Abstract

Elwha: Value of a River. Managing Risk in the Pacific Northwest

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The broad goal of this dissertation research is to help understand how societies can balance environmental and human needs while avoiding natural resource and economic collapse. Using a case study set in the north Olympic Peninsula region of western Washington State in the Pacific Northwest, an investigation is offered to explore why some societies dependent upon natural resources succeed while others fail. Special emphasis was directed to events in the Elwha River Basin and nearby Port Angeles area where intensive fisheries, power generation and timber activities have overlapped for several decades. The study's central research question asked to what extent specific social and cultural factors shaped decision-making strategies relating to natural resource use and treatment of the environment over time.

A land of mountains, rivers and rainforests, the Olympic Peninsula lies between the Pacific Ocean and Puget Sound. Formerly home to several native runs of salmon and trout, the Elwha River was endowed with a fisheries rare among streams its size south of Alaska. In the early twentieth century, a power developer completed two dams on the lower river. The projects—which are now being dismantled—provided electrical energy to create a regional timber and pulp mill economy. They also contributed to the loss of

native fisheries and ecosystem integrity, the disruption of subsistence Native groups—specifically the Elwha Klallam—and the viability of recreational and commercial fishing.

The study assessed legal, scientific and technological factors that drove a diverse set of exploitation and preservation choices among groups reliant upon natural resources. These included treatment of how societies attempt to regulate or guide their exploitative behavior, the interplay of groups competing for resource dominance, considerations of equity and fair play among different users, the application of technology and science to resource management and the role of legal institutions and laws in adjudicating access and control to resources.

An integrated policy sciences and risk studies methodological framework guided and structured the research project. The analysis employed an interdisciplinary approach that treated and relied upon various disciplines and scholarship across the natural and social sciences. These included ecology, environmental science and fisheries biology; and anthropology, ethnology, law and sociology. A narrative analytical history encompassed a range of actors organized into seven story parts. Each part, comprised of chapters that profile different perspectives and standpoints, assessed how and why resources were valued and used, and by whom. Main characters include Native groups—especially the Klallam peoples dwelling on the north Olympic Peninsula—immigrant settlers, industrial and commercial interests, governmental entities, regulatory officials and individual advocates.

From each group's experience, lessons were drawn relating to the theme of risk. Over time, human groups have developed the term risk as a reference to their means of survival—a package of tools used in an effort to exist and thrive as they attempt to build cultural and economic systems. The study of risk facilitates a comprehensive assessment of the strategies, methods and techniques these groups have used to avoid natural resource and social collapse. In this interrelated way, the use of risk is especially concerned with conditions where uncertain elements can pose a threat to desired objectives, where outcomes are not predetermined but rather are subject to possibility. This describes a formal attempt by societies to acknowledge and handle the all too real chance of critical things going wrong that could undermine important aspects of their existence.

Key outcomes of the analysis found lessons or principles that emerged from the core experience of societies on the north Olympic Peninsula over the past 150 years. These may have bearing beyond the Elwha River story and include the need to (1) align cultural imperatives with ecological imperatives; (2) prepare for the possibility of a breakdown in societal or ecosystem functioning caused by natural or human-derived events; (3) probe for inequities wherever decision making involves addressing competing interests; (4) make use of foresight, scrutiny and vigilance to minimize the unintended consequences of technology; (5) support sustained scientific endeavor to inform the protection of long-term public interests; and (6) consider the perspective and knowledge of individuals and communities directly experiencing outcomes of interest.

In addition, successful societal groups had developed distinct attributes including: (1) cultural systems to guide and shape relationships with and attitudes toward nature and natural resources; (2) civic participation and direct engagement in regulatory or risk management systems at local and regional levels; (3) adaptive social and governing mechanisms to consider and incorporate non-conventional or otherwise counter-establishment forms of information and experience; and (4) reverential attitudes and perspectives toward natural systems.

Elwha: Value of a River. Managing Risk in the Pacific Northwest

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Part 1. Introduction

Chapter 1 Viewing the Land

In late June 1788, the British explorer and merchant John Meares navigated his ship near the entrance of a vast inlet off the North American Pacific Northwest coast.[1] The English crew, working a 230-ton vessel named *Felice Adventurer*, was traveling in largely uncharted waters off present-day British Columbia and Washington (Figure 1.1). Fog and storms were common elements in this area. Many earlier ships had passed by the disguised entrance. But on this morning the day was warm under clear skies. The huge channel lay before the *Felice*, east by north, on a "clear and unbounded horizon … as far as the eye could reach."[2] Meares believed it to be the long rumored body of water possibly discovered by Juan de Fuca, a 16th century Greek mariner who claimed to have found a northwestern route between the Atlantic and Pacific Oceans. In tribute to him, Meares named this inland passage the Strait of Juan de Fuca.[3]

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[1] Meares was flying under Portuguese flag to avoid monopoly rights of the British East India Company, which was common practice. See: Glyn Williams, *Voyages of Delusion. The Quest for the Northwest Passage* (New Haven: Yale University Press, 2003) p. 359; Howay, F.W., "An outline sketch of the maritime fur trade," in *The Canadian Historical Association, Report of the Annual Meeting Held at Ottawa, May 24-25, 1932* (Ottawa: Department of Public Archives, 1932), p. 7.

[2] John Meares, *Voyages Made in the Years 1788 and 1789, from China to the North West Coast of America* (London: printed at the Logographic Press; and sold by J. Walter, 1790), p. 153 [viewed as Yale Internet Resource via Yale University Library].

[3] The British explorer William Barkley is credited with discovering, or rediscovering, the Strait of Juan de Fuca a year earlier, as acknowledged by Meares. The following summer, August 1788, the Britain Charles Duncan would visit the entrance. In July, Meares would revisit the Strait on his way northern return to Nootka. In March 1789, the American Robert Gray sailed 25 miles into the body of water but turned back because of bad weather. From 1790-1793, Spanish and British navigators, notably Manuel Quimper and George Vancouver, would visit and map interior waters. They made first recorded contact with Natives living on the northern and southern shores of the Strait of Juan de Fuca, Puget Sound and the Georgia Strait. Williams, G., 2003, pp. 350-351, 359-362; Wayne Suttles, *Coast Salish Essays* (Seattle: University of Washington Press, 1987), p. 155; See also: Erna Gunther, *Indian life of the Northwest Coast of North America, as Seen by the Early Explorers and Fur Traders During the Last Decades of the Eighteenth Century* (Chicago: University of Chicago Press, 1972), pp. 55-60; Henry R. Wagner, *Spanish Explorations in the Strait of Juan de Fuca* (Santa Ana: Fine Arts Press, 1933), pp. 1-67, 82-134.

Captain John Meares was exploring this mysterious corner of the world partly in service to geopolitical interests. By the late eighteen century, major global powers were jockeying to establish dominion here. From their foothold in the Aleutians, the Russians were moving south to the mainland of North America. From mission settlements in California, by 1774 Spain was moving northward along the Northwest Coast. The British Captain James Cook had arrived in 1778. For hundreds of years Europeans had coveted a direct water passage from the Atlantic to the Pacific. Claim to such passage offered governments a strategic foothold in new lands and markets. Royal patrons and elite entrepreneurs therefore financed high risk ventures, sending crews deeper and deeper into the unknown. Over the decades, as each expedition failed to find a new east-west shipping lane, the navigators moved farther north, pushing the limits of their crews, confronting colder climates and more isolated waters. The northern Pacific was, to their eyes, a menacing place: faraway, uncharted, rough. But in the summer of 1788, Meares believed he had found access to an important inland continental entrance.[4]

The British expedition was also serving speculative interests. They were cruising along the shores of the Pacific Northwest to acquire sea otter skins on behalf of financial investors and the monarchy. Precipitated by the Cook expedition, over the past few years a triangle trade in furs had begun with China in which marine pelts from the northwest fetched high prices in Asia. A successful mission covered its expenses and generated a profitable return to investors. The Chinese fur trade could provide such a return.[5]

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[4] See: Williams, G., 2003, pp. 239-405; Miller, D.E., "Maritime fur trade rivalry in the Pacific Northwest," *Historian* 21,4 (August 1959):392-408, pp. 392-408.

[5] For recent scholarship see, generally: James R. Gibson, *Otter Skins, Boston Ships, and China Goods: The Maritime Fur Trade of the Northwest Coast, 1785-1841* (Montreal: McGill-Queen's University Press, 1992); Robin Fisher, *Contact and Conflict: Indian-European Relations in British Columbia, 1774-1890*

This was the first of many attempts to control and access copious natural resources and new markets in the region. In the late nineteenth century, a new view of the land along this coastline emerged. Loggers would arrive. And like the maritime fur traders who had come earlier, they explored and speculated in search of previously uncharted and unexploited natural wealth. They stamped their particular vision of wealth onto the environment. Journeying from the cut over slopes of upper Midwest and boreal New England forests, they saw value in the vast stands of Douglas fir, Sitka spruce, western hemlock and western red cedar. They coveted raw material to feed saw mills and, later, pulp and paper making machines. They would build a new economy.[6]

One hundred years later, evidence of this economy still persists. From the decks of diesel-powered ships in the Strait of Juan de Fuca, 50 miles inland from Cape Flattery where Meares had sailed, twice daily ferries cut through the rough waters, moving tourists and trade cargo between British Columbia and Washington State. Standing on the ship's south-facing prow, travelers can easily mark the distant north peninsula city of Port Angeles by its characteristic long, gray ribbon of industrial wood smoke stretching along the coast.

The artificial fog bank traced its origin to 1929, when citizenry passed a bond vote to pay for a large water diversion to pipe water from the nearby Elwha River to the city's largely undeveloped water front. This civic gift enticed a California pulp mill

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(Vancouver: University of British Columbia Press, 1992), and Daniel W. Clayton, *Islands of Truth: The Imperial Fashioning of Vancouver Island* (Vancouver: University of British Columbia Press, 2000). Earlier accounts include: Gunther, E., 1972; Howay F.W., in *The Canadian Historical Association, Report of the Annual Meeting Held at Ottawa, May 24-25, 1932*, 1932; and Clarence A. Vandiveer, *The Fur-Trade and Early Western Exploration* (Cleveland: The Arthur H. Clark Company, 1929).

[6] See for example: Robert E. Ficken, *The Forested Land: A History of Lumbering in Western Washington* (Seattle: University of Washington Press, 1987).

conglomerate to move its extensive operations north, into the heart of far-reaching tracts of old growth wilderness. The new investment established Port Angeles as the largest manufacturer of pulp and paper on the West Coast for decades, forming the backbone of the town's society.

The early fur traders could never have imagined that the trees of the land would someday power its economy. Wholly concerned with sea otters and surveying, their journals barely took notice of the coastal forests. But, even so, the landscape did make an impression. "The appearance of the land was wild in the extreme," Meares wrote of the Olympic Peninsula coastline. "Immense forests covered the whole of it within our sight, down to the very beach…."[7] On the western slopes of Vancouver Island, the 1778 James Cook expedition found the land "covered with high straight trees, that appeared like a vast forest."[8] Crew of Boston-based Yankee fur trader John Gray, who reached the coast soon after Meares, thought the trees of Vancouver Island "so enormous a size that it would be attended with immense labor to clear the land." At the Queen Charlotte Islands, to the north, they marveled at trees "of an incredible size," with door-like holes cut into them, and "within was a spacious room, which appeared to be part dug, and part burnt out."[9]

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[7] Meares, J., 1790, p. 157 (as written in June 1788).

[8] James Cook, *A Voyage to the Pacific Ocean Undertaken by Command of His Majesty for Making Discoveries in the Northern Hemisphere Performed Under the Direction of Captains Cook, Clerke and Gore in the Years 1776.7.8.9 and 80, Vol. 2 of 4* (Perth: printed by R. Morison, Junr. for R. Morison & Son, 1785), p. 174. [viewed as Yale Internet Resource via Yale University Library].

[9] Frederick W. Howay, editor, *Voyages of the Columbia to the Northwest Coast, 1787-1790 and 1790-1793* (Boston: publisher not indicated, 1941), pp. 518 (first quote, Robert Haswell's Log of the First Voyage of the 'Columbia,' March 1789 on p. 59; second quote, John Hoskins' Narrative of the Second Voyage of the 'Columbia,' July 1791 on p. 203). [Viewed as electronic text via http://solomon.eena.alexanderstreet.com/ (Alexandar Street Press), September 20, 2008 and April 22, 2012.]

Over the span of two centuries, these two views of the land—sea otter skins and timber—are but two of several views held by different groups in the Pacific Northwest. Long before the maritime expeditions arrived, indigenous Native groups prospered from the region's marine and freshwater resources. Sophisticated aboriginal societies, closely tied to these resources, likely flourished for thousands of years. After the brief frenzy of fur trading, by the turn of the nineteenth century a rising influx of Euro-American settlers would establish commercial fisheries and timber products industries. Large-scale hydroelectric power and irrigation works followed, transforming major river basins into the manufacturing and agricultural centers of today. New cultures and economies interlocked with the region's natural resource base would take root and give rise to new social systems.

In one sense, the story of the modern Pacific Northwest is a story of how humans have shaped a region marvelously endowed with wood, water and fish into a society based on timber, hydroelectricity and salmon. The story consists of different periods in which certain resources were prized. Individuals, communities and institutions employed specific means to access and control these resources, often in pursuit of different aspirations. They used various tools and means, especially legal, scientific and technological, but also aesthetic and religious. Competition between and among interests could be intense. Some people won, others lost; some resources were protected, others expended.

During the time of the Meares expedition, for example, fur was the prize sought by the Europeans, technology the tool used to reach trade areas and procure pelts from

Native peoples. Early on all participants—European and Native—appeared to benefit from the process. British and Continental investors sent crews to the distant Pacific Northwest to obtain as many fur pelts as possible for profit in Asian trading and to map out a largely undiscovered region for control of commerce routes. The ships were fitted with navigation equipment, armed with weaponry, loaded with trade goods (primarily finished metal products) and provisioned for long-haul journeys. The crews, flying under the flags of various countries, competed with each other, racing to chart the coastline and to acquire furs first. They also competed with local inhabitants of the coast who, likewise, hoped to make the best possible trade. But, at least in the first phase of exchange—before the fur supply diminished and the metal supply saturated—trading was interdependent as each side needed the other to get what it wanted.[10]

In a related sense, the story of the Pacific Northwest is an attempt to understand why some resource-dependent societies have succeeded while others have failed. Key questions can be asked as to how certain groups ensured their cultural and economic survival. What tools did successful societies use to access and control resources? Conversely, what tools led some groups to perish? Moreover, what have been the implications of competition between groups for control of natural resource use? In an evolving process the region's society has grappled with matters of equity relating to both humans and nature. These included preservation versus exploitation, public versus private rights, the distribution of benefits versus harms, and whether to consider or ignore vulnerable members and things. What role did these factors play in the ability of groups to survive?

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[10] Fisher, R., 1992, pp. 1-23, Robert James Muckle, *The First Nations of British Columbia: An Anthropological Survey* (Vancouver: University of British Columbia Press, 1998), pp. 61-62.

As this analysis aims to show, societal groups are constantly at risk of collapse, often for want of effective stewardship of natural resources, an inability to channel competition among users, and a failure to acknowledge markers of equity such as justice and fairness. An exploration of these themes by means of critical assessment will attempt to inform decision making in today's Pacific Northwest society, a region struggling to understand how natural resource use will shape its future. It may also serve to inform societies in other geographies to the extent it can provide a generally representative account of the interplays of social systems and natural resource use.

Figure 1.1 The Olympic Peninsula, Washington State



Source: TerraMetrics, Google Maps, 2013. Quadrant pictured about 140 x 220 miles.

Chapter 2 The Risk Triad

One way to structure this story is through an analysis of risk. Over time, human groups have developed the term risk as a reference to their means of survival—a package of formal and informal tools and strategies used in an effort to exist and thrive. In so doing, societies try to manage their risks, or engage in *risk management*.[11] The contemporary

[11] This text will use the wording "managing risk" and term "risk management" interchangeably, and will define these broadly as the means (e.g., strategies, tools, techniques and behaviors) by which individuals, groups and societies cope with, reduce or eliminate risk effects or adverse outcomes in order to survive.

Risk literature describes or defines managing risk, or risk management, in a variety of ways. For example, Covello and Mumpower's review of the origins of present-day risk analysis and management find deep historical lineage. They instance several modes of "societal risk management" that have been developed by individuals and groups "in response to identified risks." Risk reduction or mitigation techniques include avoidance and elimination of risk; regulating or modifying activities to reduce magnitude or frequency; and reduction of vulnerability of exposed entities, for example. The authors argue that "our current ideas about societal risk management are rooted in four basic strategies or mechanisms of control." These are: insurance, common law, government intervention, and private sector self-regulation. The article also identifies important changes between past and present risks that contribute to contemporary risk analysis and management efforts. These include increases in: new risks; the ability of scientists to identify and measure risks; the role of federal government in assessing and managing risks; and public interest, concern and demand for protection (Covello, V.T. and Mumpower, J., "Risk analysis and risk management: an historical perspective," *Risk Analysis* 5,2(1985):103-120, pp. 108, 115-118).

Klinke and Renn's more recent assessment of risk management conceives of the term broadly: "To reduce or control risks, social institutions are formed to evaluate and manage risks." Once risks are determined and judged as unacceptable, then "[t]he process of reducing the risks to a level deemed acceptable by society and to assure control, monitoring, and public communication is covered under the term 'risk management.'" (Klinke, A. and Renn, O., "A new approach to risk evaluation and management: risk-based, precaution-based, and discourse-based strategies," *Risk Analysis* 22,6(2002):1071-1094, p. 1071).

Molak introduces the term by noting its roots in ancient efforts that employed "strategies for dealing with risks," including insurance and bottomry contracts. She further describes government interventions "to deal with natural or manmade hazards" used by "all great civilizations." (Vlasta Molak, editor, *Fundamentals of Risk Analysis and Risk Management* (New York: Lewis Publishers, 1997), p. 4). For contemporary analysis and examples of governmental risk management, see: David A. Moss, *When All Else Fails. Government as the Ultimate Risk Manager* (Cambridge: Harvard University Press, 2002). See also Bernstein's history of risk and a variety of management strategies employed by various social and private interests (Peter L. Bernstein, *Against the Gods. The Remarkable Story of Risk* (New York: John Wiley & Sons, Inc., 1998)).

