put the matter of fish and power to rest.<sup>89</sup> With a "joint federal-provincial research program," ran an editorial in the Sun the same year, a solution to fish and power might be possible.<sup>90</sup>

The benefits to fisheries scientists of this widespread support for an expanded research program were obvious enough; what worried them was that it operated on the assumption that a solution was possible. For despite the seeming interest of power

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<sup>87</sup> BCER CF, "Power Expert Urges Fraser River Research," Cariboo Observer, March 18, 1959

<sup>88</sup> BCER CF, "Fish vs. Power Case Depends on Research," Province, June 4, 1958; "It's a Matter of Fish AND Power for BC, Economists Tell Panel," Province, March 2, 1957; "More Work Urged on Fish Study," News Herald January 29, 1957 [this article reports the Western Fisheries position; "Still Shy on Research," Sun, February 17, 1958; "Research Answer to Fish vs. Power," Sun, February 14, 1958

<sup>89</sup> BCER CF, "No Solution Yet," Victoria Times, April 30, 1958; "A Word from the Wise," Sun, April 29, 1958

<sup>90</sup> BCER CF, "Real Threat to Fraser Fish Lies in Politicians' Blindness," Sun, March 25, 1958



supporters in developing fisheries research, a strong current of belief existed that what was needed was an end to excuses and an expansion in large scale and effective research to force a solution. When Loyd Royal made the public statement in 1958 that a solution to the fish-power problem was still far in the future, for example, Gordon Shrum asked in a letter to the editor of the Province why fisheries scientists accepted such generous research funds when they seemed incapable of imagining a way ahead? "Fortunately," he asserted, "all scientists and engineers do not approach this problem with the same pessimistic and defeatist attitude."<sup>91</sup> His proposal for a major research program would, to the contrary, develop a solution within five years, a veritable fish-power "crash program."<sup>92</sup> Shrum, stated a Province editorial, held the "scientist's conviction that science can do almost anything."<sup>93</sup> Fisheries officials and scientists thus had to treat such support for research with caution and without accepting the responsibilities for instant results that power supporters wished to see. "Hydro authorities," said Tom Reid, chairman of the IPSFC, in one attempt at deflection, "are trying to create the impression that a solution of the fish-power problem is just a matter of probabilities, and that if enough people are given enough money, the problems will be solved in no time at all."<sup>94</sup> But what was needed, he and others repeated, was time and a greater appreciation that, as fisheries scientist RN Gordon put it, not all problems can "be solved by engineering

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<sup>91</sup> BCER CF, Letter to editor from Gordon Shrum, "It Takes a Smart Salmon to Fool a Scientist," Province, May 8, 1958; Royal's statement is contained in, "Science Can't Fool Salmon," Province, May 2, 1958

<sup>92</sup> BCER CF, "Shrum Urges 'Crash' Research Program on Fish-Power Issue," Province, April 28, 1958

<sup>93</sup> BCER CF, "Science Can't Fool a Salmon," Province, May 2, 1958

<sup>94</sup> BCER CF, "No Easy Solution to Fish-Power Problem," Columbian, December 14, 1959

principles alone.”<sup>95</sup> In a major synthetic report of fish-power research published in 1960, FJ Andrews and GH Geen wrote, “Extensive basic and applied research in salmon biology and fish-power problems is now being undertaken but there is no justification for expecting early solutions to all of the particularly complex Fraser River fish-power problems.”<sup>96</sup> Against what he viewed as a naïve techno-optimism, Peter Larkin put his own scepticism bluntly in 1960: “Anyone who believes that a pat universal solution to fish-power problems is around the corner is living in a fool’s paradise.”<sup>97</sup>

It was not until 1971, when the BC Energy Board, under the chairmanship of Gordon Shrum, reopened the possibility of a dam at Moran that fish and power again dominated the politics of the Fraser River and drew fisheries science into the orbit of provincial power policy. Yet on this later occasion, not only had the politics of power shifted with the rise of a new environmental movement in BC, but also the knowledge of the biology of salmon and the environmental consequences of dams had changed in significant ways. Now, the problem of fish and power on the Fraser was framed with the background experience of large dams worldwide. Scientists traveled to Egypt to study the effects of the Aswan dam on the Nile to gain a sense of what might be the result of a dam at Moran on the Georgia Strait. More directly relevant, the experience of fish and dams on the Columbia River inspired less confidence than formerly. Fisheries scientists learned after the 1950s that dams change fish, not just delay or block them. Reservoirs on the Columbia, for example, altered underwater gas conditions, producing imbalances

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<sup>95</sup> RN Gordon, “Fisheries Problems Associated with Hydroelectric Development,” Engineering Journal 47(10) (October 1964): 37

<sup>96</sup> FJ Andrew and GH Geen, “Sockeye and Pink Salmon Production in Relation to Proposed Dams in the Fraser River System,” Bulletin XI (New Westminster: IPSFC, 1960), abstract

<sup>97</sup> BCERR CF, “Long-term Plan Urged on Fish-Power Snag,” Province, September 27, 1960

in fish nitrogen consumption with the effect of producing large bubbles in fish bodies, which, when ruptured, killed fish. During the Moran investigations in 1972, Peter Larkin insisted that BC had the strongest research specialty in the world in problems of fish and power, that no solution could be easily imagined, that fish and dams could not simply co-exist.<sup>98</sup>

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The authority of fisheries scientists, notions of their expertise and perceptions of their ability to transform nature rose, faced challenges and was vigorously defended over the 1950s. The problem of authority proved critical in the politics of fish and power. Who could say how salmon might react to environmental change, who had privileged access to the biology of salmon, and who could judge the right from the wrong impacted the public discourse of this environmental debate? In the early 1950s fisheries scientists gained widespread praise and trust for past successes. When initial results of investigation into the fish-power problem demonstrated only a more complex sense of limits, however, power promoters, inventors, amateurs and enthusiasts sought to overcome a perceived pessimism and press the boundaries of established knowledge. These efforts resulted in few solutions, but several contests of both minor and more general importance on the grounds of expertise and authority. Fisheries scientists defended their reputation and attacked those of apparently unqualified challengers as a means of maintaining a privileged and coherent voice in public discussion.