With respect to technological proliferation, Jasanoff describes risk management as "one of the most difficult and challenging tasks confronting industrial nations today," in part because of the "balancing process" needed to weigh the positive and negative impacts, differences of valuing and scientific uncertainty. She argues that contemporary risk management is more appropriately viewed from a "cross-national perspective" in light of the interplay of scientific assessment, democratic values, political culture

construct of *risk* has no single definition but does possess general features. It is often referred to as the possibility of loss or injury as the result of natural events or human activities. As humans interact with each other and the environment they develop means to cope with uncertainty and deal with threats. More broadly, risk signifies the chance that a given event or outcome will occur, or the possibility of change with resulting effects, good and bad.[12] Whether the resulting effects involve harm or gain depends on how such outcomes are perceived or interpreted. This can vary according to the perspective—as shaped by knowledge, experience and context, for example—of those involved, such as individuals, communities and public and private institutions. It can also involve the standpoint of natural systems, such as individual species, rivers and forests. Thus, different groups can assess and manage risk differently in their efforts to survive.[13]

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and the lay public (Sheila Jasanoff, *Risk Management and Political Culture.* Social research perspective: occasional reports on current topics, 12 (New York: Russell Sage Foundation, 1986), pp. v-vi).

[12] Risk scholars have characterized and conceptualized the term "risk" in different ways, often reducing its complexity into themes, elements and generalizations. In his review of risk research, Renn commented that "talking about risks faces the immediate danger that everybody talks about something different. There is no commonly accepted definition for the term risk—neither in the sciences nor in public understanding." But he concludes that all risk concepts share a common theme: "the distinction between reality and possibility." Renn, O. "Three decades of risk research: accomplishments and new challenges," *Journal of Risk Research* 1,1 (1998):49-71, p. 50. The National Research Council has broadly defined risk as "a concept used to give meaning to things, forces, or circumstances that pose danger to people or to what they value." National Research Council, Paul C. Stern and Harvey V. Fineberg, editors. *Understanding Risk: Understanding Risk: Informing Decisions in a Democratic Society* (Washington, D.C., National Academy Press, 1996a), p. 215. Klinke and Renn define risks "as the possibility that human actions or events lead to consequences that harm aspects of things that human beings value." Klinke, A. and Renn, O., 2002, p. 1071. Rowe's *Anatomy of Risk* argues that "the only certainty in life is death…. However the time and manner of death are uncertain, and man does not know with certainty whether death is final." W.D. Rowe, *An "Anatomy" of Risk* (Washington, D.C.: U.S. Environmental Protection Agency, 1975), p. 11.

[13] Clark argues that "socially relevant risk.… is a perceived inability to cope satisfactorily with the world around us." His historical analysis finds that "at the center of the risk problem are people and their fears. Fears of loss, fears of injury, and—most of all—fears of the unknown." He notes that "societal risk assessment" had a history as long as humans have tried to "explain, manipulate, and cope with [their] fears and the unknown." Clark, W.C., "Witches, floods, and wonder drugs: historical perspectives on risk management," in *Societal Risk Assessment: How Safe is Safe Enough?* Richard C. Schwing and Walter A. Albers, Jr., editors (New York: Plenum Press, 1980), p. 288. Renn describes risk as the "possibility that an undesirable state of reality (adverse effects) may occur as a result of natural events or human activities." Its analysis can be "scientific, anecdotal, religious, or magical." Renn, O., "Concepts of risk: a classification,"

Eighteenth century seafaring to the central Northwest Coast provides a useful introduction to risk in the form of a triad. The Meares expedition, for example, displayed three general features of a risk scenario. First, a *value interface* occurs, or a condition at or during which things of value or concern interact and come into contact. What elements are at play? Next, the interface involves *uncertainty*, or the inability to know or determine what will come next. What is the chance that something could happen as a result of this interface? The third feature involves *threat*, or the indication of something impending. Will damage occur as an outcome of this uncertain interface? In this interrelated way, the use of risk is especially concerned with conditions where uncertain elements can pose a threat to desired objectives, where outcomes are not predetermined but rather are subject to possibility. This describes a formal attempt by societies to acknowledge and handle the all too real chance of critical things going wrong that could undermine important aspects of their existence.[14]

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in *Social Theories of Risk*, Sheldon Krimsky and Dominic Golding, editors (Westport, CT: Praeger Publishers, 1992), pp. 56-58. Fischhoff et al. argue that definitions of risk are "inherently controversial" in part because "the choice of definition" can involve varying social and individual value systems. The choice therefore can affect policy, resource allocation and political power in society. Fischhoff, B., Watson, S.R., Hope, C. "Defining risk," *Policy Sciences* 17(1984):123-139, p. 124. Cole and Withey argue that the "'social acceptability' of risk is affected by numerous social, political, and institutional factors…" and that "'perceived risk' is a multidimensional concept." Cole, G.A. and Withey, S.B., "Perspectives on risk perceptions," *Risk Analysis* 1,2(1981):143-163; pp. 154, 143. Dake traces western society's evolving attitudes toward risks. Dake, K., "Myths of nature: culture and the social construction of risk," *Journal of Social Issues*, 48,4(1992):21-37.

[14] This triad definition is but one means of characterizing elements relating to risk. Rosa, for example, identifies three elements "found in nearly all conceptions of risk." First, something of value to humans is at stake. Second, some outcome is possible (whether undesirable or desirable). Third, uncertainty is involved. Rosa, E.A., "Metatheoretical foundations for post-normal risk," *Journal of Risk Research*, 1,1(1998):15-44, pp. 27-29. Renn provides three elements in a risk definition: "undesirable outcomes, possibility of occurrence, and state of reality." Renn, O., in *Social Theories of Risk*, 1992, p. 58. Regarding the risk triad offered in this text, for an explanation of the concept of value as it relates to defining risk see for example: Baruch Fischhoff and John Kadvany, *Risk. A Very Short Introduction* (New York: Oxford University Press, 2011) pp. 22, 41, 148-150; and see also, broadly: C. Richard Cothern, editor, *Handbook for Environmental Risk Decision Making: Values, Perceptions, & Ethics* (New York: Lewis Publishers, 1996). For an overview of uncertainty as it relates to risk see for example: National Research Council, *Science and Judgment in Risk Assessment* (Washington, D.C.: National Academy Press, 1994), pp. 160-187; Wilson, R.

A number of things could go wrong during the Meares expedition. On lengthy voyages, scurvy could reduce large numbers of crew to torpor or death for want of vitamin C. Definitive cause and treatment of the disease eluded the Royal Navy for at least another generation. To combat scurvy and avoid starvation, late 18th century crews sought to replenish fresh food supplies as often as possible. This led to an additional problem for those charged to go ashore in search of food and water: death by ambush. Sea craft, while sturdy, were also fragile. Carpenters and metal workers, essential crewmembers, enabled the ship to conduct ongoing maintenance and even self-arrest measures for extreme situations. Crippled ships suffering from damaged hulls and broken spars typically required accessible shelter and access to wood which, again, could lead to additional vulnerability while ashore. Ship wrecks were perhaps most catastrophic, portending total failure if not immediate annihilation.[15] The Northwest Coast was especially rife with navigational hazards—poor visibility and foul weather, submerged obstructions, strong currents and tides, narrow passages. A governor of the Hudson's Bay Company—the British global trading powerhouse which dominated North American

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and Shlyakhter, A., "Uncertainty and variability of risk analysis," in *Fundamentals of Risk Analysis and Risk Management*, Vlasta Molak, editor (New York: Lewis Publishers, 1997), pp. 33-43; and, generally: F. David Peat, *From Certainty to Uncertainty: The Story of Science and Ideas in the Twentieth Century* (Washington, D.C.: Joseph Henry Press, 2002). For an overview of threat as it relates to risk see for example: Morgan, M.G., "Proving the question of technology-induced risk," in *Readings in Risk*, Theodore S. Glickman and Michael Gough, editors (Washington, D.C.: Resources for the Future, 1990), pp. 5-15; Slovic, P., "Perception of risk: reflections on the psychometric paradigm," in *Social Theories of Risk*, 1992, pp. 117-152; National Research Council, *Improving Risk Communication* (Washington, D.C.: National Academy Press, 1989), pp. 30-53; and see also, broadly: National Research Council, *Risk Assessment in the Federal Government: Managing the Process* (Washington, D.C.: National Academy Press, 1983).

[15] For a comprehensive account of the dangers faced by Northwest Coast crews, see: Gibson, J.R., 1992, pp. 136-187.

trade for over two centuries—viewed its Northwest Coast shipping operations as more dangerous than any other post.[16]

So many things could go wrong during seafaring, in fact, that its early lexicon seems to have developed unique terms to describe maritime hazard and provided the basis for the contemporary word *risk*.[17] The Greek word, *peirao*, concerned trying one's fortune or making an attempt by sea. The Latin *periculum* appropriated *peirao* to mean risk, hazard and danger, as well as to run the risk of one's life. From *periculum* came *risicum*, meaning danger, venture, or risk. By the early seventeenth century the Italian *riscare* meant to hazard or to adventure. The French *risqué* included peril, hazard, chance and adventure.[18]

In turn, the seafaring business developed some of earliest methods of insurance to counter or mitigate the possibility of harm. During the Age of Discovery, in the centuries preceding the Meares expedition, the emerging belief in a spherical Earth pushed deep sea exploration to the limits of navigation. Longer, harder voyages meant greater risk of failure for both the investors and the crews. More capital was required and outcomes were more uncertain. To reduce the risk of loss to patrons of commercial ventures,

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[16] Gibson, J.R., 1992, p. 143.

[17] Etymologists cannot attribute the origin of the word risk to any one source. The Greek word *rhiza*, for example, invoked the dangers of sailing around cliffs (Covello, V.T. and Mumpower, J., 1985, p. 109). The Latin *resecum* meant danger, rock and risk at sea. (Piet Strydom, *Risk, Environment and Society* (Philadelphia: Open University Press, 2002, p. 75). In 1656, the *Glossographia*, the first English dictionary to include etymologies, defined risk as peril, jeopardy, danger, hazard, and chance. Cline argues that early definitions of the word included to adventure or venture, along with the dual meaning of danger, peril and hazard (Preston B. Cline, "The etymology of risk," unpublished paper, May 20, 2004, pp. 5, 10, 12).

[18] Cline, P.B., 2004, pp. 5-12. "Desirable risk," or risk that is sought and not avoided because of the thrill and intrinsic enjoyment it brings, is a pervasive feature of social life (Machlis, G.E. and Rosa, E.A., "Desired risk: broadening the social amplification of risk framework," *Risk Analysis* 10,1(1990):161-168. Risk literature has focused mostly on dangerous and other untoward risks resulting in definitions that comprise only undesirable risks, stated or implied (Rosa, E.A., 1998, p. 28; Althaus, C.E., "A disciplinary perspective on the epistemological status of risk," *Risk Analysis* 25,3(2005):567-588, p. 570.

Mediterranean and Northern European merchants formulated marine insurance codes. As a tool, insurance could average out the financial loss across a pool of underwriting participants and therefore protect individual investors. By the 1780s, when Captain Meares was exploring the Northwest Coast, Lloyd's of Britain was the hub of global marine insurance.[19] For the investors back in Britain, the Meares fur trading endeavor would succeed if the captain's voyage realized a healthy profit after paying investment costs.

For the young seamen who carried out these expeditions, however, there was no self-insurance, per se. At its most visceral level, the conduct of early fur trading was fraught with the possibility of hostility. The Europeans and British had begun to visit the Pacific Northwest in search of furs in the early 1780s. Yankee traders from Boston soon followed.[20] During these initial voyages, some crews experienced ultimate first contact with the region's Native peoples. Logs and journals describe the vacuous looks, incredulity and immense curiosity of the indigenous inhabitants. As the waterborne crews probed inlets, coves and island waters, those inhabitants on the ground took note and word of arrival spread fast. The stout ships were a spectacle. But to actually obtain furs through exchange, the crews had to engage the Native peoples, either from ship or on land—hence the chance of peril through engagement. This was a high-risk endeavor.

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[19] The development of marine insurance was a gradual process. Ancient seafaring societies developed precursors to modern-day insurance. In the late Middle Ages, merchants of the Baltic Sea established sea codes to regulate maritime conduct. British Parliament passed the nation's first marine insurance statute in 1601. Within a century, Britain would dominate the global marine insurance market as the country's bankers and moneylenders would see underwriting as a lucrative business. In 1769 individual underwriters organized under the name of Lloyd's, which became the official English form of marine insurance policy in 1779 (William D. Winter, *Marine Insurance. Its Principles and Practice* (New York: McGraw-Hill Book Company, Inc., 1919), pp. 1-16).

[20] Gibson, J.R., 1992, pp. 18-35.

The early encounters were especially dangerous because of unknown intentions and the ubiquity of weapons. These two factors—uncertainty and threat—shaped the risk, or possibility that harm could occur. Fur trading required a direct value interface between two alien worlds, a situation where unrelated systems were compelled to act upon each other. In this instance, the purpose was primarily for economic gain. Each group was willing to trade for something the other wanted. Neither party, however, knew whether they would be received as friend or foe. From the perspective of the European crews, sailors sometimes experienced what seemed like welcoming events, large canoes full of Natives with gifts and items for trade. At other times crews were met with a cool response, if not enmity. From the Natives' perspective, they watched as young men speaking strange languages, transported on strange craft, and manifesting strange technology, customs and behavior appeared on their doorstep.[21]

On the ships, weapons were a constant companion. They served as a means of survival in the face of an unknown danger, a sort of gunpowder underwriting. Whether this measure was actually needed is unclear, but crews nonetheless saw the need for personal protection.[22] Along the coastline, when the Europeans made contact they sometimes met heavily armed Native groups. If there was one common element to these initial encounters it was firepower. Both sides typically displayed arms. The chance of

[21] See for example: Gunther, E., 1972, pp. 19-25; Gibson, J.R., 1992, pp. 153-173; and Fisher, R., 1992, pp. 1-23. Meares, whose ship was outfitted in Canton, included 50 Chinese among his crew. Chinese carpenters and smiths would build a two-story house and stockade at Nootka. Quimby, G.I., "Culture contact on the Northwest Coast, 1785-1795," *American Anthropologist* 50,2(1948):247-255, pp. 248-249.

[22] See for example: Howay, F.W., "Indian attacks upon maritime traders of the Northwest Coast, 1785-1805," in *The Canadian Historical Review* 6,4(December 1925):287-309; Fisher R, "Indian control of the maritime fur trade and the Northwest Coast," in *Approaches to Native History in Canada: Papers of a Conference held at the National Museum of Man*, D. A. Muise, editor (Ottawa: National Museums of Canada, 1977), p. 78; Fisher, R., "Arms and men on the Northwest Coast, 1774-1825," in *BC Studies* 29(Spring 1976):3-18, pp. 10-18.

conflict was presumed high. For all participants within the interface, an ever present uncertainty and threat compromised their survival. The fur traders may have feared death by armed conflict more than by scurvy, starvation or shipwreck. But they took the risk in order to pursue reward.

The Meares expedition illustrates three general elements—value interface, uncertainty, and threat—that created a risk setting in the late eighteenth century coastal Pacific Northwest. This brief introduction serves to set the stage for later groups that have subsequently tried to build cultural and economic systems in the richly endowed land. It also serves as the starting point for a more comprehensive assessment of the strategies, methods and techniques these groups have used to cope with the risk of natural resource and social collapse. What follows, then, is an analytical narrative for this region—a story about survival told through the lens of risk. The story will feature an important river basin, the Elwha River Basin, on the north Olympic Peninsula in the northwestern tip of Washington State.

Chapter 3 The Elwha Basin

A secluded land of mountains, rivers and rainforests, the Olympic Peninsula lies between the Pacific Ocean and Puget Sound on the far northwest corner of the contiguous United States. The Olympics are part of the Coast Range stretching from Mexico to southern Canada, but differ from their typical parallel ridge-and-valley structure. They instead resemble an oblong circle comprised of many separate peaks whose highest, Mount Olympus, rises to 7,965 feet. From this center massif extends a series of radial drainages, longer to the west and south, shorter to the east and north. A dense network of watersheds

moves summer's glacial melt and winter's heavy rains along winding mountainous terrain, into deep canyons and valleys, through dense lowland forest. The system fans out in opposite directions—the Sol Duc, Calawah, Bogachiel, Hoh, Queets, Quinault, Skokomish, Duckabush, Dosewallips, Gray Wolf, Dungeness and Elwha—forming a grand wheel of corridors that at length empties into the Straits, Puget Sound and ocean encircling the peninsula (see Figure 3.1).

The Elwha River, historically, was an immensely biologically productive river. Culturally and economically it was also an esteemed river. The river's headwaters reach into the heart of the Olympic Mountains and flow 45 miles north into the Strait of Juan de Fuca, forming a delta a few miles west of the small city, Port Angeles (see Figures 3.2 and 3.3). The Elwha was once home to ten native runs of salmon and trout—including 100-pound Chinook salmon. The river was endowed with a fisheries rare among streams its size south of Alaska. For thousands of years numerous freshwater and marine species used the Elwha River, its tributaries and its estuary as a home, helping to support a web of terrestrial life. So, too, was the well-being of the Elwha Klallam Native peoples tied to the river's fisheries, a people who over countless generations developed a deep relationship with the Elwha salmon.

In 1913 and 1927 a power developer completed two dams on the lower Elwha, providing electrical energy to the north peninsula and creating a regional timber and pulp mill economy. Before the river's fisheries completely deteriorated, the Elwha provided substantial commercial and recreational catches to tribal and nontribal fishermen in its ocean approaches, helping to sustain once strong fishing economies of nearby communities. Today, the bulk of the Elwha watershed lies in Olympic National Park,

created in 1934. Following nearly 20 years of negotiations, a consortium of interests reached consensus to dismantle the Elwha dams to restore the river's fisheries and natural ecosystem. The dams, since their inception, have blocked access to over 90 percent of salmon and trout habitat in the Elwha watershed. After the Everglades restoration work, the Elwha project is the National Park Service's most expensive resource restoration, and will cost nearly $324 million.[23]

Dating back to Washington statehood in 1889, the story of the Elwha Basin chronicles the transition of the Pacific Northwest from a frontier territory to a mature economy. A new social order abruptly supplanted a subsistence-oriented one that had driven aboriginal cultures and economies in the region. Whatever equilibrium Native groups such as the Elwha Klallam had fashioned with their rivers started to unravel with the arrival of non-Indian settlers. Social change came in the form of progress based on the creation of wealth and devotion to prosperity through intense resource extraction. Timber, hydroelectricity and salmon were the building blocks of the new order.

The need to balance the interests of conflicting resource user groups quickly arose. How to channel the clash of motivation and shifting of power into a reliable source of wealth and prosperity was a central challenge to the young state's leaders. They knew, early on, that unbridled contest was disruptive to social order. Having experienced the rapid destruction of once abundant natural resources in the eastern part of the country, many also realized that unchecked exploitation had its limits. The risk of social and environmental collapse was a real concern. They had seen it happen before. Here, in the Pacific Northwest, different user groups now vied for control of and access to the

[23] National Park Service, "Olympic National Park, Washington. Frequently Asked Questions." http://www.nps.gov/olym/naturescience/elwha-faq.htm [viewed February 14, 2013].

available resources. Governing institutions—from small communities to the state capital and federal agencies—therefore attempted to devise ways to reduce or control such collapse. How best to resolve who got what, and to do so without inadvertently losing everything.

Societies have long understood the possibility that human actions and natural events can lead to harmful consequences. In response they have devised methods to anticipate and respond to risk.[24] These include a variety of legal, scientific, technological and socio-cultural forces, tools, perceptions and attitudes. This collective response has served as a referee, of sorts, trying to mediate the survival of human groups on the one hand, and the natural systems upon which they depend, on the other. The Elwha story proves to be no exception. In some cases, the response has been successful, in others disastrous.

Indeed, the story of the Elwha serves as a case study for the broader Pacific Northwest experience because it provides a rich historical and contemporary account of how humans have tried to wrest a meaningful existence from wood, water and fish. More generally, it may also provide insights beyond this particular region into the means by which other societies dependent upon natural resources have been successful or unsuccessful in their management of risk.

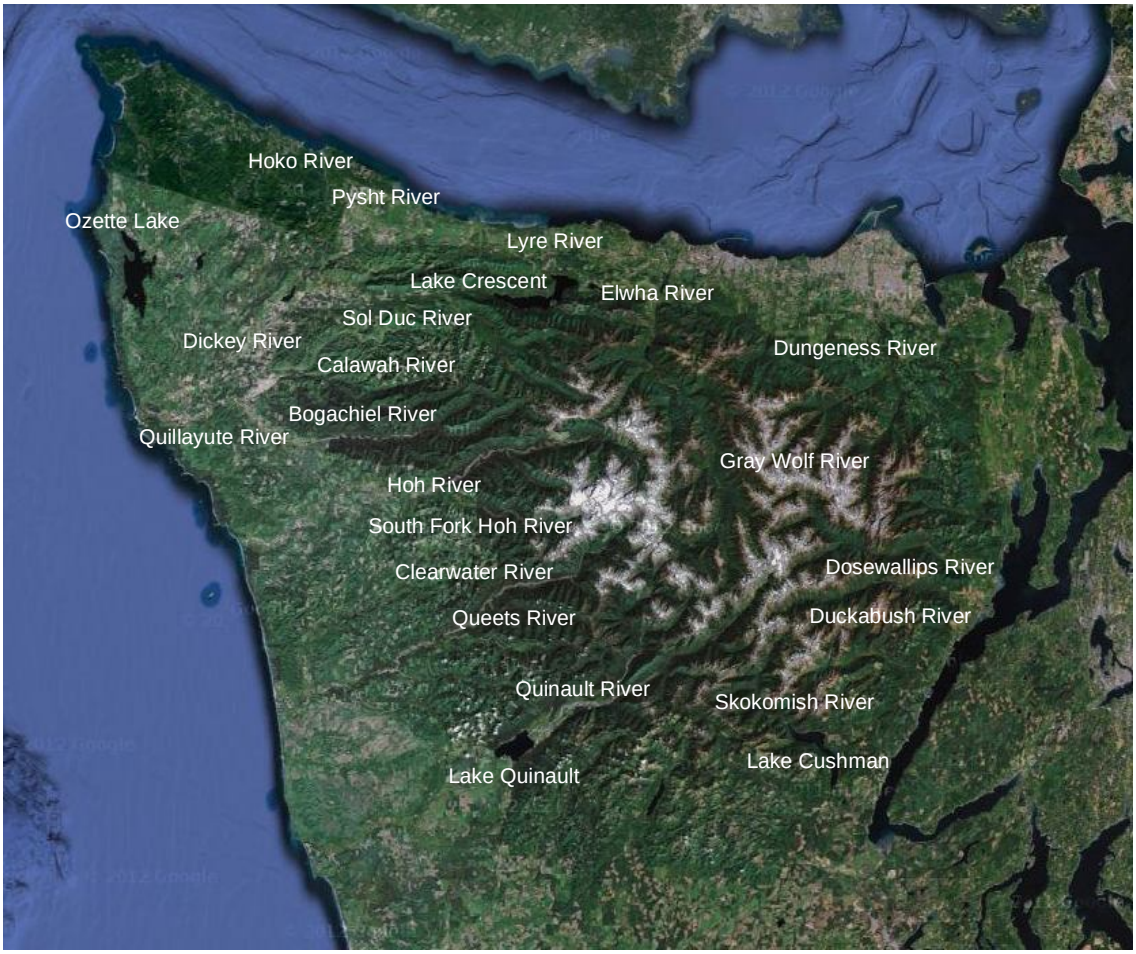
Elwha: Value of a River, Managing Risk in the Pacific Northwest is structured as a series of assessments profiling the risk strategies of distinct groups on the north Olympic Peninsula and Elwha River. These comprise Native peoples; Euro-American settlers and their descendants; fishing, timber and hydroelectric interests; local

[24] Covello V.T. and Mumpower J., 1985, pp. 103-120.

government; and state and federal resource management agencies. In addition, Pacific salmon—perhaps the most revered symbol of the region's former natural wealth—are profiled as a biological organism and through the eyes of individuals and entities who have worked hard to preserve them.

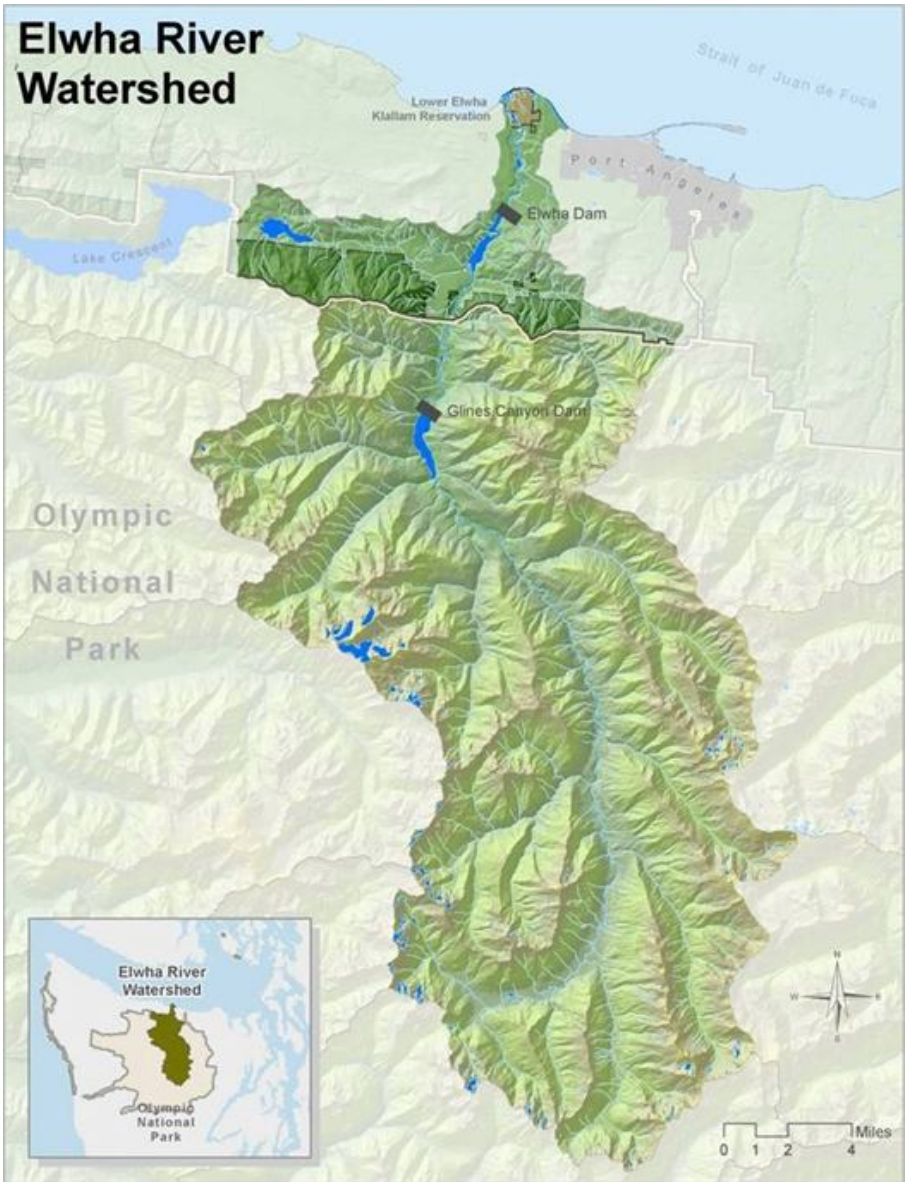
Each profile, or section, introduces and expands on a basic construct that influences human behavior and in turn contributes to efforts to control or manage risk. These include the role of perception, the unknown and complexity; the use of technology, science, laws and religion; and the challenges of equity such as distribution, trade-offs and susceptibility. Lessons are drawn and applied to contemporary risk scenarios in the Pacific Northwest. The story ends with a proposed framework of effective risk management built from the lessons and insights derived from the risk profiles. Such a framework seeks to highlight what we can learn from history—both to use what works and to avoid what has not worked—in helping to shape our present and future efforts to balance human endeavor and the environment.

Figure 3.1 Rivers of the Olympic Peninsula



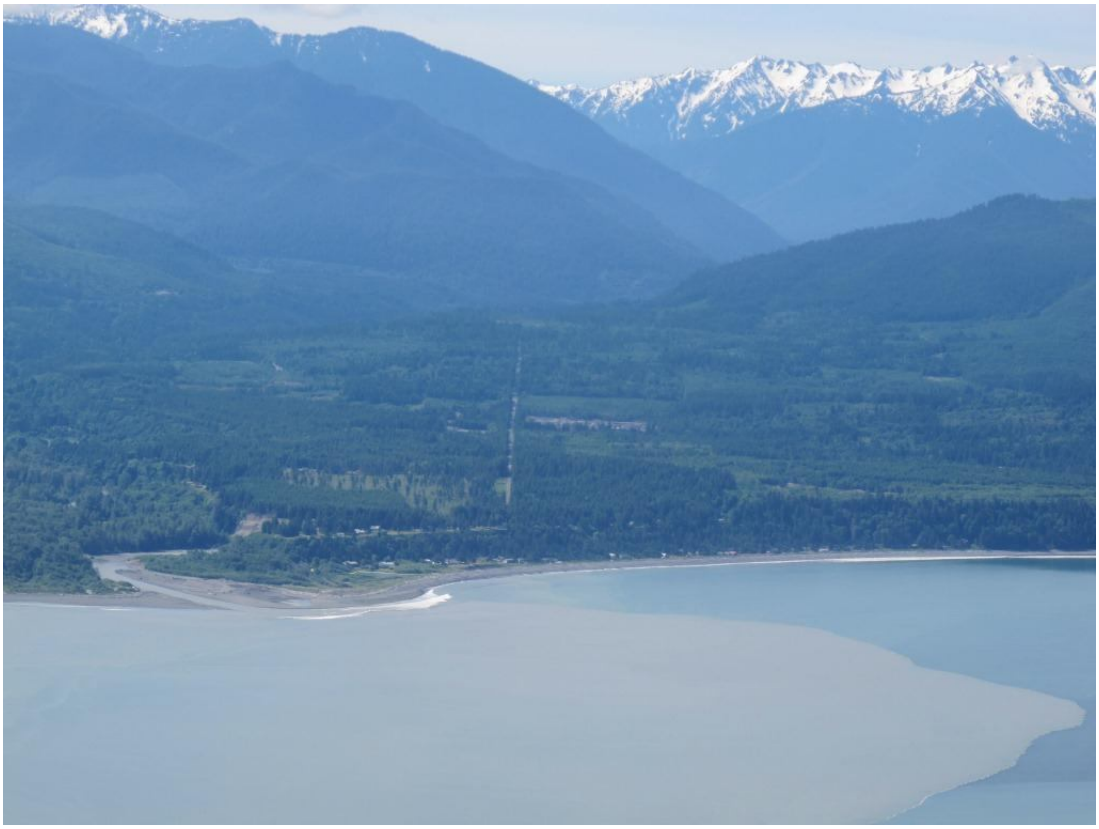
Source: TerraMetrics, Google Maps, 2013. Quadrant pictured about 85 x 105 miles.

Figure 3.2 Elwha River watershed



Source: "Elwha River Restoration Project." http://www.video-monitoring.com/construction/olympic/js.htm [Viewed March 3, 2013]

Figure 3.3 Elwha River mouth and Olympic Mountains



Source: Sam Brenkman, digital photograph, June 20, 2012. (Brown discharge is early sedimentation pulse from recently removed lower Elwha Dam. See, for example, Olympic National Park, "Dam Removal Blog." http://www.nps.gov/olym/naturescience/damremovalblog.htm [Viewed March 3, 2013].

Part 2. Salmon Dwellers

Chapter 4 Limits to Abundance

On the day the Meares expedition reached the northern shores of the entrance to the Strait of Juan de Fuca, sunny weather greeted his arrival to this far flung part of the world in the summer of 1788. The ship had just left the relative safety of present-day Vancouver Island, where the Spanish and British had established friendly relations with Natives along the western shores at Nootka. The crew spent the afternoon trying to find anchorage, slowly moving south into unfamiliar waters. In the distance loomed the headlands of the Olympic Peninsula, a tough breach of fortress-like cliffs and reefs jutting into the water—an unknown land, reputedly dangerous. A year earlier, coastal Natives south of the Strait killed several of British Captain Charles Barkley's crew when they went ashore for fresh water.[25]

Failing to find anchorage, the *Felice* eventually reached a small group of islands near the Strait's southern approach. From the ship's perspective, the largest island looked barren and wind-swept, an imposing massif surrounded by crashing surf. But against this outwardly desolate backdrop many Natives suddenly appeared, swarming the vessel in large canoes holding 20-30 men. The British had entered Makah territory, the Native inhabitants of the northwestern tip of the Olympic Peninsula. Hundreds more came into view along the island precipices, "principally cloathed in sea otter skins … their faces grimly bedaubed with oil and black and red ochre." The crew was stunned by the seeming contrast. "We could by no means reconcile the wild and uncultivated appearance of the place," Meares wrote, "with such a flourishing state of population." As the crew

[25] This incident occurred on the western shore of the Olympic Peninsula. On the same voyage, Barkley may have been the first explorer to "discover" the Strait of Juan de Fuca. Gunther, E., 1972, p. 56.

continued south along the coastline of the peninsula, they continued to wonder at the juxtaposition between landscape—"wild in the extreme"—and the surprisingly large number of villages it held, marked by the continuous number of Natives who paddled out to greet the sailors.[26]

Two years later, the Spanish were among the first Europeans to explore the Strait of Juan de Fuca. The 1790 logs of ensign Manuel Quimper, considered the first written account of the Strait, offer brief but valuable observations of the Klallam, who possessed much of the northern slope of the Olympic Peninsula along the Straits from the Hoko River to Port Discovery Bay.[27] Quimper recorded frequent contacts with Natives eager to

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[26] Meares, J., 1790, p. 153 (first and second quote), p. 157 (third quote).

[27] Clallam, Northern Straits, Nooksack, Halkomelem and Squamish comprise five languages whose speakers are collectively called the Central Coast Salish. They formerly possessed much of the inland waters of present-day British Columbia and Washington including most of the Strait of Juan de Fuca, the Lower Fraser Valley, the southern end of the Strait of Georgia and some adjacent areas (Suttles, W., "Central Coast Salish," in *Handbook of North American Indians, Volume 7: Northwest Coast*, Wayne Suttles, volume editor (Washington, D.C.: Smithsonian Institution, 1990), pp. 453, 456). Other spellings of Clallam include S'Klallam, as designated in the Treaty of Point No Point, 1855, and Klallam, as spelled by Erna Gunther in her 1927 *Klallam Ethnography* (Suttles, W., *in Handbook of North American Indians: Northwest Coast, Volume 7: Northwest Coast*, 1990, p. 474). The Olympic Peninsula Intertribal Cultural Advisory Committee refers to the Salishan language family as one of three on the Olympic Peninsula, including also the Chimakuan and Wakashan. With the Salishan are the Klallam, Quinault and Twana languages, spoken by the S'Klallam, Quinault and Skokomish, respectively. The language family comprises much of the geography of the Olympic Peninsula, including the majority of the northern shores, not including the Makah, on the far western portion, and Chemakum, on the far eastern portion (Olympic Peninsula Intertribal Cultural Advisory Committee, *Native Peoples of the Olympic Peninsula: Who We Are*, Jacilee Wray, editor (Norman: University of Oklahoma Press, 2002), pp. 3-5. See Figure 4.1.

For geographic uniformity, this text uses Klallam to refer generally to the northern Olympic Peninsula groups, and uses Elwha Klallam when referring specifically to the group at the Elwha River environs. Of note, these groups are distinct from the Makah of the area around Cape Flattery at the northwestern part of the Olympic Peninsula, whose lands formerly extended east to the Hoko River and south beyond Cape Alava (Renker, A. and Gunther E., "Makah," in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 422). They are also distinct from the Quileute group (Powell, J., "Quileute," in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 431) on the western peninsula, whose territory included the Sol Duc, Quillayute, Bogachiel and Hoh Rivers; the Southwestern Coast Salish, including the Quinault group on the southwestern peninsula, whose territory included the Queets and Quinault Rivers (Hajda, Y., "Southwestern Coast Salishan," in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 503); and the Southern Coast Salish, including the Twana on the southeastern part of the peninsula, whose territory included the Skokomish, Duckabush and Dosewallips Rivers (Suttles, W. and Lane, B., "South Coast Salish," in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 486). See also: Olympic Peninsula Intertribal Cultural

trade a rich variety of natural resources, as well as reed mats, woolen blankets and animal skins for metal and copper. At Dungeness Spit "many canoes of Indians came out with delicious and abundant fish and shellfish, among which were flounder, ray fish, salmon, 'mojarras' [possibly halibut], sea-bass, little dog-fish, crabs, and some venison."[28] As the crew returned to the mouth of the Strait, they paused to replenish fresh water supplies near the mouth of the Elwha River, at Freshwater Bay, where "two canoes of Indians came out with salmon berries."[29] At Neah Bay, among the Makah near the southern entrance to the Strait, "many canoes of Indians, men and women, came out with whom barter was carried on for woolen cloaks, bear skins," and "delicious fish, among which were salmon of 100 pounds or more in weight."[30] Amid such bounty throughout his month-long journey among the Klallam, Quimper later concluded "they pass their time in hunting, fishing, and weaving baskets, reed mats and woolen cloaks for wear and for trade with those from the outside."[31] But there was much the maritime crews could not see or understand from their limited vantage points and brief encounters.

Explorers, fur traders and early settlers who interacted with Native peoples of the Northwest Coast marveled at the abundance and variety of land and sea mammals, and

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Advisory Committee, 2002, pp. 3-5; Valadez, J., "Elwha Klallam," in Olympic Peninsula Intertribal Cultural Advisory Committee, *Native Peoples of the Olympic Peninsula: Who We Are*, Jacilee Wray, editor (Norman: University of Oklahoma Press, 2002), p. 18.