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<sup>98</sup> BCARS, GR 442, BC Energy Board, Box 26, File 1, Larkin to Hugh Keenleyside, May 29, 1972

The insistence of fisheries scientists on denying their capacity to know, while at the same time denigrating the knowledge claims of others, points to the politics of their studied claims of ignorance: no answer was an answer. By implying that science had no clear solutions, scientists displaced responsibility into the political realm and the hands of developers. Should politicians or developers wish to proceed, they did so with no scientific legitimacy or apology. They would have to admit frankly their willingness to risk destroying fish runs. Only the more flamboyant and marginal power promoters such as Harry Warren took this tack. Dominant hydro interests like BC Electric attempted to resolve the problem by funding science in search of a solution. Following the undecided reports on this research, and in the late 1950s the rising possibility of development on the Columbia, BC Electric backed off, stating its long term interest in the Fraser but insisting that no development would occur before scientists could solve the fish-power problem. Throughout the 1950s, WAC Bennett avoided a direct judgment on the Fraser River issue by consistently claiming that he would not support power development until the fish-power problem had a scientific solution.

By altering the emphasis of the fish-power debate and resisting the deployment of science towards a development agenda, BC fisheries scientists took a different approach than their American counterparts on the Columbia in the 1930s and after. Whereas in Canada fisheries scientists insisted on pre-development studies and withheld approval of numerous dam projects, US fisheries scientists had helped to legitimize dam development by taking active roles in dam construction and planning and in boosting their own capacity to save runs by means of fishways and artificial propagation. This role was in

part related to the long-standing dependence of fisheries science in the US, particularly within the federal government, upon hatchery research. It was in light of this experience that BC fisheries scientists and American scientists within the IPSFC sought to insist that these earlier so-called solutions were no solutions at all and that understanding of the relevant problems only became more complex over time.

Apart from shifting the discourse of the fish-power debate and positioning science within it, fisheries scientists found it possible to play a more active political role in resisting specific development proposals. As discussed in Chapters 6 and 7, scientists gained powerful positions within the Department of Fisheries, the IPSFC and the Fraser Basin Board to assess dam projects and comment on their merits and demerits during the planning stage. Scientists played more than the role of advisors in this capacity because of the legal authority of the Department of Fisheries under Section 20 of the Fisheries Act, which allowed the department to insist on remedial measures in river structures. Although, as in the Alcan case, scientific assessments could be ignored or over-ridden, even in this case, some important and expensive changes were made to the original project design. In the case of the BCPC's Quesnel River project in the early 1950s, fisheries scientific advice played a stronger role and dam development was displaced. When the project was cancelled, Premier Johnson co-opted fisheries scientists of the IPSFC to brief him and used scientific findings to lend credence to his political decision. Fisheries scientists' views had instrumental power within institutions and the planning process. They could not simply deny development projects, but they could suggest

imposing expensive mitigation exercises on developers or place potential projects in such a poor light as to instigate political difficulties.

The influence of science on the fish-power debate was not unidirectional. Politics changed science and its knowledge. Throughout the 1950s, the search for a solution to fish and power—both in fundamental and applied studies—occurred within a new institutional framework. In response to this looming problem, funding for fisheries science increased, institutions emerged and cooperative linkages were created. These shifts had variable impacts. UBC probably benefited the most from expanded funding; the Department of Fisheries became the institution with the most porous boundaries and strongest cooperative links and coordinating function. Scientists in these institutions made and gained new roles within the Pacific fisheries science community as a result.

The results of research had more significance and meaning than the instrumental goals to which some wished to direct them. In 1970, Peter Larkin reflected on the course of research during the 1950s and observed “From a biological point of view, the fish-power problem spurred interest in physiology and behaviour, bringing to light a better appreciation of the many adaptations of salmon to their environment and mode of life.”<sup>99</sup> In 1956, William Hoar stated that the fish-power debate had acted as a forcing ground for drawing fish behaviorists into the broader community of fisheries science; political pressures erased former disciplinary barriers.<sup>100</sup> The cooperative project of fish-power

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<sup>99</sup> PA Larkin, “Management of Pacific Salmon of North America,” in A Century of Fisheries in North America eds. Norman G Benson (Washington, DC: American Fisheries Society, Special Publication No. 7, 1970), p 232

<sup>100</sup> UBC Special Collections and Archives, Fraser River Hydro and Fisheries Research Project, File 4, William S Hoar, “Power Development and Fish Conservation on the Fraser,” Technical Report—Biological, September 15, 1956

research and the intersecting of different intellectual avenues of approach produced significant side effects for the development of biological thought. What remains unstated in Larkin's observation, of course, is that the focus on problems of inland waters and the questions of changing fresh water environments produced a different and less salutary by-product in a concomitant inattention to problems of ocean migration and oceanography. Although research surrounding the negotiations of the International Convention for High Seas Fisheries of the North Pacific Ocean signed with Japan and the United States in 1952 produced new knowledge of ocean habitats of salmon, the fish-power problem emphasized a bias towards riverine environments.<sup>101</sup> There is no doubting that the increased funding of applied problems on fish and power produced important fundamental findings about salmon life history as well; but it also the case that the emphasis of funding, institutional research programs and scientists' political contexts directed science in ways that did not necessarily overlap with questions of a fundamental character. It may well be impossible to know, as Robert E. Kohler suggests in a study of scientific institutions, what would have happened to science without the impetus of institutional funding and the pressures of the political context.<sup>102</sup> But it is tempting to wonder: Given the freedom to pursue their own questions, would fisheries biologists have focused on the study of salmon responses to environmental change under dam development? Or would they have taken a broader view, encompassing the ocean and