[28] Wagner, H.R., 1933, pp. 109-110.

[29] Wagner, H.R., 1933, p. 22. The crew presented the two canoes of Natives with small pieces of iron. The crew then launched an armed canoe with empty casks to a nearby place the Natives said could provide them with freshwater. The journal described it as "delicious water, taken from a beautiful stream," which was presumably the Elwha River (p. 119). See also: Gunther, E., 1972, p. 63.

[30] Wagner, H.R., 1933, p. 123.

[31] Wagner, H.R., 1933, p. 131.

freshwater and marine fishes in their possession. It is tempting to assume the Natives enjoyed an effortless, comfortable life because of the wealth that seemingly appeared at their doorstep.[32] "In the lives of the Indians ages passed slowly," a standard account reads. "Along the shore they continued to spear their seals, harpoon their whales, catch salmon in their weirs, build up their riches of seal oil, dried fish, baskets, blankets, shell money—and then potlatch themselves poor again."[33] Among the Makah at Cape Flattery in the 1860s, the pioneer James Swan wrote: "on any day in the year when the weather will permit, they can procure, in a few hours, provisions enough to last them several days."[34]

It is true that the Makah and other groups did inhabit their coastal environment for a long time, in large part because of the availability of natural resources. The Makah occupied the mouth of the Hoko River, for example, for at least 3,000 years, where they conducted an intensive off-shore halibut fishery.[35] But the ability of the Makah and other groups to survive in this region was attributable not only to what the environment

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[32] Gordon W. Hewes. *Aboriginal Use of Fishery Resources in Northwestern North America* (Ph.D. dissertation, University of California at Berkeley, 1947), pp. 42, 127; Barbara S. Lane, "Political and economic aspects of Indian-White culture contact in western Washington in the mid-19th century," (Portland: Bureau of Indian Affairs, 1973), p. 1; Wessen, G., "Prehistory of the ocean coast of Washington," in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, p. 421; Suttles, W. and Ames, K., "Pre-European history," in *The Rain Forests of Home: Profile of a North American Bioregion*, Peter K. Schoonmaker, Bettina von Hagen, Edward C. Wolf, editors (Washington, D.C.: Island Press, 1997), pp. 263-264.

[33] Ruby El Hult, *The Untamed Olympics: The Story of a Peninsula* (Portland, OR: Binfords & Mort, 1954), pp. 1-2. The term "potlatch" refers to a ceremony in which gifts were dispensed to invited guests, to be described in later chapters.

[34] James G. Swan, *The Indians of Cape Flattery, at the Entrance to the Strait of Fuca, Washington Territory,* Smithsonian Contributions to Knowledge, 16(8):1-106 (Seattle: Shorey Publications, reprint 1982) [The Newberry Library Edward E. Ayer Collection, Chicago, IL], p. 30.

[35] Dale R. Croes, *The Hoko River Archaeological Site Complex: The Rockshelter (45CA21), 1,000-100 B.P., Olympic Peninsula, Washington* (Pullman, WA: Washington State University Press, 2005), p. 236.

offered, but also to how their societies functioned and interacted with the environment. These Northwest Coast peoples, in fact, developed societies typically attained only by agriculturally dependent societies, not by food-gatherers. They were able to achieve social and political organization while relying on wild rather than domesticated plants and animals for their subsistence and material well-being. In spite of their subsistence activities, they were semi-sedentary peoples, spending one or two seasons in one spot—typically a household-based winter settlement, with heavy dependence on food stores.[36]

Anthropologists have defined this type of food economy as an example of complex hunter-gatherers, or affluent foragers. While their environment was rich, the availability of food was not constant, guaranteed or profuse. Their success appears to be attributable to a number of important accomplishments. These include the ability to develop highly skilled food getting and storing techniques, to marshal cooperatively based community- and inter-community-scale workforces to hunt and process food, to distribute surpluses equitably across social strata, and to regulate conduct toward the environment through attitudes of veneration and guardianship.[37]

Marveling at the accomplishments of the Northwest Coast Native societies—rather than simply at the outward abundance of their environments—anthropologists cite many accomplishments that took place over the past several thousand years. As shown in Figure 4.2, archeological evidence indicates the presence of human exploitation of habitat in this region as early as 8,000 years ago. Within a few thousand years, coastal economies

[36] Suttles, W., 1987, pp. 45-63; Kenneth M. Ames and Herbert D.G. Maschner, *Peoples of the Northwest Coast: Their Archaeology and Prehistory* (New York: Thames and Hudson, 1999), pp. 13-19, 24-28, 113-117.

[37] Ames, K.M. and Maschner, H.D.G., 1999, pp. 13-19, 24-28, 113-117; Suttles, W., 1987, pp. 45-63.

centered on the use of salmon and other species emerged. This progressed into a widespread reliance on stored salmon by about 3,500 years ago. Over time, the Native peoples developed a specialization in several kinds of hunting and fishing, crafts, and curing, using complex technologies and occupational expertise.[38]

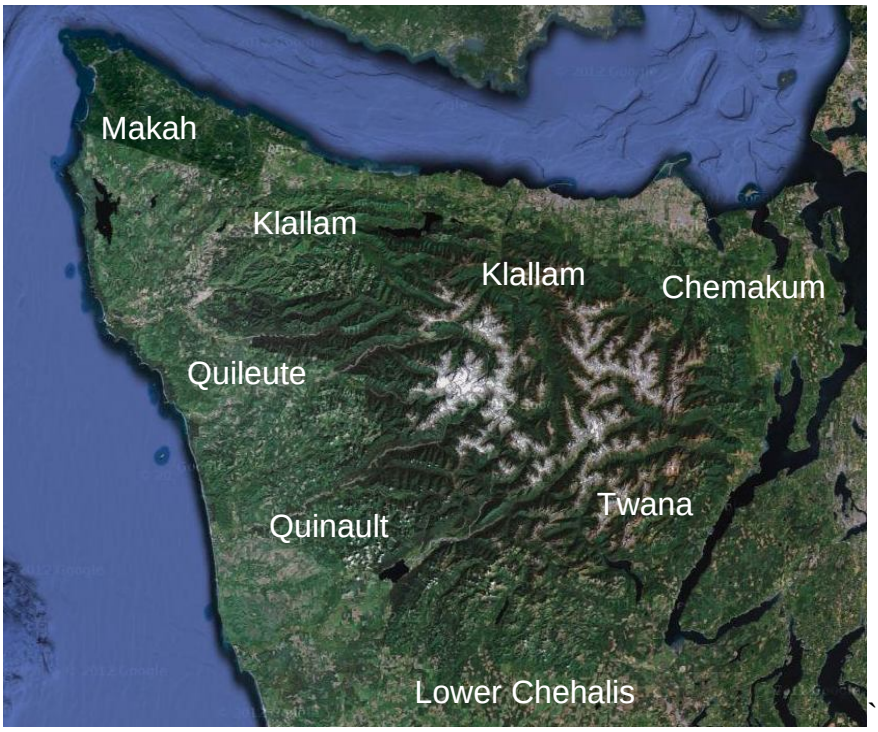
The presence of social stratification and development of an art style appeared by about 2,500 years ago. These societies developed a highly stratified social structure with permanent differences in power and prestige, including a hereditary caste of slaves and ranked nobility. They also produced distinctive and famous art styles, including sculpture, basketry, textiles and monumental architecture. Along the coast, the earliest known villages and housing structures were in place as early as 3,200 years ago. Native groups sustained village populations of more than a thousand, with some towns standing for several hundred years. They attained population densities that were among the highest in pre-modern North America. And their languages were the most diverse in North America, other than California, with 11 language families. Finally, and perhaps most significantly, they professed a worldview that embraced the natural world, in spiritual terms and myth, through elaborate ceremonies and with an intimate knowledge of their environment.[39]

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[38] Ames, K.M. and Maschner, H.D.G., 1999, pp. 13-17, 26-27, 219; Suttles, W., 1987, p. 45; Suttles, W. and Ames, K., in *The Rainforests of Home*, 1997, p. 259.

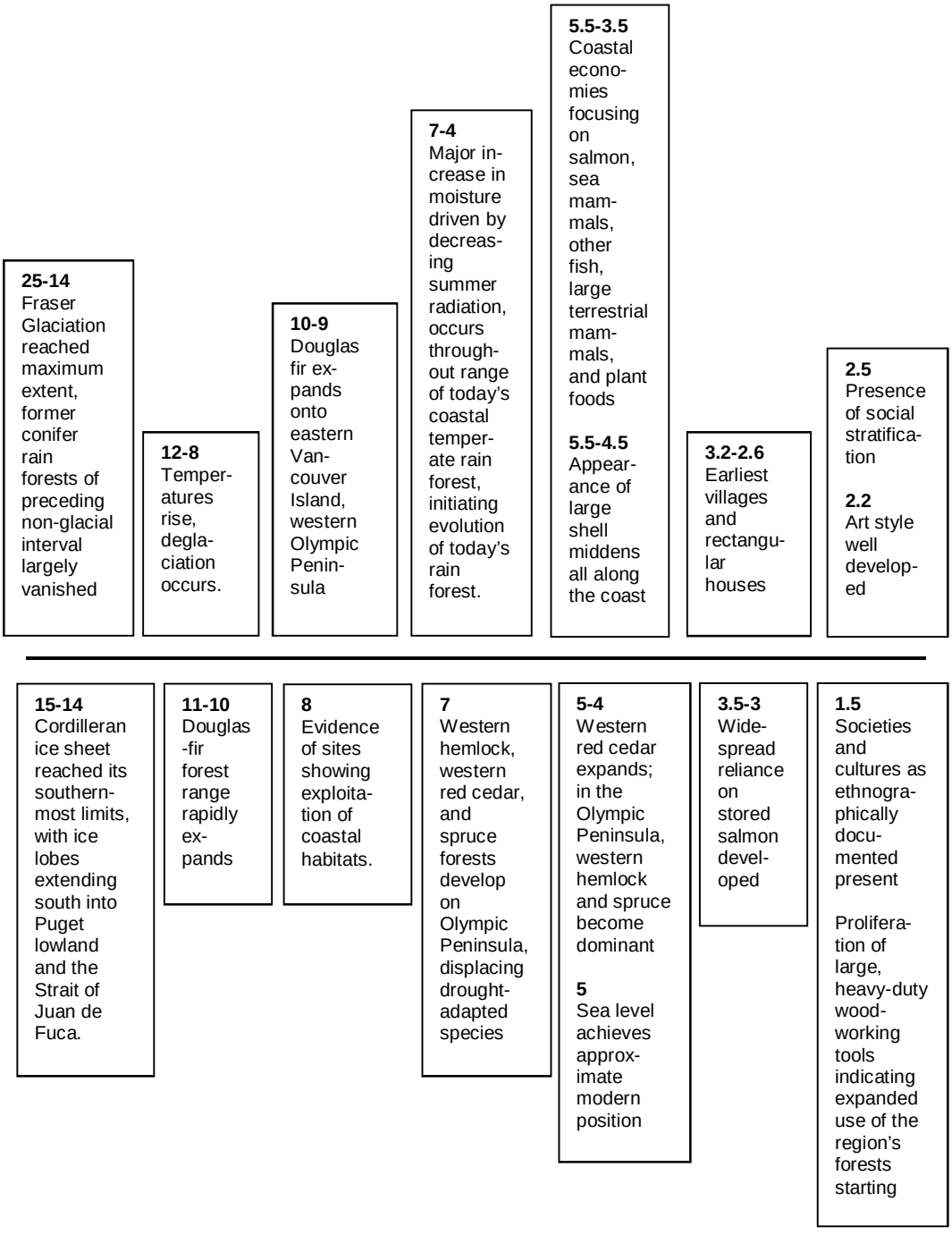
[39] Ames, K.M. and Maschner, H.D.G., 1999, pp. 13-17, 26-27, 219; Suttles, W., 1987, p. 45; Suttles, W. and Ames, K., in *The Rainforests of Home*, 1997, p. 259; Turner, N.J., "Traditional ecological knowledge," in *The Rainforests of Home*, 1997, pp. 277-280; Holm, B., "Art," in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 602-632.

Figure 4.1 Language families of Native groups on the Olympic Peninsula



Source: TerraMetrics, Google Maps, 2013; Olympic Peninsula Intertribal Cultural Advisory Committee, 2002, p. 4. Quadrant pictured about 85 x 105 miles.

Figure 4.2 Timeline of notable events on the Northwest Coast up to 1,500 years before present (in 1,000-year units)



The environment which sustained these societies on the Northwest Coast stretches along the North Pacific Coast from the Gulf of Alaska to southern Oregon, some 1,500 miles long. Backed to the east by coastal mountain ranges, the shoreline includes glaciers and impenetrable mountain in the northern reaches; a vast assortment of banks, inlets, islands and marshes among the outer shores and inland waters of British Columbia and northern Washington; and river estuaries and bays to the south. These waters were home to a variety of fishes and mammals. The region's coastal forests started to develop about 7,000 years ago in response to climatic changes (Figure 4.2). Cool summers, wet and mild winters, and a long growing season in much of the landscape have given rise to vast temperate zone rainforests of fir, hemlock, spruce and to a lesser extent, cedar. The western slopes of the outer mountain ranges, such as on Vancouver Island and the Olympics, experience the heaviest rains—over 100 inches per year in some areas. These lowland and mountain forests were home to plant materials, mammals and fish.[40]

Two environmental features of the coastal temperate rain forest especially influenced Native subsistence activities: the variety of foods and the variation of food availability in time and place.[41] As shown in Table 4.1, the diet of the Northwest Coast peoples was comprised of a diverse assortment of plants and animals. Across the region, Natives used over 200 species for food. They used upwards of 500 different plant species and about 100 animal species for food, medicines, and materials in technology.[42] Salmon likely supplied the greatest amount of food in the Northwest Coast throughout the year,

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[40] Ames, K.M. and Maschner, H.D.G., 1999, pp. 44-47; Suttles, W., "Introduction," in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 16-18.

[41] As adapted from Suttles W., 1987, pp. 22-24, 43-63.

[42] Turner, N.J., in *The Rain Forests of Home*, 1997, pp. 282-283.

but the fish was by no means the only source. Hunting, foraging, marine animals and freshwater fishes also were important.[43]

Table 4.1 Estimated numbers of plant and animal species used traditionally as foods (including beverages and condiments) by Northwest Coast Native peoples

Category	Number of species	Examples
Fruits	~50	blueberries, salal, salmonberries
Root vegetables	~25	Pacific silverweed, spiny wood fern
Green vegetables	~20	cow parsnip, fireweed, seaweed
Other plant products	~10	licorice fern, western hemlock (inner bark)
Mammals	~20	bear, deer, elk, seals, whales
Birds	~20	ducks, geese, seabirds
Fish	~35	cod, halibut, herring, salmon
Invertebrates	~35	clams, crabs, mussels, octopus

Source: Turner, N.J., in *The Rain Forests of Home*, 1997, p. 283.

Even with the many plants and animals available, their frequency, duration, intensity and setting varied by species. Resources were not readily available all the time—they could vary by season and year. Nor were resources constant when they did appear. They could arrive for a prolonged period or brief episode, with changing abundance. Moreover, location meant everything. Resource distribution across the region was not uniform and varied with respect to climate, topography, and other factors.

Pacific salmon, for example, were a widely used resource by Native peoples. One or more of its seven species could annually be found in many of the region's streams, rivers and estuaries. Salmon spend their lives in freshwater and salt water. After hatching and rearing in streams (and for one species, lakes), they move into saltwater where they

[43] See for example: Suttles, W., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 457; Philip Drucker, *Indians of the Northwest Coast* (New York: Published for the American Museum of Natural History [by] McGraw-Hill, 1955), p. 24; and Ames, K.M. and Maschner, H.D.G., 1999, pp. 25-26. Not all groups relied primarily on salmon, and all required other sources of food (Ames, K.M. and Maschner, H.D.G., 1999, p. 116).

mature. After a certain number of years, adult salmon return to their birth rivers to the spot where they were born in order to reproduce, whereupon they die. This migratory "run" upriver to spawn is a distinguishing trait of anadromous fish. Salmon runs occur in regular seasonal patterns and at accustomed locations, in small and large watersheds alike.

The salmon species is but one example of the flux of natural systems—an ebb and flow of animal and plant materials that Natives had to harness in order to exploit food resources successfully. Thus, as the anthropologist Wayne Suttles observed, there were limits to the abundance on the Northwest Coast, consisting "only of certain things at certain places at certain times and always with some possibility of failure."[44]

Native reliance on diverse food sources likely was an adaptive strategy to reduce the risk of famine. Because of the cyclical availability of many species, year-round food gathering tried to overlap with the growth and migration patterns of different plants and animals. This strategy also served to minimize the chance of total failure, should certain resources not routinely produce or appear from season to season, or should factors such as weather prevent hunting and gathering. In these circumstances other more accessible resources could be used as backup or as a supplement.[45] "To gain the greatest reward from nature," Suttles wrote, Natives "had to be at the right place, at the right time, with the right equipment, and with the right complement of personnel."[46]

In his 1940 fieldwork in the Hood Canal region, along the eastern shores of the

[44] Ames, K.M. and Maschner, H.D.G., 1999, p. 114; Suttles, W., 1987, pp. 22-23, quote on p. 47.

[45] Turner, N.J., in *The Rain Forests of Home*, 1997, p. 284; Suttles, W., 1987, pp. 46-50.

[46] Suttles, W., 1987, p. 68.

Olympic Peninsula, William Elmendorf interviewed an elder who told of a salmon run on the Skokomish River that arrived late. Villagers went hungry and moved to the bay to dig for clams and hunt seal. When salmon were finally spotted at the mouth of the river, everyone was redeployed upstream to harvest the massive run during the brief time it appeared. "They speared the salmon … speared them as fast as they could. They send a man to the people who had gone down to the bay, to tell them to come home. And they all came to catch the salmon, dry the salmon. And other people from all over came, they heard about it. From Nisqually, Puyallup, Oakville, they came."[47]

Ethnographic field work among the Klallam conducted by Erna Gunther in the 1920s, and among Native groups on the western Olympic Peninsula by Ram Raj Singh in the 1950s illustrates the temporal interplay of species abundance and collection effort. Gunther found that fishing was economically the most important resource collection activity for the Klallam, comprising the largest portion of their food. As shown in Table 4.2, the Klallam used numerous techniques to catch a variety of fish in several freshwater and marine locations throughout the year. They were accustomed to moving throughout their territory to intercept the most fruitful resource flows. While permanently located in productive areas, groups of families or even whole villages visited other areas to fish or gather vegetables several times each year, returning to their main villages during wintertime. For example, along the south shores of the Strait of Juan de Fuca, the Klallam would migrate east to Hood Canal in August for the dog salmon run, until late November

[47] William W. Elmendorf, *Twana Narratives. Native Historical Accounts of a Coast Salish Culture* (Seattle: University of Washington Press, 1993), p. 255. See also: Indian Claims Commission, "Commission Findings on the Coast Salish and Western Washington Indians," in *Coast Salish and Western Washington Indians, Volume V* (New York: Garland Publishing, Inc., 1974).

or December.[48]

On the western Olympic Peninsula, Singh analyzed the former food collection activities of six Native groups. Table 4.3 presents a variety of different activities across the year undertaken by the Quinault and Queets Native groups in ocean, coastal, river, and land habitats. In contrast to the Klallam and groups on the western peninsula, the Makah at Cape Flattery had few large streams and depended on marine species more extensively. Table 4.4 shows the relative importance of food sources among the six groups. Across the groups, salmon and whale were most important. Elk, deer, bear and marine species were also highly ranked.

Table 4.2 Succession of salmon runs together with other fish and methods of catching them by Klallam Native peoples

Fish[1]	Time	Method of catching
Spring salmon	middle of April to July	trap, trolling, gill net
Dog salmon	late July	gill net, trap
Humpback	August to end of October	trap, speared, line fishing
Silver salmon	October through December	trap, line fishing in river, gill net outside of spit, speared at night
Dog salmon (another variety)	follow silver salmon	
Steelhead	December, January, February	trap, line fishing in river
Halibut	April to September	line fishing
Ling cod	April to September	line fishing, speared close to shore
Flounder	April to September	Speared from canoe in salt water
Herring	middle of February to late March	Raked
Smelts	September	hole dug on beach, tide stranded fish in it
Candlefish	September to late October	raked and dipped

Source: Gunther, E., in *University of Washington Publications in Anthropology*, 1927, table from pp. 198-199.
[1] See Table 16.1 for common names and attributes of salmon.

[48] Gunther, E., "Klallam ethnography," in *University of Washington Publications in Anthropology*, 1,5(January 1927), pp. 195, 212-214.

Table 4.3 Hunting, fishing, digging and gathering activities by location and month, Quinault and Queets Native peoples

Activity	J	F	M	A	M	J	J	A	S	O	N	D
Marine	sea trout, night smelt		lion blueback, candle fish		fur seal, salmon		whale, sea otter, smelt		Silver and king salmon			
Land	land otter, beaver		Bird			elk, deer, bear, marmot, coon				bear		land otter
											beaver	
Beaches and Sea rocks			Mollusk									
Land			camas, vegetable sprouts			berry, basket grass			berry camas, root			

Source: Singh, R.R.P., 1966 [49]

Table 4.4 Relative importance of food resources for six western Olympic Peninsula Native groups (1 most, 10 least)

Food resource	Quinault	Queets	Quileute	Hoh	Ozette	Makah
Blueback salmon	1				2	
Silver and King salmon	2	1	1	1	6	7
Dog salmon						11
Halibut					3	2
Steelhead		10	6			
Cod					11	4
Smelt	7	4	7			
Mollusk	5	9	8		7	5
Elk and deer	3	2	2	2	9	10
Bear		3		10		
Whale	4		3	3	1	1
Fur seal			7	7	5	6
Hair seal			9	4	4	3
Sea Lion and porpoise	9	8	10	8	8	8
Camas and fern roots	6	6	4	5		
Berries	8	5	5	6		9
Birds and eggs	10	7	11	9	10	

Source: Singh, R.R.P., 1966, table from p. 48.

[49] Singh, R.R.P., *Aboriginal economic system of the Olympic Peninsula Indians, western Washington* (Sacramento, CA: Sacramento Anthropological Society, Sacramento State College, 1966), pp. 2-9, table from p. 67.

Getting all this food in different places and at different times was no simple task. Even so, Klallam and other Northwest Coast Native groups possessed a highly functional technology that sought to supply their societies with ample stores. Key techniques included mobility, hunting and fishing, and food processing and storage. Water travel was the main form of transportation to harvest sites, both ocean and river. Different types of dugout cedar canoes were used, of various sizes and proportion, with customized hulls, sides, bows and sterns, depending on their function and travel environment. A northern type included raised bow and sterns that projected over the water to prevent swamping from cresting waves. Sea-going canoes, such as those intended for seal hunting, might be intended to carry a few persons quickly and quietly. The largest vessels could carry as many as 50-60 adults and could be used to travel long distances of several hundred miles, hauling freight or war parties. Southern type canoes, mainly for use in rivers, were designed with wide bows and sterns and were more maneuverable. The smallest river craft, a "shovelnose" canoe with identical bluntly pointed ends and round bottom, was widely used.[50]

Once the harvest sites were reached, whether by land or water travel, the Natives used many kinds of apparatus and techniques to gather, capture or kill their prey. The Elwha Klallam, for example, used numerous fishing methods, such as trapping, dip-netting, gill-netting, reef-netting, trolling, long-lining, jigging, set-lining, impounding, gaffing, spearing, harpooning and raking to take salmon and steelhead, halibut, flounder,

[50] Pliny Earle Goodard, *Indians of the Northwest Coast* (New York: American Museum of Natural History. Handbook Series No. 10, 1924), pp. 33-34; Drucker, P., 1955, pp. 63-66.

ling cod, rockfish, sturgeon, herring, smelt, eulachon, dogfish, trout and other species.[51] In her Klallam study Gunther describes the importance of the weir, which extended across rivers to intercept fish. The construction of these devices included two rows of slanting fir posts tied with stripped cedar limbs, reinforcement poles, fir webbing with cedar twine, pocket doors and a platform for gaffing.[52] For some forms of hunting, such as whaling, Natives used a variety of specialized equipment including tackle, harpoons, whale floats and canoes. Whaling parties possessed keen navigation skills, courage, dexterity, strength and endurance.[53]

Although whales were a highly prized resource, the risk involved in capturing and killing them was equally high. Elmendorf's narrative account of a whaling incident at Clallam Bay depicts a nearly deadly encounter when one of the whalers, tangled in the harpoon line, was dragged under water for a long time. She survived by breathing through the whale float. Many hours later, the hunt concluded successfully:

> That whale jumps and starts out of the bay, with those two canoes after him, following those bladders, with the lines tied to the canoes. And the whale goes east down the strait now, he tows the canoes almost to Port Angeles, then he turns and comes back toward Klallam Bay…. Now they have been out following that whale one day and one night…. About two or three miles this side of Klallam Bay he goes ashore on a sand beach.[54]

After the harvest was finished, Natives had to preserve their bounty swiftly. Processing and storage techniques made it possible to harvest large amounts of otherwise

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[51] Hewes, G.W., 1947, pp. 126-156, 12; Gunther, E., in *University of Washington Publications in Anthropology*, 1927, pp. 198-210; Suttles, W., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 457-458.

[52] Gunther, E., in *University of Washington Publications in Anthropology*, 1927, pp. 199-200.

[53] Waterman, T.T., "The whaling equipment of the Makah Indians," *University of Washington Publications in Political and Social Science*, 1,1 (June 1920):1-67, pp. 9-41; Elmendorf, W.W., 1993, pp. 42-43.

[54] Elmendorf, W.W., 1993, p. 43.

perishable food that appeared in great quantity in a short time, such as during salmon runs, whale kills and berry season. The Natives used these supplies later when food was not available, or in trade and exchange when there was surplus. Plank house dwellings were the central hub for this production activity during wintertime. Single structures, often home to dozens of persons, were erected using post-and-beam construction, with gable or shed roofs, and some with multi-level interiors. Here, nuclear families converted raw food materials into finished storage products through the use of butchering, drying, rendering, smoking and other techniques.[55]

In Klallam territory, according to Gunther, salmon was the staple food and summers were an intensive time for drying and storing the fish. To prepare spring salmon, for example, the head was first cut off and the fish cut on the dorsal side. Next, the salmon was sliced toward the center into strips about 1-1.5 inches wide, deboned and wiped with fern leaves. It was hung over night in a smoke house using alder wood as fuel. Alder smoke emits a pleasant odor and makes fish soft. The fish was then cut into two pieces along the dorsal fin, sliced thin, and smoked for a week. During this time each piece was bent and twisted at least once for proper aeration. When dry, the smoked salmon was folded and stored in cedar baskets. No part of the fish was wasted: the head, intestines, stomach, eggs and milt were all used.[56]

Using the technologies of watercraft, harvesting tools and food processing, Native peoples of the Northwest Coast were able to exploit a variety of natural resources in their environmental interface. These resources, however, varied by location and season, and

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[55] Suttles, W. and Ames K., in *The Rain Forests of Home*, 1997, p. 259; Ames, K.M. and Maschner, H.D.G., 1999, pp. 147, 151; Suttles, W., 1987, p. 54.

[56] Gunther, E., in *University of Washington Publications in Anthropology*, 1927, pp. 207-208.

sometimes fluctuated in quantity and occurrence. There was uncertainty in their availability, and the threat of food shortage and scarcity was known locally and regionally. Because natural abundance was subject to such limits, subsistence techniques were versatile and adaptable to fit environmental conditions.

But these strategies only partly explain how coastal hunter-gatherer societies were able to achieve such a high level of sustained affluence. In addition to their technologies used to harvest and process resource flows across time and space, they also developed other strategies to manage their use of natural resources. These were comprised of cultural and social behaviors, and are best illustrated among Native groups that relied heavily on the salmon fisheries for their survival.

Chapter 5 The Salmon Ethos

For many groups in the Northwest Coast, salmon, above all else, have been the defining characteristic of their existence—a mainstay source of sustenance and wealth for over 5,000 years. This way of life guided their social behavior and was infused within their economies and cultures to form a sort of "salmon ethos."[57] The preceding chapter described how the use of technologies helped these fishing societies successfully exploit their environment. But just as important to their survival was the need to structure and regulate subsistence efforts. How, for example, did Native peoples protect and preserve

[57] Likely these groups could risk staking their existence on salmon because of the availability of other supplemental food sources. See: Ames, K.M. and Maschner, H.D.G., 1999, pp. 26, 116. Moreover, groups that relied on other species possessed similar ethos-like qualities in relation to those animals. See for example: Gunther, E., "A further analysis of the First Salmon Ceremony," in *University of Washington Publications in Anthropology*, 2(1928) pp. 158-159.

natural resources to avoid overuse and degradation? How was access to resources determined, and how was surplus shared?

Much of this was accomplished by a core set of attitudes, habits, beliefs and practices that comprised the salmon ethos. It could be seen in their social systems that served to organize and regulate the production, distribution and consumption of the fish within and across villages. Communal and private networks guided access to salmon resources, ensuring a degree of equity among the poor and rich alike. It could also be seen in their cultural systems, through rituals and ceremonies that prescribed and guided exploitation behavior. This was manifest in a worldview that treated the natural world as coequal to humans, requiring acts of respect and appeasement to animals and plants. Together, such strategies formed the backbone of how individuals and groups on the Northwest Coast treated each other and their environment to ensure mutual survival.

Property use, social relations and gift exchanges were three important ways that social networks guided the movement of food resources from point of origin to consumption within communities. Among Native peoples on the Olympic Peninsula, the concept of property was connected to water courses and productive resource sites. Geographically, streams or watershed drainage boundaries formed territorial divisions between communities and neighboring groups. In the Skokomish River area, for example, Elmendorf found that boundary configuration, as such, was rooted in watercourses. Among neighboring groups of the Twana in the Hood Canal region, going “halfway to their waters” placed oneself in “foreign” country. But concern with exact boundaries “never entered anyone’s mind.” In this Native area, degree of use for subsistence formed the principal view of property—but not in terms of exclusiveness. Every economically

useful site had a specific name, especially along the river and salt-water shoreline. Less used landscapes typically were unnamed. Within village environs, intensive resource-gathering shoreline and river site areas fell under varying degrees of group use-ownership. Land "was not looked upon as private property as were slaves, plank houses, canoes" and other materials. Community groups that intensively used certain areas did possess feelings of "ownership"—such as at winter-village settlements—but not in terms of individually owned property.[58]

Absent clear boundary "lines" defining property ownership, villages, family kin groups, and individuals monitored and controlled access to common and private areas containing productive resource sites. While a single person could gather plant species and shellfish, hunt for birds and land animals, and fish in the public domain, group activities typically led to larger surpluses in food production. This happened when labor was pooled, gear shared and productive sites were reciprocally used—not only within villages but also across groups and even territories. In these ways, the quest for abundance could often compel cooperation in resource management. Group techniques might involve public domain resources where participation was on an equal basis. In some areas, the community as a whole could control key fishing spots with large investment structures, such as salmon weirs or traps, with varying forms of access. The outlay of material and labor needed to build and maintain sites was borne by many, and rights of use were

[58] Elmendorf, W.W., "Structure of Twana culture," in *Coast Salish and Western Washington Indians, Volume IV* (New York: Garland Publishing Inc., 1974), pp. 266 (quote), 270 (quote), 30. See also: Riley, C.L., "Investigation and analysis of the Puget Sound Indians," in *Coast Salish and Western Washington Indians, Volume II* (New York: Garland Publishing, Inc., 1974), pp. 76-78.

restricted to multiple groups within that community.[59]

In other villages, cooperation might be on an unequal basis, where kin groups controlled ownership of a site or harvesting equipment. Among the Straits Salish in the area of the San Juan Islands, for example, extended families or individuals managed access to some of the most productive sites, typically spots or areas where resources were concentrated at certain times. Those persons invested with the authority to manage desirable sites were expected to share food—through exchange systems—with close relatives and housemates, as well as with neighbors and relatives from other communities.[60] In her study of the Klallam, Gunther found that village chiefs owned salmon traps at the mouths of many streams and creeks. Although they claimed the most productive catches that took place at night, they allowed poor relatives without traps to use whatever fish were caught during the day.[61] Non-owners could also participate in exchange for equipment, labor and specialized skills, receiving in return access at certain times or a share of the catch. In these ways, Native communities ensured that individuals, groups and even neighbors could have some level of access to productive natural resource sites, whether through reciprocal access or in-kind contribution.[62]

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[59] Richardson, A., "The control of productive resources on the Northwest Coast of North America," in *Resource Managers: North American and Australian Hunter-Gatherers*, Nancy M. Williams and Eugene S. Hunn, editors (Boulder, CO: Westview Press, 1982), pp. 97-101; Suttles, W.P., "The economic life of the Coast Salish of Haro and Rosario Straits," in *Coast Salish and Western Washington Indians, Volume I* (New York: Garland Publishing, Inc., 1974), pp. 56, 485-486; Riley, C.L., in *Coast Salish and Western Washington Indians, Volume II,* 1974, pp. 76-78.

[60] Suttles, W.P., in *Coast Salish and Western Washington Indians, Volume I,* 1974, pp. 485-486; Richardson A., in *Resource Managers: North American and Australian Hunter-Gatherers,* 1982, p. 101; Suttles, W., 1987, pp. 9-10, 20-21.

[61] Gunther, E., in *University of Washington Publications in Anthropology*, 1927, p. 199.

[62] Richardson, A., in *Resource Managers: North American and Australian Hunter-Gatherers*, 1982, p. 101; Suttles, W., 1987, pp. 9-10, 20-21; Suttles, W.P., in *Coast Salish and Western Washington Indians, Volume*

While shared access to subsistence activities may have provided a reasonable guarantee of collective survival, those who controlled privately owned sites could benefit materially from surplus food production. Should they not store the food or consume it immediately, they could convert excess into wealth—such as blankets, fine baskets, canoes and slaves. Households enjoying surplus might redirect labor normally devoted to gathering food instead to producing wealth items. Extra food could be given to relatives with the expectation of return gifts of wealth. The impetus for wealth-giving may have been to achieve high status or prestige, which would have enhanced social standing through wider ties and better marriages, for instance.[63]

Perhaps the most famous mechanism of gift exchange among the Native peoples was a lavish ceremony called the potlatch, a lingua franca term meaning "give." Although the practice varied among groups, typically a number of houses from a village hosted the event to give away items of wealth to guests invited from other villages in exchange for some kind of recognition.[64] Generations of social scientists have theorized over the significance of the ceremony, some interpreting it broadly as an investment for social prestige or a way to avoid conflict. Variants include viewing the potlatch as a method of acquiring rank, a means of publicly making claims to or defining social status,

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I, 1974, pp. 485-488; Riley, C.L., in *Coast Salish and Western Washington Indians, Volume II,* 1974, pp. 76-78.

[63] Suttles, W., 1987, pp. 21-25.

[64] Suttles, W. and Ames, K., in *The Rain Forests of Home: Profile of a North American Bioregion,* 1997, p. 261; Suttles, W., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, p. 469.

a way to express esteem, an attempt to secure relations with neighbors, or an endeavor to avoid physical conflict.[65]

A potlatch was not an everyday event. Among some Puget Sound Native groups potlatches marked important occasions such as when one received a new name, in summer when salmon began to run, death, and the reburying of a corpse. Gunther found that Klallam potlatch ceremonies usually accompanied notable occurrences in a family's life, such as a developmental phase of children or young adults. A lot of planning and preparation was involved. Special houses were built for potlatches that could not be occupied or used for any other purpose. It could take up to four years for potlatch hosts to gather the needed wealth materials for the ceremony. At Washington Harbor, for example, a potlatch took place only every other year. Once underway, a week of feasting, gaming, trading, songs and speeches would crescendo into a final day of formal present giving. Smaller potlatches also occurred, such as to feast after a successful hunt.[66]

Suttles' interpretation of the potlatch among the Central Coast Salish sees the ceremony ultimately serving as an inter-village regulating mechanism, or "a kind of safety valve in a system of exchange of food and wealth."[67] As depicted in Figure 5.1, surplus food was converted into high status by using wealth items as the transfer medium

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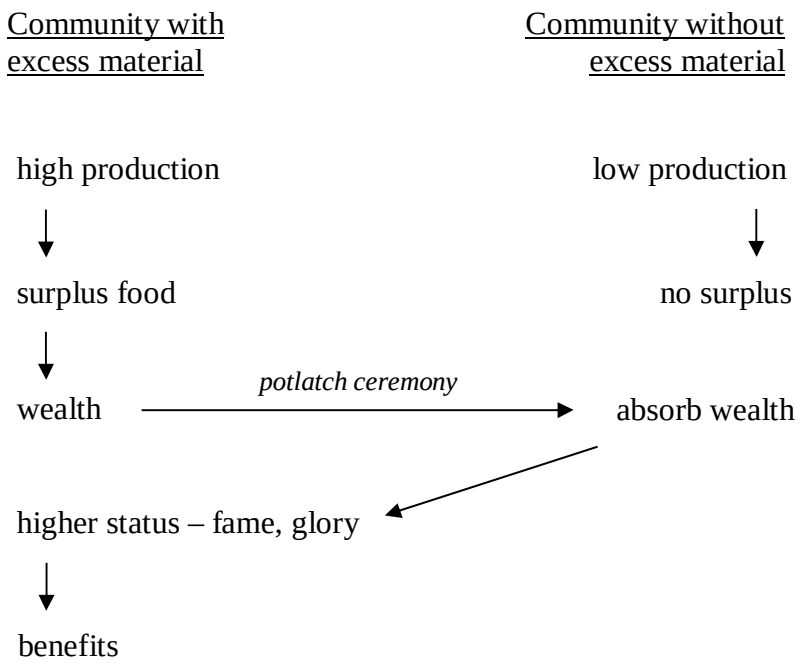
[65] Ames, K.M. and Maschner, H.D.G., 1999, p. 16; Suttles, W. and Jonaitis, A., "History of research in ethnology," in *Handbook of North American Indians, Volume 7: Northwest Coast*, pp. 84-86; Suttles, W., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 469.