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<sup>101</sup> On the impact of this convention, see: MC Healey, "The Management of Pacific Salmon Fisheries in British Columbia," in Perspectives on Canadian Marine Fisheries Management eds. LS Parsons and WH Lear Canadian. Bulletin of Fisheries and Aquatic Science 226 (1993): 250

<sup>102</sup> Robert E Kohler, Partners in Science: Foundations and Natural Scientists 1900-1945 (Chicago: University of Chicago Press, 1991), pp 2-3

the river, and not looking to immediate ends, but long-term topics of ecological significance?



## Conclusion

The free flow of the Fraser River bears the consequences of history, but, with its rich muddiness, reveals none of its causes. Over the twentieth century, this river has played host to dreams of liberation and transformation; to physical changes and social consequences; to protective actions and inactions. Yet against the predictions of most observers in the early and middle parts of the century, the river runs freely in its main course. The river plays host to dreams, but not to large dams.

How and where the Fraser could be dammed came into focus in the early twentieth century. Pioneering hydrologists mapped the Fraser's waterpower, measured the river and its tributaries and sold the public on potential. The river, they explained, could be dammed on its main stem, or large tributaries in the upper basin could be turned into reservoirs, reversed and sent to power generators on the coast. Carried out by both the provincial and federal governments, these water surveys aimed to rationalize water rights and spur development. Before the 1940s, they performed the former function better than the second. What dams were built in the Fraser basin remained small in scale and limited to tributaries.

Fisheries scientists conducted similarly inventorial projects in the early years of the century. They sought to determine where salmon migrated, if they migrated and what conditions benefited and harmed them. Just as hydrologists hoped to spur growth, fisheries scientists aimed to produce more fish and conserve those in existence. They built hatcheries, toured the Fraser basin, observed conditions and collected informal knowledge. Both provincial and federal governments contributed to these ends. By the 1920s, the federal government, with its research station at Nanaimo, assumed a

leadership role, while the provincial effort declined. In the water field the opposite federal-provincial emphasis took hold. Federal initiatives in water surveying fell off, while the province took on the major role. As institutions evolved and conditions came under closer scrutiny, the instrumental knowledge of BC's resources grew.

British Columbians realized the river's waterpower incrementally. In the upper basin extractive resource development introduced a mining dam on the Quesnel River and a lumber splash dam on the Adams. In the lower basin, an expanding metropolis, serviced by the monopolistic utilities concern, the BC Electric Railway Company, reached into its immediate hinterland and dammed the Coquitlam, Stave and Alouette Rivers. Some promoters imagined damming the Fraser's main stem in 1912. Compared to other jurisdictions such as the US Pacific Northwest, where competition drove development and state investments laid the groundwork for major hydro projects, in BC the monopoly aspect of the utilities field served to limit rapacious expansion and exclude a strong state presence. While large dams appeared on the Columbia in the 1930s, on the Fraser the BCER faced the depression with a conservative policy of canceling planned developments, the better to be led by demand.

How dams would affect the river's salmon did not figure prominently in the planning and building of these early projects. Although the federal Department of Fisheries possessed legal authority to demand the installation of fish passage facilities, it did not exercise this power consistently or with much technical ability. The regulatory framework was not yet well defined. Regulation generally followed fisheries protest. In some instances, provincial officials, without jurisdiction, played a prominent role.

Sporadic attempts sought to domesticate dams to the river. The Quensel dam had fishways added to it, but not before runs suffered severe damages. Fishways at the Coquitlam dam proved unworkable; they were jettisoned with dam expansion in 1912. No mitigation works were used in the Stave Lake or Alouette projects, and some runs disappeared. Only in the 1920s did provincial and federal officials begin to study the problems of fish passage, jurisdiction and regulation in a concerted manner. What is remarkable is that more damage did not occur. In part, the conservative growth strategy of the monopolistic urban utility, that created a concentrated program of dam development in two watersheds, inadvertently limited the range of dam building and its deleterious consequences on fish.

The most important dam in the river's modern history in terms of salmon conservation arrived by accident, not design. Between 1911 and 1914 rockslides at Hells Gate, triggered by railroad construction, filled one of the river's narrowest gorges. In the summer of 1913, the largest salmon migration of the century reached Hells Gate and confronted a nearly impassable earth dam. John Pease Babcock, BC's Assistant Fisheries Commissioner stood above the gate and watched the writhing, red bodies of thousands of mature sockeye dying below. For decades afterwards, Babcock and his fellow fisheries scientists would study how to restore fish to the river.

The slides proved a tragedy for more than aspiring fisheries scientists and regulators. Native fishers in the canyon and beyond who fished at the Hells Gate site found their access to resources transformed. Former ways of making a livelihood were denied, former practices forbidden or limited. Government officials, promising, but only

belatedly delivering, conservation, annexed former fishing places belonging to kin groups. For commercial fishers the slides undercut supply beginning in 1917. In the future the industry would change the focus of its fishing pressure to other species, and, for a variety of reasons, re-orient to the northern fishing grounds. The slides impacted the water, the fish and the salmon's many human claimants.

The political consequences of fisheries depletion on industrial fisheries concerns in both Canada and the US provided the impetus to international negotiations in the 1920s and 1930s. Following on a protracted round of diplomatic discussions, pitting different groups of fishers as well as national interests against one another, the Pacific Salmon Convention was finally approved by both national governments in 1937. This convention divided the sockeye salmon catch between the US and Canada and provided the basis for a new restoration and regulation program under the auspices of a bi-national commission. The commission's responsibility began with an eight-year scientific program to establish the contours of the resource problem. Just as science impacted political discussions about how resources should be conserved and treated in the early years of the century, the IPSFC's scientific program delivered advice about how the river should be managed, and how the salmon should be captured and saved.