[66] Gunther, E., in *University of Washington Publications in Anthropology*, 1927, pp. 306-310; Haeberlin, H. and Gunther, E., "The Indians of Puget Sound," in *University of Washington Publications in Anthropology* 4,1 (September 1930):1-84, pp. 59-61; See also: Suttles, W., 1987, pp. 204-205.

[67] Suttles, W. and Jonaitis, A., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 85. Suttles first put forth this theory in 1959. It has generated considerable discussion about the interaction of culture and environment. See: Suttles, W. and Jonaitis, A., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 84-86 and Suttles, W., 1987, pp. 15-25.

and the potlatch ceremony as the distribution opportunity. The benefits from holding high status, or fame or glory, could include numerous social opportunities and economic advantages. From year to year the roles of resource distributor and absorber could change, depending upon the environmental productivity enjoyed by each community. As a result, the potlatch could enable a social network "to maintain a high level of food production and to equalize food consumption both within and among communities." This acknowledged the limitations of the Northwest Coast environment, in which natural resource availability could fluctuate by location and season. Suttles thus interprets the potlatch as a culturally adaptive mechanism that responded to environmental and economic variability by modulating the movement of wealth across social groups.[68]

Figure 5.1 Resource flow schematic of potlatch ceremony (after Suttles)



[68] Suttles, W., 1987, quote on p. 25; Suttles, W., 1987, pp. 60-62.

Perhaps the most sophisticated survival strategy of the Northwest Coast Natives was found in their relationship with nature, the source of materials which supported their long-term social and economic well-being. Cultural attitudes directed this relationship. These attitudes comprised a set of shared beliefs and values that, when put into practice, strove to ensure an abundant and reliable supply of natural resources. Rituals, taboos, ceremonies and mythology were the most important cultural tools that guided Native relations with nature. Foremost was the idea that humans coexisted with the natural world. For that reason, nature was to be respected, treated carefully, and even appeased. In return, it was believed the natural world would accommodate Native needs—provide for their wants, reduce the risk of starvation, and spare hunters from injury or death. When plants and animals were abundant and hunts successful, Native peoples attributed this largely to the cultural techniques they employed, which were equally important to their technological means, if not more so.[69]

Among those groups that used salmon extensively, the first salmon ceremony illustrates their complex relationship with the natural world and the motivations that guided their behaviors. The ceremony took place when the season's first salmon returned to spawn, marking the arrival of a run, often in early spring when winter food stores were low. Because Native peoples believed that plants and animals were immortal and endowed with conscious spirits, they understood these spirits to have volition. This imparted the fish with an ability to decide whether it would inhabit local streams and rivers and submit to capture by humans. In a sense, the ceremony was an effort to

[69] This observation is found predominately in ethnographic literature. See for example: Drucker's discussion of whale hunting rituals (Drucker, P., 1955, pp. 35-37) as well as Waterman, T.T., 1920, pp. 38-47; Singh, R.R.P., 1966, p. 45; and Fischhoff, B. and Kadvany, J., 2011, pp. 135-138.

convince the salmon run that the humans were deserving of its sacrifice. In Gunther's words, the appeal for abundance was a "petition for luck." Until the welcoming ceremony was performed, it was not safe to harvest and eat the fish. Should they somehow offend the salmon spirits through a poor ritual performance, there was the ever present risk of food supply failure, as the salmon would choose not to appear. Accordingly, in the event salmon did not come, or did so in marginal numbers, the Natives placed the blame on themselves.[70]

Gunther's analysis of salmon rituals in the region found that many groups had integrated ceremonial patterns, taboo observances and mythology in coastal and inland areas where salmon migrate. Most of these groups performed some type of observance when the first salmon to ascend their streams was caught. This was often in the form of a ceremony, either simple or intricate, where the normal handling of the salmon was elaborated in a show of honor. Ceremonies could include various rites of catching, cooking, eating and disposal of the fish.[71] Table 5.1 tabulates some of these rites for selected groups, as described in Gunther's *Klallam Ethnography*:

> When the first sockeye is caught the little children sprinkle their hair with down, paint their faces and put on white blankets. They go out to the canoe and carry the fish on their arms as though they were carrying an infant. A woman cuts it with a mussel shell knife, after which the fish is boiled and given only to the children to eat. The sockeye is just like a person, they say; that is why they must be careful.[72]

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[70] Charles Hill-Tout, *British North America: I. The Far West, the Home of the Salish and Déné* (London: A. Constable and Company, Ltd., 1907), pp. 167, 169; Gunther, E. in *University of Washington Publications in Anthropology*, 1928, pp. 150 (quote), 155, 166; Elmendorf, W.W. in *Coast Salish and Western Washington Indians, Volume IV*, 1974, pp. 62-63.

[71] Gunther, E. in *University of Washington Publications in Anthropology*, 1928, pp. 135, 145, 147, 150, 166.

[72] Gunther, E. in *University of Washington Publications in Anthropology*, 1928, table facing p. 147; Gunther, E. in *University of Washington Publications in Anthropology*, 1927, quote on p. 203.

Table 5.1 Ritualization of normal handling of salmon for selected Northwest Coast Native groups

	Bella Coola	Kwakiutl	Klallam	Nootka	Chinook	Nisqualli	Snohomish	Tillamook
Carried in specified manner	✓	✓	✓					
Cut by specified person		✓						✓
Cut in ritual manner		✓	✓[1]	✓	✓	✓		
Cooked in ritual manner	✓	✓	✓[1]	✓			✓	✓
Eaten by: All present		✓	[2,1]				[2]	
Children			✓					
Ceremonial leader					✓	✓		✓
Dance held								✓
Prayers recited		✓						
Bones thrown in water	✓	✓				[3]		[4]

[1] Features belonging to Dungeness Klallam, others to Beecher Bay Klallam; [2] By all except host; [3] Heart burned; [4] Bones thrown into fire. Source: adapted from Gunther, E. in *University of Washington Publications in Anthropology*, 1928, table facing p. 147.

The use of taboo and myth by many Northwest Coast groups likewise showed an attitude of veneration toward salmon. They often served direct regulatory functions, such as prescribing how salmon habitat should be treated or salmon spirits respected, or admonishing conduct disrespectful to salmon spirits. In all cases, noncompliance with these rules and traditions was believed to have dire and sometimes evil consequences that could lead to loss of the resource.[73] In expectation of the salmon runs, for example, no impurities were to be put into the river for fear of offending the conscious personality of the fish. These could include anything deemed "unclean," such as food scraps, rubbish

[73] Gunther, E. in *University of Washington Publications in Anthropology*, 1928, pp. 136, 166; Goodard, P.E., 1924, pp. 116-118.

and canoe bilge.[74] During the first catch ceremonies, even certain people were prohibited from eating the fish for want of cleanliness. These could include parents of newborns, immediate survivors of the dead, and menstruating women.[75] Children were cautioned about trifling with dead salmon. Gunther reported the tale of a young girl swimming in the Dungeness River who made fun of an old salmon. "Soon after she became ill. Her eyes began to look like salmon eyes and her actions just like the movement of the fish as they swim…. The shaman could do nothing for her and she soon died."[76]

Chapter 6 Living within Risk

Watercraft, food preserving, public and private access to resources, food gifts, wealth exchange, reverence ceremonies, taboos and myths—all these techniques and strategies helped Native peoples of the Northwest Coast develop successful societies that lasted well over a few thousand years. Much of this success was tied to how they managed their relationship with local environments. How they defined this connection with the natural world was especially notable, by placing their existence on equal footing to key species they depended upon. Because of their spiritual viewpoint, they perceived their fate as being intimately coupled to the fate of the ecological systems that produced the plants and animals they exploited. They matched this profound sense of interdependence with a highly integrated risk management system that combined cultural, economic and social spheres. Their methods were so unified, in fact, that it is difficult if not impossible for

[74] Gunther, E. in *University of Washington Publications in Anthropology*, 1928, p. 155; Elmendorf, W.W. in *Coast Salish and Western Washington Indians, Volume IV*, 1974, pp. 62-63.

[75] Gunther, E. in *University of Washington Publications in Anthropology*, 1928, pp. 152-153.

[76] Gunther, E. in *University of Washington Publications in Anthropology*, 1927, p. 203.

anthropologists to tease apart the cause and effect sequences from which they evolved.[77] These attributes collectively describe societies whose way of life was situated *within* their risk matrix. In other words, they did not live apart from or beyond their various means of survival.

Because risk management strategies were well assimilated into the cultural and economic fabric of Native societies, there appears to have been a high participation rate in activities to protect natural resources. At community and family levels, a variety of managers were charged to regulate the use, distribution and care of resources. At the highest level, village "chiefs" oversaw control and access, directed food production, and facilitated the exchange of food and surplus wealth within and among villages.[78] The heads of families and kin-groups were in charge of many resource gathering sites, functioning as "owners," directors or stewards. They might maintain and oversee the use of important gear at especially productive sites or allocate access to outsiders.[79] Thus, an effective monitoring system with direct feedback loops was in place over most Native country where resources were valued—at fishing banks, streams, beaches and berry-picking areas. Village and family principals administered the sites, passing along accumulated knowledge and expertise from generation to generation. They were responsible for maintaining harvest infrastructure, closely observing and protecting the resources, and ensuring some degree of equitable access.[80] Such a system relied

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[77] See for example: Suttles, W., 1987 conclusions at p. 25 and at pp. 61-62 and Gunther, E. in *University of Washington Publications in Anthropology*, 1928, p. 164.

[78] Suttles, W. and Ames, K. in *The Rain Forests of Home*, 1997, p. 264; Suttles, W., 1987, p. 21.

[79] Suttles, W., 1987, pp. 30, 21.

[80] Turner, N.J. in *The Rain Forests of Home*, 1997, pp. 287-288.

extensively on social pressure to guard against noncompliance. “Everywhere,” in the words of ethnobotanist Nancy Turner, there were “sanctions against waste, wanton killing, and destruction.”[81]

The concept of mutual survival, as dictated by spiritual beliefs, also helped to promote widespread participation. Natives viewed natural life as having an interactive ability to affect their well-being. To a large degree, everyone had a stake in ensuring the proper treatment of the environment. This ensured a respect for and conservation of natural resource life forms in every stage of use from harvest to consumption, through individual and group practices.[82] Such relations between hunters and the hunted, for example, was observed by Charles Hill-Tout: “Hunters never talked lightly or made fun of any animal they hoped to trap or kill, but always spoke of it in respectful tones, and said, ‘We *may* kill it,’ never ‘We *shall* kill it.’”[83] During the welcoming rites for the first run of salmon, the community practice of taboo observances and ceremonial performances to supplicate the salmon involved many members and was performed for the good of the entire group.[84] Similarly, Gunther noted that during all Klallam salmon rituals “the welfare of the animal is most important and the taboos regulate conduct that his spirit may not be offended.”[85] Hence, Native spiritual alignment with their natural

[81] Turner, N.J. in *The Rain Forests of Home*, 1997, p. 278.

[82] Turner, N.J. in *The Rain Forests of Home*, 1997, pp. 277-278.

[83] Hill-Tout, C., 1907, pp. 166-168, quote on p. 168.

[84] Gunther, E. in *University of Washington Publications in Anthropology*, 1928, pp. 144-145.

[85] Gunther, E. in *University of Washington Publications in Anthropology*, 1928, p. 166.

environment served to curb counterproductive human impulses at individual and group levels. As explained by Suttles:

> The culture of the Straits peoples can be seen as a set of possessions which man uses in his struggle with his habitat and with himself. The possessions of a group include first a world-view which sees nature as a source of supernatural powers and sees food as a gift of the supernatural. In this view, neither supernatural power nor food is to be taken lightly.[86]

The dual reliance on hunting and food processing technologies on the one hand, and spiritual beliefs and practices on the other, was especially important when risks were most uncertain and hazardous: when resource flows varied in appearance and fluctuated in abundance, or when the pursuit of resources was dangerous. Yet this interface often presented the greatest chance of payback. Where large natural resource flows were concentrated in time and space, such as the periodic occurrence of a salmon run within a local river or a whale sighting in home waters, the use of ritual and honing of equipment was intensified.[87]

Examples are found among the whaling groups of the Olympic Peninsula and Vancouver Island. Perhaps the riskiest part of the whale hunt took place at the moment the canoes were physically attached to the whale by the harpoon and floats, when the thrashing animal could smash the canoe or tangle hardware. As recounted by anthropologist Philip Drucker:

> It was mainly for this moment that the whaler and his crew practiced long drill sessions and carried out arduous rituals of ceremonial purification to forestall any mishaps. On the beach, their families also observed certain rituals for their good luck and welfare. Ritual behavior before and during the hunt was considered essential for all sea hunting, of course, but because of the importance of whaling

[86] Suttles, W.P. in *Coast Salish and Western Washington Indians, Volume I,* 1974, pp. 49-50.

[87] Singh, R.R.P., 1966, pp. 43-44; Gunther, E. in *University of Washington Publications in Anthropology*, 1928, p. 166.

> in native eyes its ceremonial requirements were more elaborate and more rigid than those for any other quest.[88]

In sum, it seems clear that Native groups of the Northwest Coast possessed a cohesive set of survival strategies. Several categories emerge from a synthesis of the available ethnographic and anthropological literature when viewed as a composite, as summarized in Table 6.1. Perhaps the ultimate confirmation of their success was the long-term survival of societies that gave rise to stable communities, flourishing cultures and economies, and a worldview that embraced many life forms and redistributed wealth. Over the centuries, these groups deeply situated themselves in their environment, a vast web of forests, rivers, coastal waters, plants and animals. They endowed these things with spiritual and physical importance, upon which they anchored their core actions and beliefs. In this sense, they dwelled alongside the key species—such as salmon and whales—that made their survival possible.

The salmon dwellers were those groups, including the Klallam, whose survival relied on this critical species of fish. Fittingly, their winter domiciles were multifunctional dwellings where cultural, economic and social pursuits intersected—a reflection of their collective survival strategies. First these large plank houses served as the homes to several families. Their sturdy and ornate facades not only kept out the rain and wind but also identified the superhuman protectors of their owners. Inside, Natives manufactured tools and pursued arts and crafts. They also operated food processing centers where occupants preserved and stored salmon and other staples. And the structures played host to feasts, potlatches and ceremonies. These wooden dwellings

[88] Drucker, P., 1955, p. 35.

functioned as places of safety, status symbols, centers of creation, production and storage facilities, banquet halls, theaters and temples.[89]

But how could it be that within a few generations this remarkable way of life would largely disappear? Indeed, by the twentieth century many anthropologists hastened to document as much about these societies as possible—civilizations that seemed to be vanishing before their eyes. They conducted extensive field investigations, sought out the oldest surviving members of the Native groups, collected objects and materials, and published detailed ethnographies.[90] Although the Native peoples of the Northwest Coast had learned to coexist with an environment that sustained their lifestyle for centuries, an influx of newcomers would change everything. Within the space of a lifetime, a momentous outside force swept aside many facets of Native existence, overturning, disrupting, usurping and even erasing basic elements of their societies in spite of their success in managing risk.

[89] Suttles, W. and Ames, K. in *The Rain Forests of Home*, 1997, p. 259.

[90] Suttles, W. and Jonaitis, A.C., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 73-80.

Table 6.1 Successful risk management strategies of Northwest Coast Native societies dependent upon natural resources for survival

Attitudes toward nature
Viewed nature on equal terms, mutual survival; everyone had a stake
Related to plants and animal world by using spiritual cues
Supplicated species with extensive ritual and myth from harvest through consumption; high participation rate
Construed resource abundance as directly connected to volition of species
Control of access to natural resources
Individual and group access to public harvesting sites, within villages and across territorial areas
Family and village-controlled private harvesting sites, with modes of access available to non-owners
Enforcement-compliance of regulations
High participation rate among peoples at family and village levels
Designated family and village stewards well attuned to environmental conditions, maintenance and proper use of technologies, and appropriate access to resource harvesting sites; knowledge accrued and transferred
Designated leaders and practitioners of taboo observances and ceremonies
Effective social sanctions against noncompliance
Equity schemes
Public access points to common and private resource flows to ensure basic subsistence levels
Food gift exchanges within and among families
Surplus foods converted to wealth, which was redistributed through prestige ceremonies across villages and territories
Technology
Highly developed watercraft, food preserving and storage, hunting and fishing, and lodge construction techniques
Versatility and adaptability
Responded to local and regional environmental variability through combination of mobility, food production and hunting-fishing technologies; seasonal and annual intra- and inter-village access to resources, food gifts and wealth exchange; and reliance on backup subsistence sources.

Part 3. Newcomers

Chapter 7 First Contact

The maritime fur trade on the Northwest Coast, an accidental offshoot of European exploration efforts, was responsible for the first sustained contact between Native peoples and the outside world starting in the late eighteenth century. With its extremely dense

coat and weight of up to 100 pounds, the sea otter (*Enhydra lutris*) possessed a luxuriant and large pelt valued as fur trim and winter wear by the north Chinese upper class. The otter's thick, soft fur would eventually doom it close to extinction because the lure of possible investment returns of several hundred percent in triangle trade drew foreign vessels to the coast for decades.[91] The arrival of European and American traders—newcomer groups to the region—also devastated Native populations by exposing them to a new and fatal risk they could not have predicted.

The emerging interface between these new worlds set into motion a series of potential hazards and benefits to Native society. Euro-American presence introduced new technologies, influenced economic and social activities, and lead to the loss of a natural resource. Historians and anthropologists disagree as to the net effect these actions had on Native societies in this region. The introduction of guns, for example, might have altered relationships among Native groups and increased violence. And the reconditioning of hunter and gatherer economies to focus on fur trading for new commodities could have had cultural reverberations.

Notwithstanding these questions, most scholars agree the first contact period had a serious demographic impact on Native societies. The rapid profusion of new wealth, hyper-exploitation of fur-bearing animals, and introduction of muskets, guns and iron goods was not the cause. Rather, the impact came from the inadvertent transfer of epidemic diseases that lead to the depopulation of some villages and groups. Once unleashed from their foreign hosts, microbial hazards such as the virulent smallpox to

[91] Monique M. Lance, Scott A. Richardson, Harriet L. Allen, *Washington State Recovery Plan for the Sea Otter* (Olympia, WA: Washington State Department of Fish and Wildlife, Wildlife Program, December 2004), pp. 1, 15, 17-20; Gibson, J.R., 1992, pp. 12-13.

which the Natives had no natural immunity could be lethal to large numbers. Spread invisibly through close contact, the virus presented a significant risk. It was an outcome for which they were wholly unprepared.

The start of the Northwest fur bonanza stemmed from a chance incident during the third Cook expedition in 1778, when the crew sought a £20,000 discovery reward (estimated at perhaps $3.18 million currently)[92] offered by the British Admiralty for finding an Arctic seaway. Some 40 years earlier, the Russians had inadvertently realized the value of sea otters or "soft gold" in Chinese markets after acquiring pelts for warmth in their Bering Sea explorations. Following crews eventually exhausted Alaskan fur populations and probe south along the Canadian coast.[93] Converging on these same waters to blunt Russian expansion were Spanish crews, based well to the south in the Californias and Mexico, who established an outpost at Nootka on the western shores of Vancouver Island in 1774. Cook's crew purchased fur from Natives while wintering at Nootka, needing warmer clothing for their voyage north. Returning to England by way of Canton in 1779, the British likewise found Chinese willing to purchase pelts for a high price: some of the skins made a profit of 1,800 percent.[94]

Soon after publication of the accounts of Cook's voyage, Euro-American investors scrambled to outfit fur trading missions to these far away Pacific waters, initiating economic and diplomatic rivalries among countries for control over the region's

[92] See Table A.1 for year 2013 relative price valuations (initial years spanning 1870-1990) representing a cross-section of years and sums found in this text.

[93] Gibson, J.R., 1992, p. 13. Contemporary equivalent currency value is uncertain. An approximate 2013 relative value using a purchasing power calculator was generated at http://www.measuringworth.com/ [viewed February 23, 2013]. As estimated: £20,000 (1778) equals £2.085 million (2013), or $3.18 million.

[94] Gibson, J.R., 1992, pp. 22-23. The Spanish would later establish a second post, briefly, at Neah Bay among the Makah. Gibson, J.R., 1992, p. 18.

fur trade. This event was merely part of long sequence in global fur trading. Long prized by Europeans for both utility and fashion, the demand for fur garments had exceeded capacity in Western Europe by the fifteenth century. As wild fur-bearing species were killed off import markets developed, such as from Eastern Europe, Scandinavia and Russia. The forests and streams of eastern and central North America opened up vast new stores as early as the sixteenth century, propelling a new colonial trade until the American Revolution. Thus, the new Pacific trade was well-timed. In 1785 a second British ship reached Nootka, aptly renamed *Sea Otter,* with many more on the way. Over three hundred vessels would come between 1785 and 1825. The peak years in the maritime fur trade started in 1792, when 21 British and American Boston-based ships arrived, and lasted for about two decades, during which other countries also participated, including France and Portugal. American traders eventually dominated the trade until 1815, enjoying large net profits.[95]

As the fur trading period unfolded on the Northwest Coast, Native risk management systems demonstrated a versatile and adaptive response to potential threats to survival. Firearms were an obvious hazard that early on evoked a mixture of curiosity, awe and fear among some groups. While wintering at Nootka, Cook found that musket fire did not alarm the Natives until the British shot holes through wardress hides used as defensive armor and impenetrable to spears and arrows. "Their astonishment at this plainly indicated their ignorance of the effect of fire-arms. This was afterwards very

[95] Fisher, R., in *Approaches to Native History in Canada: Papers of a Conference held at the National Museum of Man*, 1977, p. 66; Paul Chrisler Phillips, *The Fur Trade, Volume 1* (Norman: University of Oklahoma Press, 1961), pp. xii, 1-14, 15-18, 20, 627; Howard I. Kushner, *Conflict on the Northwest Coast: American-Russian Rivalry in the Pacific Northwest, 1790-1867* (Westport, CT: Greenwood Press, 1975), pp. 4-6.

frequently confirmed, when we used them to shoot birds, at which they appeared greatly confounded."[96] Within 15 years, however, a Spanish scientist and ethnographer living at Nootka in 1792 would write of the Natives: "Today they handle all the European arms of flints, sabers, and swords with special dexterity," weapons for which many "had a singular affection."[97] Whatever advantage firepower afforded Euro-American crews was soon countered as ship-to-shore trade and intertribal trade diffused guns throughout the region.[98]

Moreover, Native combat tactics may have been superior to firearms in some instances. Native societies were familiar with warfare on small and large scales. It was a means of economic and social survival for access to foods, slaves, territory and trade routes, as well as a mechanism for revenge of perceived wrongs or aggressive acts and to reclaim prestige. They engaged in surprise attacks, were familiar with terrain, and used large numbers of warriors to overwhelm vulnerable adversaries at close quarters. They wore body armor and were proficient in hand-to-hand fighting, using weapons such as daggers, war clubs and thrusting spears. Large warrior excursions could mobilize war parties using 60-foot long canoes, traveling hundreds of miles to raid distant groups. To counteract assaults and sieges, villages built wrap-around palisade fortifications. Ambush and close combat tactics, sometimes unprovoked and sometimes in retaliation, were used

[96] Cook, J., 1785, pp. 211, 233-234.

[97] José Mariano Moziño, *Noticias de Nutka: An Account of Nootka Sound in 1792*, Iris H. Wilson, editor (Seattle: University of Washington Press, 1991), p. 16.

[98] Gibson, J.R., 1992, pp. 221-224.

in Euro-American confrontations, often with success.[99] When the Meares expedition sent a heavily armed 13-man longboat to reconnoiter the Strait of Juan de Fuca in July 1788, the mission returned early, "pierced in a thousand places by arrows" and carrying a battered and wounded crew. As the British were preparing to land, Natives on the shore assailed them with "continual showers of stones and arrows" while 40-50 others in canoes tried to board the longboat, engaging in close combat. It is likely that Klallam Natives attacked Meares' men just west of present-day Port Townsend, in Discovery Bay.[100]

But violence against the Natives did occur, and provoked revenge—if not on the offender then sometimes on the next vessel they encountered, regardless of that vessel's lack of involvement—which, in turn, could prompt retribution.[101] The American Captain Robert Gray, for example, was known to use force to compel trade, counter perceived unfair trading schemes, or respond to surprise attacks or the appearance of a pending attack, perhaps because he believed Americans would soon be ousted from participating in the fur trade. During 1792 Gray seemed to engage in conflict most everywhere he went. In May at Grays Harbor, on the southern coast of the Olympic Peninsula, amid a nighttime sortie of Native watercraft testing British patience a war canoe with at least 20 Chinook warriors that came too close was obliterated with "a Nine-pounder, loaded with

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[99] Fisher, R., in *BC Studies*, 1976, pp. 10, 15; Howay, F.W., in *The Canadian Historical Review*, 1925, pp. 287-309; Fisher, R., "Indian warfare and two frontiers: a comparison of British Columbia and Washington Territory during the early years of settlement," in *The Pacific Historical Review* 50,1(1981):31-51, pp. 34-35; Cole, D. and Darling, D., "History of early period," in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, p. 126; Ames, K.M. and Maschner, H.D.G., 1999, pp. 195, 196, 1999, 200, 217.

[100] Meares, J., 1790, pp. 174, 176, 178; Gorsline, J., "Prelude," in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, Jerry Gorsline, editor (Port Townsend, WA: Empty Bowl, 1992), p. xv.

[101] Howay, F.W., in *The Canadian Historical Review*, 1925, pp. 307-309; Gibson, J.R., 1992, pp. 165-166.

lagerege and about 10 Muskets, loaded with Buckshot." The ship's fifth mate wrote, "I do not think that they had any conception of the power of Artillery." Among the various villages situated on the inlets of Clayoquot Sound on Vancouver Island, further conflicts ensued. Later in May, while anchored Gray's men fired upon an approaching war canoe, killing or wounding over 25 Natives.[102] He also razed a village of 200 houses after a failed attack on his ship, and killed seven more Indians in another nearby village.[103]

Mutual trading interest likely tempered much would-be hostility between the Euro-Americans and Native groups. Many traders returned for more than one season and needed to maintain good relations with accustomed trading partners. During the numerous fur missions to the Northwest Coast, overtly violent incidents were uncommon, although may have escalated over time.[104] For those traders who saw no long-term benefit or became impatient with Native conduct, force was sometimes used to compel trade. Because of the uncertain outcomes, both sides were typically cautious, more than ever when parties employed unfair or unreasonable tactics that fostered ill-will, distrust and vengeance.[105]

In addition to minimizing the threat of Euro-American firepower, Natives were adept at creating advantages throughout the trade process with respect to time, place and material. For security and ease, ship captains preferred to coast the shoreline, thereby

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[102] For an analysis of several hostile events, see: Howay, F.W., in *The Canadian Historical Review*, 1925, pp. 295-296.

[103] Gibson, J.R., 1992, pp. 163-164.

[104] Fisher R., in *Approaches to Native History in Canada: Papers of a Conference held at the National Museum of Man*, 1977, pp. 77-78; Cole, D. and Darling, D., in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, p. 126; Kushner, H.I., 1975, p. 6.

[105] Gibson, J.R., 1992, pp. 171-175; Howay, F.W., in *The Canadian Historical Association, Report of the Annual Meeting Held at Ottawa, May 24-25, 1932*, 1932, p. 9.

forcing Natives to paddle alongside vessels to trade wherever and whenever crews appeared. As Native leaders consolidated their control over fur distribution networks, Euro-Americans were forced to trade directly with certain individuals at specific villages, often anchored in ports. Situated on their home turf with access to manpower and shelter, leaders could insist on access to ship decks and prolong trade over days until their terms were met. So, too, did changing Native preferences for items force the crews to expand their inventory. Once iron materials saturated the coast, demand switched to textiles—chiefly blankets—firearms, liquor, tobacco and molasses. To their surprise, the captains came to view their Native counterparts as quite capable traders. "We learned to our cost," Meares wrote, "that these people … possessed all the cunning necessary to the gains of mercantile life."[106]

As fur trading increased, inter-village competition pitted Natives against each other, vying for trade opportunities and monopolization of skins from inland suppliers. Some coastal leaders became tremendously wealthy in their role as central distributors or fur agents, effectively controlling intra- and inter-village trade relationships with the Euro-Americans.[107] Natives readily incorporated new items into their cultural and economic pursuits. Metal tools, for example, amplified the output and scale of wood carving, which along with more trading wealth generated a profusion of arts and crafts.

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[106] Fisher, R., in *Approaches to Native History in Canada: Papers of a Conference held at the National Museum of Man*, 1977, pp. 67-79 (Meares quote on p. 79); Cole, D. and Darling, D., in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, p. 124; Muckle, R.J., 1998, pp. 61-62.

[107] Fisher, R., in *Approaches to Native History in Canada: Papers of a Conference held at the National Museum of Man*, 1977, pp. 74-77; Muckle, R.J., 1998, pp. 61-62.

The massive influx of material wealth also led to more frequent and grander potlatch ceremonies.[108]

Although the Natives enjoyed a certain measure of control in the fur trade that led to the flow of new technologies and materials throughout the region and enabled some villages and individuals to amass great wealth, questions of impact remain. To what extent did the fur trade affect economic and cultural strategies that had long sustained Northwest Coast societies? Enthusiastic in the exchange of animal skins for foreign goods, Native groups rapidly augmented their hunting and trapping of marine, river and land fur-bearing mammals over two to three generations. For some groups, this voluntary redirection of energy and equipment could have deemphasized traditional activities. The location and timing of strategic fur trading centers, for example, could interfere with seasonal migrations to subsistence sites. It also encouraged additional Native settlement near these areas. Labor and expertise employed to intercept, process and store food might be redirected to pursuing furs, whether through hunting effort, inland trade, or plunder of rival villages. In turn, these actions could impair the ability of villages to provision for winter and build surpluses for gift ceremonies. At Nootka, for example, during the 1790s Native groups experienced an increase in famine for want of a winter food supply.[109]

The repercussions of these shifts in Native lifestyle are hard to calculate, but likely important. While changes did occur, Natives may have played a role: the adoption

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[108] Fisher, R., 1992, pp. 45-46; Muckle, R.J., 1998, p. 61; Holm, B., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 603-605; Gibson, J.R., 1992, p. 270.

[109] Muckle, R.J., 1998, pp. 61-62; Cole, D. and Darling, D., in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, pp. 125, 130 (see generally pp. 119-134); Fisher R., in *Approaches to Native History in Canada: Papers of a Conference held at the National Museum of Man*, 1977, p. 76; Gibson, J.R., 1992, pp. 271-272.

of new technologies and resource consumption patterns was unforced and even enriching to society, with the effect of intensifying or accelerating preexisting trends. Moreover, critical Native autonomy over land and resources remained intact. In sum, the outcome was not radical, revolutionary, or destructive in the short-term.[110]

Even so, for those groups that participated actively in the fur trade, age-old risk strategies were altered in the quest to provide furs to traders in return for previously unknown goods of foreign origin. Socially, power balances within and among villages may have changed as some individuals and groups enjoyed a surge of wealth to the exclusion of others.[111] Economically, manufactured textiles, tools and alcohol could have modified Native production regimes and networks to some degree.[112] Culturally, it is at least plausible to consider that the new emphasis on fur hunting eroded Native spiritual ties to the natural world and undermined the practice of traditional subsistence activities. Regulating mechanisms governing reverence toward animals and harvest level may have been undermined. As these alterations magnified from season to season, unforeseen consequences likely rippled across societies involved in the trade in a variety of ways, subtle and obvious, with the potential for a variety of cumulative effects.

The near extirpation of the sea otter for peltry within a few decades speaks to the failure of some Native groups to protect a natural resource they clearly valued. This perhaps signifies a breakdown in previously successful risk management systems that

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[110] See for example: Cole, D. and Darling, D., in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, pp. 126, 128, 133; Fisher, R., 1992, pp. 21, 47; Gibson, J.R., 1992, pp. 269-270.

[111] Suttles, W., 1987, p. 197; Cole, D. and Darling, D., in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, pp. 128-129.

[112] Cole, D. and Darling, D., in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, pp. 130-132.

protected the environment. Such strategies could not foresee the rapid infusion of new materials and technologies into a region whose economy, culture, and technology had evolved gradually over millennia.

By 1825, the Hudson's Bay Company—already dominant across much of Canada—solidified control over the fur trade on the Northwest Coast, functioning as a commercial ruler of the region. The maritime trade had ceased in part because of the scarcity of sea otters on the coast.[113] Trade in land mammals continued—until these, too, declined in number—as Native groups funneled furs to company posts in exchange for goods. The company set up trading centers in Coast Salish territory north and south of the Elwha Klallam. It built Fort Langley on the lower Fraser River in 1827. In 1833 Fort Nisqually was established at Puget Sound's southern end. Ten years later, Fort Victoria started operating directly across the Strait of Juan de Fuca from the Elwha River. This location immediately became a great magnet for trade, attracting Natives from throughout the Straits, Puget Sound and Alaska.[114] Nisqually records indicate that between May 1833 and April 1835 Klallam visited the settlement to trade animal skins and game, and on several occasions did not trade because of unfair exchange rates.[115]

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[113] Howay, F.W., in *The Canadian Historical Association, Report of the Annual Meeting Held at Ottawa, May 24-25, 1932*, 1932, pp. 5, 10-11; Fisher, R., in *Approaches to Native History in Canada: Papers of a Conference held at the National Museum of Man*, 1977, p. 66; Ames, K.M. and Maschner, H.D.G., 1999, p. 12; Gibson, J.R., 1992, p. 277; Harold A. Innis, *The Fur Trade in Canada. An Introduction to Canadian Economic History* (Toronto: University of Toronto Press, 1956), pp. 262, 286; Phillips, P.C., 1961, p. 431.

[114] Cole, D. and Darling, D., in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, p. 125; Suttles, W., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 470-471.

[115] *Told by the Pioneers. Tales of frontier life as told by those who remember the days of the territory and early statehood of Washington, Volume I* (Olympia, WA?, United States Works Project Administration, 1937), "Hudson's Bay Company, Occurrences at Nisqually House," pp. 7-53.

Throughout the half century that marked the first contact period between Euro-American newcomers and the Northwest Coast peoples, a series of infectious diseases struck the region. Native societies were especially vulnerable for interrelated reasons. Trading centers were typically located in or near densely populated villages or gathering points, where close contact with disease carriers was common. Natives carried no natural immunity, and thus were at high risk of succumbing to disease. Many lived in communal settings, where several families shared a dwelling, exacerbating virus transfer. In addition, Native routes that distributed goods throughout the region from coastal trading points served as disease vectors. Such factors created ideal conditions for epidemics.[116]

Late eighteenth century explorers and traders, as well as the first wave of nineteenth century settlers who followed, introduced eight major varieties of epidemic diseases to the Northwest Coast including smallpox, malaria, measles and influenza. Scholars agree that Native populations declined significantly. But it is difficult to determine definitively how many Natives died during this period. Pre-contact population numbers are inexact, the virulence of the disease strains and their corresponding mortality rates is unknown, the variability of epidemic spread and intensity across time and space is uncertain, the extent to which diseases killed subgroups capable of regenerating depressed populations is ambiguous, and the role of immunity and use of inoculation is unclear. Estimates therefore vary among historians, demographers and anthropologists.[117]

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[116] See generally: Boyd, R., "Demographic history, 1774-1874," in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 135-148; Gorsline, J., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, p. xvii.

[117] Fisher, R., "The Northwest from the beginning of trade with Europeans to the 1880s," in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part 2*, Bruce G. Trigger and Wilcomb E. Washburn, editors (New York: Cambridge University Press, 1996), pp. 144-146; Fisher, R., 1992, p. 22.

Using back calculations based on early census baseline numbers—collected by Europeans after the arrival of early epidemics—and a mortality rate estimate of 33 percent, one scholar concluded that between 1774 and 1874 diseases reduced the Northwest Coast Native population from about 188,000 to less than 35,000. The largest episodic events to occur were smallpox in the 1770s, a fever and ague that was likely malaria in the early 1830s, and smallpox again in 1862-1863. Total population loss could have been far greater by using different mortality rate estimates.[118] Assuming a mortality rate of 90 percent for the early epidemics, another researcher put the pre-contact coastal population at over 1 million people, with correspondingly greater depopulation.[119] Among Native groups in coastal and inland British Columbia, disease loss may have been the major cause of a precipitous drop in numbers, from 250,000 persons during the mid-1700s population to about 100,000 by 1835.[120]

Smallpox was particularly feared. Spread through droplets as an airborne virus, over several hundred years the disease had already killed millions in Europe and Asia, accounting for an average of 10 percent of all recorded deaths. The virus could spread during face-to-face contact or through contact with infected bodily fluids or contaminated objects, with a non-contagious incubation period of up to two weeks following exposure. High fever, vomiting and malaise followed by rash and sores spreading from the mouth and throat, culminating with skin eruptions across the body characterized the disease's first contagious phase. Telltale bumps and pustules gave way to scabs that would

[118] Boyd R, in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 135, 139, 147.