The commission's most important discovery occurred at Hells Gate. Canadian officials had examined the site after the slides and again in the late 1920s in an intensive set of engineering studies. They had declared the gate restored. The commission found evidence, however, of continuing blockages at the gate and begged another look. By tagging fish above and below the gorge, they tried to create a mirror for nature. What

they found instead were approximate signs, confused by social and cultural complications. Native fishers collected tags, fished for them deliberately and used them as local currency. Fisheries scientists tried to counter the effects of these practices on their results, but did not explain fully how they did so. The tagging studies suggested that many fish could not pass the gate at certain water levels or did so only after considerable delays. When William Thompson, the scientific director of the commission, observed the blockade below Hells Gate in 1941, he believed that he was witnessing a repeat performance of the famous blockade of 1913. Thompson read the history of the rise and fall of the river's salmon as a story of dams and their impacts. The great leveler was Hells Gate, he said, not the industrial fishery. Fishways became the answer to this problem and in the late 1940s the commission constructed fish passage through the gate as its major restoration effort. Of course, all were not content with Thompson's explanation. Canadian fisheries scientist William Ricker disagreed with Thompson's arguments and questioned the IPSFC's methods and data. He and Thompson engaged in a polemical debate that drew in their respective institutions and national fisheries scientific communities. Speaking to the concerns of a new era, Ricker asked whether the fishways were expected to save fish or block dams?

Before 1940 British Columbians held modest expectations of their ability to dam the Fraser, but during the war attitudes shifted and hopes soared. On the Columbia during the 1930s massive dams at Bonneville and Grand Coulee had transformed the river into one of the New Deal's most spectacular examples of social and environmental experimentation. Whereas in the US Pacific Northwest during the war years aluminum

projects blossomed as well as large industrial plants, in Vancouver lighting restrictions and occasional brown-outs marked the period. Constrained by BC's limited power supply and restricted industrial growth, British Columbians looked enviously to the Columbia and began to question the efficiency of the existing utilities. BC enthusiasts like Harry Warren pored over the water surveys conducted in the 1920s and 1930s and imagined possibilities. Across the province a leftward shift in political sentiment and activity combined with a broad social vision of rural electrification to create an impressive non-partisan public power movement. Against this wave, the center-right coalition government did not stand but sought instead to re-direct the flow. And this it did with modest success. In 1945 it created a public power commission that would service hinterland areas, but leave the major urban monopoly intact. The agenda met the demands for expanded electrification, while preserving private capital. When the Fraser River flooded in 1948, the call for dams gained another aspect and another bureaucratic home. The Fraser Basin Board joined other river institutions in imagining and debating the river's future. By the late 1940s a new dam project at Bridge River to supply Vancouver's bursting demand set the tone for a new era. British Columbians embraced power and sought more of it.

Following the war, the Aluminum Company of Canada (Alcan) delivered on some of these expectations and inaugurated the fish vs. power conflict in its post-war form. Seeking a site that would deliver power to a major smelter facility, Alcan followed up on the early provincial waterpower surveys and examined sites at Chilko Lake and on the Nechako River. Public enthusiasm and the unwavering support of the provincial

government greeted Alcan's investigations, and so too did fisheries protest. The prospect of a major dam development in the Fraser Basin and possibly on a major spawning ground like Chilko Lake, provided a focus for political organization across the fishing industry and between different government departments. When the determination of the provincial government to back the aluminum development over the interests of the fisheries became apparent, however, aspects of this defense fractured and members of the cannery elite brokered a secret trade-off agreement with Alcan and the provincial government. The Chilko would be saved and the Nechako sold. Once Alcan gained its water license, the federal Department of Fisheries sought to regulate the building process using its authority under Section 20 of the Fisheries Act, but without great effect. Alcan officials proved obstinate and brilliant in negotiation; they lowered expectations as well as their level of compliance. With strong provincial backing and high public approval for the project, the formal process of the fisheries mitigation exercise fell victim to the development imperative.

This result threatened to but did not portend the future of the river. A parallel episode involving the BC Power Commission (BCPC) on the Quesnel River demonstrated that the organized fisheries interest could also trump the development game. The aim of the BCPC, in this instance, to develop the interior's power supply on the Quesnel ran into the organized force of the fisheries interest in a case that offered far less power and promise than the aluminum project but represented a major loss to the fisheries. Fisheries interests marshaled public and political support and inserted fisheries representation into a provincial commission convened to consider the project. The



IPSFC and the federal Department of Fisheries played a major role by insisting on the necessity of expensive mitigation works for the project and, critically, by offering alternative sites for investigation. Without the financial clout of Alcan, or its political leverage, the BCPC proved unequal to the concerted challenge of the fisheries interest. The balance of fish and power tilted in the opposite direction to the aluminum precedent.

These were the opening contests of the post-war period. They established examples, focused attention and opened some of the major questions in public policy, but what of the major game—the Fraser River's main stem? This is the question which prescient observers were asking as the 1950s arrived. With electrical demand soaring and examples of successful programs of hydro-led development elsewhere, they wondered how long it would be until the Fraser was converted into a major power generator and with it the province into a glorious industrial heartland? The proposals mounted with the years. Harry Warren, a professor turned promoter, joined with American investors and a group of local business people and engineers to form a company with the goal of damming the river at Moran and other places besides. General McNaughton, Canadian Section Chair of the International Joint Commission, aimed to disrupt negotiations with the US over the Columbia and reap returns for Canada by proposing to divert the upper Columbia into the Fraser and throw up a series of major hydro dams on the Thompson and Fraser Rivers. BC Electric examined development sites in the canyon and funded research in aid of a solution to the fish-power problem. Engineers for the Fraser Basin Board sited numerous flood control dams in the upper basin and lent credence to the

dream of a multiple use river. Little wonder with so many interests pressing for control of the river's power that many thought the damming of the Fraser inevitable.

The notion of inevitability invited debate. During the 1950s, the fish vs. power debate raged in the press, in letters to the editor, in high school debates and the provincial legislature. The dilemma of choosing between rival resource uses expanded to become a discussion about the future of the province. British Columbians asked could there be fish, power or both? Those who answered fish suggested that there was no proven way to save salmon, that dams would pose an insurmountable challenge. They argued that salmon connected all British Columbians to their heritage, provided food in a world filled with want; they portrayed hydropower as old-fashioned and celebrated the atomic future. They insisted there were alternatives. They tried, in short, to portray the fishing interest as the general interest. Those who claimed that both fish and power could co-exist believed in the ideals of multiple use conservation. They saw the river's transforming power as more valuable and grander than fish, a relic of an older economy. Power promoters believed that dams would build industry, lead the way for further expansion when atomic energy became available, and turn BC's resource export economy into a core region. They did not wish to destroy the fisheries but held optimism in the promise of a technological solution and asked why salmon could not be retrained. They labeled the fisheries a narrow interest against electrification for all.

Those with something to gain or loose sought to organize coalitions. Fisheries forces feared that momentum was against them during the 1950s, but devised a coherent political campaign to defend the river and the salmon. Led by the federal Department of

Fisheries, cannery groups, unions, the Native Brotherhood, sports fishers and representatives from all of the relevant government departments and fisheries scientific institutions formed a fisheries lobby. On the other side of the debate, power interests failed to come to any unified platform on the fish-power question. Only the Fraser River Multiple Use Committee provided the pretense of a cross-industry lobby. The Fraser Basin Board, an institution of bureaucratic representatives, probably played the greater coordinating role. Competition between different concerns within the industry made cooperation difficult to imagine. The fisheries interest reaped the rewards.

The fish-power problem on the Fraser articulated with development politics on the Columbia. Columbia politics fed off the fish-power controversy and the Columbia prospect changed the nature of the fish-power discussion. The Columbia program began independently of the Fraser as an extension of American development into the upper basin. But General McNaughton's plan to divert the Columbia into the Fraser made the political flow of these two rivers meet in a tumultuous confluence. After initially marshalling the support of key federal interests and the major utility BC Electric, McNaughton's plans faded with the lack of support of the province and the reaction of threatened American interests. The possible impact of the diversion on salmon made the provincial government skeptical, led BC Electric into a major scientific program in an attempt to solve the problem of fish and dams on the Fraser and caused Canadian and American fishing interests to support a coordinated US-Canadian development program, the better to save the Fraser. In the fish-power debate, fisheries interests increasingly believed that the battle over the Fraser could be won if the Columbia program went ahead

in the short term. Under these and other pressures, the diversion plan did not come to fruition; it did nevertheless bear important consequences for BC river politics.

McNaughton's intervention served not to save Canadian water for Canadians, but instead to strengthen Canada's negotiating position with the United States over downstream benefits. When the Peace River program gained attention in 1957, this position was strengthened further. Using funds earned through the Columbia Treaty, the provincial government moved to develop both the Columbia and the Peace under the auspices of the newly invented BC Hydro in 1961. This plan of action stepped over the fish-power problem, as it were, developing the interior and north in favour of the salmon-bearing rivers of the coast. When these hydro projects came on line, providing massive new blocks of energy to the province, the political and economic pressure on the Fraser faded, at least for a decade. When the Moran project reappeared in studies of the BC Energy Board in the early 1970s, the politics of power had changed and the proposal dissolved rapidly.

Scientists played an important role in the fish-power debate and found their approach to science changed in the process. Who could say what a salmon was capable of? This question proved contentious in a debate over harmonizing conflicting river interests. Whether a fish could pass a dam and under what conditions became a crucial matter. In order to support a scientific 'solution,' different interests within government, the fishing industry and the utilities field funded research. Fisheries scientists expanded their institutions and projects. They tried to coordinate research in new ways and evolved a new level of cooperative science. Yet, to the annoyance of hydro developers,

politicians and promoters, scientists refused to supply an answer. They did explain that the problems involved were complex. And over time they came to understand aspects of the complexities. Science could not, however, provide a solution. In refusing to offer a solution, scientists made a kind of declaration and resisted the co-optation of science to development. They left promoters and politicians to explain how developing the river would not lead to the end of the fisheries. When challenged on this position, fisheries scientists underlined their expertise and criticized amateur critics. The context of this debate changed scientific institutions, the linkages between scientists within and between institutions and the focus of scientific study. Just as fisheries scientists tried to change the fish-power debate, so too the debate changed science.

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Was the fish-power debate on the Fraser unique, or did it bear parallels to other North American river disputes in these years? Why did the Fraser, to make the problem more specific, not follow the path of the Columbia, a river with which it shared many similarities? Five key differentiating factors bear underlining: the productivity of salmon populations and the fishery; the aspect of timing; the scale and character of state intervention; the relative power of fisheries and power interests; and the existence of alternatives.<sup>1</sup>

Salmon did not stop dams, but their numbers demanded attention. On the Columbia even before major dam development, the scale of the fisheries never reached the heights of the Fraser's productivity. The Fraser was and is the greatest salmon stream

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<sup>1</sup> This comparative material draws heavily on Richard White, The Organic Machine: The Remaking of the Columbia River (New York: Hill and Wang, 1995).

in the world. Although the Hells Gate episode and other factors depleted the fisheries sharply in the early decades of the century, by the 1950s and, significantly, at the height of the fish-power debate, they experienced a rebound, delivering, many presumed, the benefits of scientific restoration and promising unending growth. Whereas fishing interests faced the power challenge on the Fraser in a growth position, on the Columbia in the 1930s, salmon numbers were in free fall. In one case, the fishing industry could be portrayed as strong and growing, in the other it appeared diminished and shrinking. Numbers mattered for political and economic reasons, but also for biological and technological ones. Whereas on the Columbia, fisheries scientists could imagine technical contrivances to pass fish over dams, on the Fraser the nature of the problem was larger. Passing tens of thousands of fish through a dam in a single hour was a problem of unprecedented proportions.

Timing changed the fish vs. power debate and it linked the Columbia and Fraser in important ways. Dam building on the Columbia's main stem began in the 1930s before British Columbians could imagine damming the Fraser on such a scale. Besides modeling a progressive future and the merging of technology and nature, the Columbia dams depleted salmon runs, a fact which few could deny or ignore. The Columbia experience hung like a 'shadow' over the Fraser, as one journalist said. The earlier American experience informed and impacted later Canadian decisions. The early restoration of the Fraser River, before the highpoint in the fish-power debate, also served the fisheries interest well. Building the Hells Gate fishways produced new knowledge of salmon, enhanced the fishery and laid a claim for the fisheries interest to the river as

spawning habitat. The fishways program also increased American influence in Fraser affairs as an interested party defending the fisheries at the same time as the US pursued development on the Canadian Columbia. These goals coincided and complemented one another. By fighting development on the Fraser, the American government helped to limit Canadian options on the Columbia. By pressing for coordinated development on the Columbia, it also diminished the potential or rationale for development on the Fraser. The earlier development of the Columbia recast the boundaries of possibility on the Fraser and it tied two national histories together.

The role of the state proved crucial in both cases. On the Columbia, the federal government, bent on demand stimulation and public works in the New Deal era, pressed the development agenda forward and paid for it. Powerful bureaucracies like the Bureau of Reclamation and the Army Corps of Engineers favoured the Columbia dam program. Weaker bureaucracies like the US Bureau of Fisheries and fisheries departments at the state level found themselves forced into positions of compromise and capitulation. Private utilities initially resisted state intervention, but then changed course when it became apparent that public development would entail selling publicly generated power to private utilities, not displacing them. On the Fraser by contrast, no New Deal forged a development consensus or proposed to pay for it. Federal power on the river— institutionalized primarily through the Department of Fisheries, Fraser Basin Board and IPSFC— generally favoured fisheries preservation to hydro development. The provincial government, with jurisdiction in water development, had neither the institutions to guide such a program (the BCPC was too small and undercapitalized) nor the political will to

mortgage the province on such a contentious issue. The Fraser Basin Board, one possible vehicle for dam development, and for bridging federal-provincial differences, operated as a bureaucratic shell, ad hoc in all respects, without independent political power or purpose. State power proved more important on the Fraser in terms of stopping the power threat.

Interest groups shaped this debate and drove it; their relative strengths proved critical. In the 1930s when development occurred on the Columbia, the fisheries interest managed a marginal struggle. It was riven internally, had little support from powerful bureaucracies and found fisheries scientists willing to accommodate development rather than question it. The power agenda on the Columbia had on its side an active public power movement and the force of numerous government bureaucracies and politicians. Power was greeted as a social savior by folk singers like Woodie Guthrie; it inspired utopian visions by the likes of Lewis Mumford; it compelled a broad and powerful constituency to transform the river into a massive 'organic machine' putting the river's work to society's gain. In Canada, the fishers' protest in the 1950s proved stronger and more united; it had the backing of the federal Department of Fisheries, the IPSFC, and the provincial Fish and Game Branch. Fisheries scientists advised the industry, joined committees to provide technical advice, and, critically, did not allow their knowledge to be put to the ends of development. One American fisheries lobbyist observed in a personal letter in 1956, "I understand the fisheries people of British Columbia are making a much stronger fight against power dams on salmon streams than the Americans have been making down here in connection with the Columbia River which is gradually, year



by year, being destroyed as the great salmon river.”<sup>2</sup> No such unity of purpose drew power supporters together on the Fraser. Power promoters and hydro utilities remained divided in these years, their interests competitive; no state bureaucracy provided the auspices for organization. Besides unusual cases like the Alcan project, support for the power agenda could not simply overcome fisheries protest. Whereas on one river fisheries interests were weak and power forces strong, on the other river, the opposite bias obtained.

In the American case, the Columbia was the single focus of development. In the Canadian case, alternatives existed. Because the Columbia was the river in the American Pacific Northwest, the one core power possibility, salmon preservation, not power development, went in search of alternatives. Fish passage devices, fish trucking around dams, hatcheries and artificial spawning channels were some of the many alternatives proposed for Columbia salmon. In BC, water development alternatives appeared to release the pressure on the Fraser. The upper Columbia and the Peace River provided British Columbians with other promising sites, beyond the reach of salmon, and uncomplicated by fish-power politics. Although before the early 1950s these sites appeared far too distant from the urban southwest to provide technically feasible or economically viable transmission, by the mid-1950s technical advances and the shifting political economy of power in BC changed those limiting conditions. British Columbians saved the Fraser’s salmon by displacing development, not by canceling it.

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<sup>2</sup> UBC Special Collections and Archives, Henry Doyle Papers, Box 1, File 1-2, ED Clark, Secretary Treasurer of the Association of Pacific Fisheries, Seattle to Doyle, May 4, 1956

If this study speaks to the comparative experience of the Columbia River and offers a different perspective on the course of river, fisheries and resource development in western North America, then it also seeks to redraw some of the ways in which the relevant analytical problems are framed, particularly in the Canadian context. In seeking to ask how conflicting resource demands shape science, society and the rest of nature, this study attempts to reopen and reanimate the staples paradigm. By pursuing questions on the margins of staples analysis-- how nature is defined and remade in the course of economic development, how the resource needs of different groups are contested and represented, and how ideas and politics shape resource use and allocation— I have tried to rethink central assumptions in the study of economic development. Although, to some degree, the impact of hinterland resource development on the environment has been a recurring concern in the staples literature, the rest of nature is generally treated as a bundle of commodities that can be depleted through misuse or profligacy, but which does not shape history, except through human refashioning.

Natural change, however, is more complex than a depletion tale would suggest. Consider the Hells Gate slides. Here falling rock remade a critical natural portal in the river-as-salmon migration route. The site was not simply destroyed, but altered in subtle ways. The slides introduced a new and variable element into the complex system of relationships that make up the life history of pacific salmon. At different times, changes in the gate triggered cascading consequences in the natural system of salmon migration, leading salmon populations to rise and fall. The salmon's human claimants on the shores understood these shifts within different cultural traditions, according to different

economic perspectives and drawing upon different levels of scientific understanding and misunderstanding. The slides case should be read not simply as a story of depletion with economic ramifications (although it was that) but also as an episode in the transformation of relationships in which natural changes reshaped the possibilities of human economic and cultural life and introduced confusion into established bodies of knowledge and science. None of these relationships were separate, but intertwined and reshaped one another, as the multiple meanings of fish tags would suggest. Humans' relations with the rest of nature were thus shaped not only by material connections but also by perceptions and representations of the rest of nature and by diverse forms of social interaction.

Where my analysis fits more squarely within the staples tradition is in the attempt to understand the changing spatial relationships created through the conflicting demands of fish and power. Throughout Innis's work and in the later writings of historical geographers and economic historians, problems of distance and time in the Canadian space economy have remained enduring questions. Metropolitan-hinterland relationships shaped the expansion and contraction of the early staples trades. The costs of transportation and the 'struggle with distance' helped to constitute society in space.<sup>3</sup> What I have tried to add to this analysis is an expansion in its domain of concern: by considering how metropolitan-hinterland relationships shape science, for example, and how political and economic disputes over the proper locations of hydroelectric development intersected with cultural perceptions of region and nation. To some degree I

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<sup>3</sup> Cole Harris, "The Struggle with Distance," in *The Resettlement of British Columbia: Essays on Colonialism and Geographical Change* (Vancouver: UBC Press, 1997); Graeme Wynn, *Timber Colony: A Historical Geography of nineteenth Century New Brunswick* (Toronto: University of Toronto Press, 1981)

have attempted to follow William Cronon's lead in Nature's Metropolis by seeking to understand how processes of economic expansion in space and cultural perceptions of nature and commodities interacted and shaped one another.<sup>4</sup> Economic space, I have sought to suggest, is not a geometric field in which various contingent variables impede expansion across that field. It is a social creation, shaped by ideas and politics, nature and society.

This thesis also offers another perspective on the role of the state in economic development that bears parallels to other studies in the staples and political economy literature.<sup>5</sup> The fish-power debate reveals a federal system in conflict and a variety of interested lobbies trying to harness those divisions for their own ends. The provincial state, like many other provinces in the postwar era, demonstrated a client –like relationship to large capital, particularly of international origin, and proved to be open to influence at a variety of levels. Where this study offers a new perspective to this field is in its attention to the role of science in public policy. At various stages of the fish-power debate, scientific ideas proved to be a crucial justification for, or a limitation on, political initiatives. In turn, state planning initiatives helped to shape science.

While attempting to look at problems of staples analysis from different vantage points, this study does pursue lines parallel to many recent works in American environmental history, from which it has taken inspiration. The pioneering texts of Cronon, McEvoy, White and Worster have opened up new questions and demonstrated

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<sup>4</sup> William Cronon, Nature's Metropolis: Chicago and the Great West (New York: Norton, 1991)

<sup>5</sup> For example, HV Nelles, The Politics of Development: Forests, Mines and Hydro-Electricity in Ontario, 1849-1941 (Toronto: Macmillan, 1974); Martin Robin, Pillars of Profit: The Company Province, 1934-1972 (Toronto: McClelland and Stewart, 1973).

the possibilities of integrating the rest of nature within more traditional historical approaches.<sup>6</sup> Of course, this body of literature contains its own divisions and nuances and it is well to register briefly my position within it. On the question of the social construction of nature, and all of its related concerns—human-nature boundaries, different cultural attitudes to nature, universalism vs. localism—I have attempted to chart a middle ground between the increasingly realist position of Donald Worster and more skeptical positions that investigate multiple meanings.<sup>7</sup> I have tried, in particular, to look carefully at scientific knowledge to understand the bases of its creation, and the shifts in its content and interpretation of the rest of nature. Because environmental history relies so heavily on a sampling of the contemporary scientific literature in order to gain a sense of past environmental change, there is a challenge latent in this endeavor to assess how such ideas and their intellectual histories should impinge upon or shape current historical analysis. There is no easy answer to this question. My own approach has sought to treat scientific knowledge as changing body of ideas, subject to both social and natural forces in its making. This allows for a modest form of realism in weighing and adopting current

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<sup>6</sup> William Cronon, Nature's Metropolis: Chicago and the Great West (New York: Norton, 1991); Arthur McEvoy, The Fisherman's Problem: Ecology and the Law in the California Fisheries, 1850-1980 (Cambridge: Cambridge University Press, 1986); Richard White, Land Use, Environment and Social Change: The Shaping of Island County, Washington (Seattle: University of Washington Press, 1980); The Organic Machine; Donald Worster, Dust Bowl: The Southern Plains in the 1930s (New York: Oxford University Press, 1979); Rivers of Empire: Water, Growth and the American West (New York: Pantheon, 1985); Under Western Skies: Nature and History in the American West (New York: Oxford University Press, 1992)

<sup>7</sup> Donald Worster, "Transformations of the Earth: Toward an Agroecological Perspective in History," Journal of American History 76(4) (March 1990): 1087-1106; Richard White, "Environmental History, Ecology and Meaning," Journal of American History 76(4) (March 1990): 1111-1116; William Cronon, "Modes of Prophecy and Production: Placing Nature in History," Journal of American History 76(4) (March 1990): 1122-1131

scientific analysis, but also protects against a naïve acceptance of science as received wisdom. Scientific ideas should be placed in context and learned from also in context.

All of these concerns, of course, border on the historiography of science. In seeking an appropriate approach, I have learned from recent debates in science studies about constructivism and the influence of the rest of nature in shaping the scientific process.<sup>8</sup> While I believe that environmental historians could fruitfully adopt some of the approaches from this body of literature to qualify and enhance their understandings of scientific knowledge, I would also argue that historians of science could benefit by closer attention to questions of environmental change. Many of the most famous constructivist studies concern careful analyses of laboratory science.<sup>9</sup> Environmental historiography, however, offers cases of science in the field and sciences of large resources that press the questions of the role of environmental change clearly to the fore. Nancy Langston's study of the changes in the Blues Forest, for example, explains how the object of scientific concern –the forest-- changed over decades under the influence of scientifically driven fire and forestry policy.<sup>10</sup> Here the case, not just a philosophical position, demands attention to the dynamics of ecological change in the forest in order to understand the extent to which scientific ideas helped to shape this forest, and changed in response, or developed with little direct relation to the subjects under consideration.

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<sup>8</sup> Stephen Cole, Making Science: Between Nature and Society (Cambridge: Harvard University Press, 1992); Bruno Latour, We Have Never Been Modern (Cambridge: Harvard University Press, 1993); Andrew Pickering, The Mangle of Practice: Time, Agency, and Science (Chicago: University of Chicago Press, 1995)

<sup>9</sup> On the need for more studies of field science, see: Jan Golinski, Making Natural Knowledge: Constructivism and the History of Science (Cambridge: Cambridge University Press, 1998).

<sup>10</sup> Nancy Langston, Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West (Seattle: University of Washington, 1995)

Although some positions within the historiography of science try to account for the role of nature in the making of scientific ideas—actor-network theory, for example, assigns the label of ‘agent’ to the rest of nature—these efforts seem somewhat modest in light of much recent work in environmental history that argues convincingly for the importance of a changing nature in shaping society and economy.<sup>11</sup> A thorough going integration of approaches has yet to occur and this thesis is one modest contribution in that direction.

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This study ends in the early 1970s when the last Moran dam proposal sank with its predecessors. But the debate of fish vs. power continued-- and continues-- to create controversy in British Columbia, one of many resource debates that seem to dominate this province’s political and social life. Shortly before this study was begun, the provincial government cancelled Alcan’s Kemano completion project, an extension of the first development begun in the late 1940s; the legal debate over compensation continues. During the research stage, British Columbia’s news filled with stories of BC’s salmon fights with the United States, the outcome of a breakdown in the earlier catch-sharing regime that had provided the IPSFC with its coherence and legitimacy. Towards the end of the writing of this thesis, a boulder slide on Canadian National’s track in the Fraser Canyon resulted in the clearance and explosion of a number of transformer rocks sacred to native peoples. Protests followed—one instance of a renewed politics of native resistance in British Columbia. All of these problems grow out of BC’s fractious history

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<sup>11</sup> Bruno Latour, We Have Never Been Modern

of development politics, repeating old patterns and inserting new concerns and complications.

Visit Hells Gate today and you will find a metaphor of our continuing problems, our search for solutions and our flight to the past as escape. Where once rocks slid down the cliff, a Swiss-built gondola now carries busy loads of photograph-snapping tourists (myself included), capturing still images of a gorge and its fishways below. Fudge, barbecued salmon, a fisheries museum, and a film showing the river raft voyage of Simon Fraser's American descendant aim to entertain, educate and engage audiences in a heady mixture of experiences-- for a fee. It is now possible to purchase a t-shirt with the phrase emblazoned on the front, "Hells Gate I did it!" On the day of my visit fisheries officials monitored the passage of salmon through the fishways. From the viewing platform where I stood salmon were difficult to see, despite large arrows prompting my sightline. 1999 registered one of the lowest returns of the sockeye in the river's recent history. The commercial catch was cancelled for the first time. Warm ocean currents, pollution problems, habitat destruction, overfishing: the list of contributing factors goes on and on. Of course, none of this could cancel the fun. A man in a plaid kilt sang folk songs on guitar, and through the postmodern kaleidoscope of past and present, slippery surfaces and intangible absences and silences, the river and the fish appeared as they would on a post-card: a spectacle of nature, a spectacular nature, a new commodity for our relentless appetite.



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GR 1222 BC Premiers' Papers

GR 1414 BC Premiers' Papers

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A note on newspaper sources cited in the thesis: For the most part, this thesis relies on newspaper sources collected by institutions in clippings files. I have done some original searches in the press to verify stories and dates that seemed particularly pertinent to my research; however, without the existence of well-documented clipping files maintained by Cannery groups for the early part of the century and BC Electric for the mid-century, my research in the press could not have been as broadly based across time and space. Both the cannery scrapbooks and the BC Electric clippings file are housed at the UBC Special Collections and Archives. In the body of the thesis, I have cited the relevant collection before newspaper references in shortened form (CSB and BCER CF).

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