[119] Ames, K.M. and Maschner, H.D.G., 1999, p. 53.

[120] Muckle, R.J., 1998, p. 60.

eventually fall off, concluding the contagious period. Death could occur within two weeks of experiencing first symptoms. Fatality rates vary by virus type, averaging 30 percent but ranging from 1 to 100 percent. Survivors often had permanent scaring or partial blindness, but at least gained immunity to subsequent attacks. While vaccines became available in the early nineteenth century, the virus was not eliminated globally until the 1970s.[121]

Spanish maritime expeditions in the 1770s may have introduced smallpox to groups north of Vancouver Island, with subsequent spreading throughout the Northwest Coast.[122] Much of the continent already had been and would again be ravaged: East Coast Natives and cities such as Boston experienced periodic epidemics during the seventeenth century.[123] And during the 1780s smallpox killed up to one-third of the Plains Natives when the disease spread from the Sioux up the Missouri river into the Canadian prairies.[124] By the late 1780s, American and British crews had observed pitting and blindness among the Northwest Coast Natives—evidence of an earlier epidemic. These

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[121] Colin G. Calloway, *One Vast Winter Count. The Native American West before Lewis and Clark* (Lincoln: University of Nebraska Press, 2003), pp. 416-417; Centers for Disease Control and Prevention. Smallpox Fact Sheet. August 9, 2004. http://www.bt.cdc.gov/agent/smallpox/overview/overview.pdf [viewed November 20, 2008]; *Oxford Textbook of Public Health, Third edition, Volume 1*, Roger Detels, Walter Holland, James McEwen, Gilbert S. Omenn, editors (New York: Oxford University Press, 1997), p. 404.

[122] Disease migration from the northern plains or the Russian Far East was also possible during that decade. Boyd, R. in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 137-138; Gibson, J.R., 1992, pp. 273-274; Fisher, R., in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part 2*, 1996, pp. 142-143.

[123] Calloway, C.G., 2003, pp. 416-417.

[124] Fowler, L., "The Great Plains from the arrival of the horse to 1885," in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part 2*, Bruce G. Trigger and Wilcomb E. Washburn, editors (New York: Cambridge University Press, 1996), pp. 20-21; Arthur J. Ray, *Their Role as Trappers, Hunters, and Middlemen in the Lands Southwest of Hudson Bay, 1660-1870* (Toronto: University of Toronto Press, 1974), p. 105.

same crews may have been exposed to the virus in Canton, where smallpox outbreaks were frequent.[125] Smallpox revisited the coast by 1801, this time having traveled westward from the Plains across the Rockies and into the Columbia Plateau. Another outbreak occurred on the northern coast in the mid-1830s, perhaps through navigators from Asia or Spanish America.[126] Epidemics hit Washington's coast in 1853 and coastal British Columbia in 1862, likely brought from San Francisco trading vessels.[127]

The social and cultural ramifications of these diseases on Northwest Coast peoples varied and are hard to generalize.[128] How Native groups responded partly depended on the severity and frequency of epidemics in their territories. Where disease decimated substantial fractions of villages, for example, the effects were overwhelming. Obviously, the psychological impact of such large-scale horrific death must have been devastating, with long-lasting shock to survivors who witnessed it. The inability of Native healers to cure the mysterious disease and belief systems to make sense of the carnage exacerbated the sense of futility and demoralization.[129] Moreover, loss of knowledge and skill and memory—among fishermen, hunters, warriors, shamans, ritualists, leaders and many other specialists—could have had serious societal

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[125] Gibson, J.R., 1992, p. 274.

[126] Boyd, R., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, pp. 138, 140-141.

[127] Fisher, R., in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part* 2, 1996, pp. 142-143; Ames, K.M. and Maschner, H.D.G., 1999, p. 54; Boyd, R., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, pp. 141, 145.

[128] Fisher, R., in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part* 2, 1996, pp. 143-144.

[129] See for example: Harris, C. "Voices of disaster: smallpox around the Strait of Georgia in 1782," *Ethnohistory* 41,4(Autumn, 1994):591-626; Suttles, W., 1987, p. 197; Gorsline, J., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, p. xvii.

consequences.[130] Suttles, for example, notes that the preservation of heritage through knowledge—links to the past—was so important that it helped to define low-class from high-class people.[131] The loss of individuals possessing wealth and status might have plunged social landscapes into confusion. One theory suggests that potlatching increased among an especially hard-hit group on coastal British Columbia as survivors attempted to sort out new statuses. Among the Makah at Cape Flattery, the 1853 epidemic was reported to have killed off many Indians, including a famous chief.[132]

Some areas experiencing only gradual population declines appear to have retained social and cultural continuity. These include groups on the southeastern Alaska panhandle, central and northern Nootkan areas on Vancouver Island, and the Southern Coast Salish.[133] For disease vectors emanating from ship contact, the more isolated inland Klallam territory with its minimal sea otter populations might have been spared the direct impact of coastal fur trading ports.[134] Nevertheless, as humans traveled they carried diseases. Smallpox epidemics afflicted the Klallam in 1775 and 1801, as well as an unidentified mortality event in 1824-1825, a measles epidemic in 1848, and smallpox again in 1853. Population estimates are imprecise and vary, but suggest a diminution during these years. Their 1780 numbers may have been around 2,400; 1,760 by 1845; and

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[130] Gorsline, J., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, p. xvii; Muckle, R.J., 1998, p. 61.

[131] Suttles, W., 1987, pp. 8-9.

[132] Boyd, R., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 147; Fisher, R., in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part 2*, 1996, pp. 145-146; Gorsline, J., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, pp. xvii-xviii.

[133] Boyd, R., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 147.

[134] Suttles, W., 1987, p. 155.

926 in 1855.[135]

Overall, the risk management systems of Native societies on the Northwest Coast successfully endured many aspects of the first contact period. Beginning in the 1770s, European and American mariners came to the coast in search of East-West passage and furs. They continued to come, trading for about 50 years. During this period of contact Natives were active participants and astute merchants, eager to supply Euro-Americans with pelts in exchange for numerous items. At the same time, Native peoples were able to avert direct threats to their security and autonomy. They appear to have coped with the threat of firearms by possessing their own. They also manipulated the conditions of trade to suit their needs: many captains noted the Natives' penchant for business, often in dismay. As it progressed, the maritime fur trade infused Native economies and cultures with new technologies and wares and, for some leaders and villages, tremendous wealth. Scholars generally agree that Native social systems gainfully incorporated foreign items into existing cultural and economic structures. Trade was beneficial not only to Euro-Americans but also to Native groups.

There were also failures. Similar to earlier European and Asian societies, Native peoples were unprepared for and incapable of dealing with the biological hazards of infectious diseases. And yet—even after several waves of diseases wracked the region over a few generations—it is a testament to the strength of Native societies that some groups were able to survive and even recover. Certain features of risk management were

[135] Boyd, R., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 145; Robert H. Ruby and John A. Brown, *A Guide to the Indian Tribes of the Pacific Northwest* (Norman: University of Oklahoma Press, 1992), p. 28; Elmendorf, W.W., in *Coast Salish and Western Washington Indians, Volume IV*, 1974, p. 272; Valadez, J., in *Native Peoples of the Olympic Peninsula: Who We Are*, 2002, p. 18.

in place that enabled villages and groups to regain their footings and even thrive anew, notwithstanding lasting psychological effects. The widespread slaughter of fur-bearing sea, river and land mammals at the hands of Native hunters—evidently viewed as an expendable resource—raises questions as to whether the fur trade undermined traditional relationships between some Native peoples and segments of the natural world. In addition it is unclear to what extent trade eventually atrophied or supplanted Native expertise in the production of basic needs such as subsistence activities and the manufacture of materials. Such questions apply less to those groups peripherally involved with the fur trade, such as the Klallam and Coast Salish.

The next phases of contact—American treaty making and settlement—presented new threats to Native societies including the Elwha Klallam. Unlike the maritime traders whose interests were limited primarily to accessing furs, settlers sought control of Native territory and the natural resources therein. They brought not just new wares, technologies and more diseases. They also set up different forms of governance. The net effect would be a shift in the balance of power. Native villages lost their property and Natives lost access to natural resources. This affected their traditional economic and cultural relationships with the natural environment. The newcomers would build a different society, and with it they formed and relied on distinctly unique risk management systems.

Chapter 8 Transferring the Land

In late 1852 James Swan saw something peculiar in the Pacific waters during the fifth day of his voyage on the brig *Oriental*. The Massachusetts native had secured passage on a San Francisco ship heading up the coast to get timber. As the vessel headed north it cut

through a wide swath of woody debris some 30 miles west of the Columbia River—"great quantities of drift-logs, boards, chips, and saw-dust." This was the largest river in the region, whose discharge was capable of discoloring ocean waters well beyond shore. The volume and force of the Columbia was so torrential that early explorers were afraid to navigate into its mouth for fear of wrecking. Robert Gray was the first to enter the river in 1792, naming it after his vessel the *Columbia Rediviva*. The Chinook Native peoples who inhabited its lower reaches called it the "Big River." On the day Swan passed by, the Columbia was releasing the waste and leftover materials of a newly born timber industry.[136]

Swan disembarked at Shoalwater Bay, shallow protected waters just north of the Columbia mouth, now known as Willapa Bay. Only a distant memory, the navigator John Meares had briefly visited this bay after confronting the Makah at the entrance of the Strait of Juan de Fuca during the summer of 1788. But unlike the early maritime fur traders, Swan was not visiting. He was here to stay, a settler who would spend most of the next half century living among both the Natives and pioneers of western Washington and the Olympic Peninsula. A habitual observer and avid writer, his books, papers, reports and personal journals chronicled an important transitional period on the Northwest Coast. Close friend of Native and settler alike, he would witness key events: the organization of Washington Territory in 1853, federal treaties with Native peoples in the mid-1850s, the arrival of a transcontinental railroad in 1883 and statehood in 1889.

[136] James G. Swan, *Northwest Coast* (Fairfield, WA: Ye Galleon Press, 1989), pp. 17-20, quote on p. 19; Lucile McDonald, *Swan Among the Indians: Life of James G. Swan, 1818-1900, Based Upon Swan's Hitherto Unpublished Diaries and Journals* (Portland, OR: Binfords & Mort, 1972), p. 1.

By the time of Swan's death in 1900, Native inhabitants had lost much of the autonomy and control they had held when he first arrived on the coast.[137]

This period of settlement saw unprecedented growth in a process largely dependent upon the federal government's efforts to accommodate westward expansion through treaty making with Native groups. Nineteenth century public land law was a means to facilitate the disposal of federal lands and resources into state and private hands. The basis of "public lands law" was the concept that some lands are public, and that law—as an expression of public interest and guided by the public interest—governs these lands. Once the United States had acquired lands from other sovereigns, such as foreign countries or indigenous Native peoples, the government could either open these lands to entry and settlement or it could reserve and withdraw them. Lawmakers oversaw the distribution of newly available lands in a tug of war between public and private interests.[138]

With the removal of feudal restrictions after the American Revolution, law had responded to the needs of an active society set upon westward expansion and committed to putting natural resources to use. The legal historian Willard Hurst saw the federal government as using law to "protect and promote the release of individual creative energy" and to "mobilize the resources of the community" in the nineteenth century. The impetus could have been to create new power and positions of individual leadership or to enlarge self-respect for many. Whatever the cause, people in the United States, Hurst

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[137] Swan, J.G., 1989, pp. 20-23; McDonald, L., 1972, pp. vii-viii. See also description of Swan's ethnological contributions and relationship with the Smithsonian Institution: Ivan Doig, *Winter Brothers: A Season at the Edge of America* (New York: Harcourt Brace Jovanovich, 1980), pp. 114, 115, 233.

[138] George Cameron Coggins, Charles F. Wilkinson, John D. Leshy, *Federal Public Land and Resources Law, Fifth Edition* (New York: Foundation Press, 2002), pp. 2-3.

wrote, "had already sighted the promise of a steeply rising curve of material productivity as the dynamic of a new kind of society."[139] Throughout the history of the frontier, most of Indian country had been converted to government property that eventually was opened up for homesteading or retained for other purposes. The Northwest proved no exception to this pattern, starting in the lower Oregon Country region below the Columbia River. Up until the early twentieth century, federal legal apparatus transferred the region's lands to many private interests—sometimes through controversial means—thus facilitating westward migration and the eventual development of lumbering, mining, irrigation and manufacturing.[140]

Settlers and missionaries following the Oregon Trail had already begun to enter the Willamette Valley by the 1840s. Their arrival was not without conflict. The pioneers wanted some type of assurance from government that their hard work would be rewarded—in land, access to resources, and security. Tensions and hostilities were building while the newcomers moved onto desirable lands already claimed by the Hudson's Bay Company traders and Native groups. The Organic Act of 1848—which ended British claim below the Strait of Juan de Fuca and the 49th parallel north and established Oregon Territory—affirmed settler protection by extending federal law to the new territory. The Act also protected Native groups, guaranteeing Indian land title, rights, liberty and protection from undeclared war in the region. Congress reaffirmed Indian

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[139] James Willard Hurst, *Law and the Conditions of Freedom in the Nineteenth-Century United States* (Madison, WI: University of Wisconsin Press, 1956), pp. 6-7.

[140] Coggins, G.C., Wilkinson, C.F., Leshy, J.D., 2002, pp. 7-8, 39-46; Gates, P.W. "An overview of American land policy," in *American Law and the Constitutional Order: Historical Perspectives*, Lawrence M. Friedman and Harry N. Scheiber, editors (Cambridge: Harvard University Press, 1978), pp. 121-131; Robert E. Ficken, *Washington Territory* (Pullman, WA: Washington State University Press, 2002), pp. 73-74, 97-98, 169.

"law and custom" in all lands not yet ceded to the government in 1850 by extending the Indian Trade and Intercourse Act. But the Oregon Donation Act of 1850, intended to promote agriculture in the region by providing grants of up to 320 acres to individuals, led to a rush of land claims in Willamette Valley and Puget Sound. Within five years nearly 7,500 claimants acquired more than 2.5 million acres that cut across Native areas.[141]

The United States government viewed treaty making as the preferred method of obtaining Native lands in order to accommodate new arrivals. As the country's Manifest Destiny and expansionist policies pressed westward, many Native groups had already been pushed out of the way and placed in reserves in order to free up land. The treaty process was necessary in order to remove legally Native occupants who had rightful claims as construed by longstanding federal policy. Until the Northwest Coast Natives ceded their land title to the United States, the homesteading of settlers could not proceed and regional instability continued.[142]

Handling competing interests between settlers and Natives proved especially difficult in the coastal region south of the Columbia River. The first round of treaty-making efforts largely failed. The Donation Act had prematurely unleashed newcomers into the region who evidently had little interest in the treaty formalities of negotiating

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[141] Marino, C., "History of western Washington since 1846" in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 169; Beckham, S.D., "History of western Oregon since 1846," in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 180 (quote); Gorsline, J., "Commentary: Pioneer existence," in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, Jerry Gorsline, editor (Port Townsend, WA: Empty Bowl, 1992), pp. 33-34; Ames, K.M. and Maschner, H.D.G., 1999, p. 12.

[142] Clifford E. Trafzer, editor, *Indians, Superintendents, and Councils: Northwestern Indian Policy, 1850-1855* (Lanham, MD: University Press of America, 1986), p. 2; Charles Wilkinson, *Messages from Frank's Landing: A Story of Salmon, Treaties, and the Indian Way* (Seattle: University of Washington Press, 2000), p. 10; Coggins, G.C., Wilkinson, C.F., Leshy, J.D., 2002, pp. 39-46.

land cessions. Describing the fertile bottom lands of a river basin in western Oregon, a federal Indian agent wrote in 1851, "the whole tract will be rapidly settled first, on account of its proximity to the gold-mines, again its inducements in an agricultural point of view, and thirdly on account of the easy access to its almost interminable forests of Cedar." Pioneers demolished Native villages, ignored their claims and altered the landscape with the effect of suppressing or eliminating traditional subsistence activities. Gold discoveries in the Rogue River in 1852 worsened the situation. Miners destroyed fisheries habitat, drove some Natives from their villages, and raped, enslaved and murdered others. An Indian uprising resulted that led to more hostilities.[143]

The government was therefore compelled to settle the land cession problem not only to help settlers but also to protect the Native groups from lawlessness and violence. Federal commissioners now viewed the Northwest territorial treaty process as a government imposition of provisions on increasingly dependent and submissive wards. These were not strict negotiations between equal sovereigns—although the United States recognized Native ownership of the land, it did not recognize independent nations. Treaty provisions adhered to government terms and discretion more than Native interests. The treaties were viewed as civilizing documents. In addition to requiring land cessions, treaty provisions attempted to restructure and transform Native societies, what treaty historian Francis Paul Prucha described as an "overwhelming obsession of the United States with changing the cultures of the Indians from communally to individually based

[143] Beckham, S.D., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, pp. 180-182; Coan, C.F., "The first stage of the federal Indian policy in the Pacific Northwest, 1849-1852," *Oregon Historical Quarterly* 22, 1(March 1921):46-89, quote on p. 73.

systems of property ownership and from hunting or mixed economies to yeomanry."[144]

Oregon officials, however, could not follow federal directives to transfer the Indians of the Willamette and lower Columbia valleys east of the Cascades. The idea was to ship them completely out of the region, over the mountains. But Natives refused to leave their homelands and insisted on retaining their right to hunt, forage and fish. When officials capitulated, completing agreements to allow some Native groups to remain, Congress failed to ratify them. Indian Superintendent Ansel Dart, for example, secured land cessions in exchange for giving Native bands small homeland reservations with reserved rights to natural resource use. In response, territorial delegates worked to make sure the Senate did not accept the agreement. "The poor Indians," he wrote "are fully aware of the rapidity with which, as a people, they are wasting away." Recognizing the power of the government and the settlers' ability to "kill and exterminate" them, they nonetheless did not willingly leave their homes and ancestral lands. "They further told me," Dart added, "that if compensation for their lands was much longer withheld, the whites would have the lands for nothing."[145]

Against this backdrop in 1853, officials of the newly formed Washington Territory sought to engage Native groups in treaty making. Settlers were already threatening the region's stability. Aided by lessons learned from Oregon, the government's short-term strategy was to consolidate Native groups into small reserves up and down the coast while permitting them to continue subsistence activities. If secured,

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[144] Beckham, S.D., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 182; Francis Paul Prucha, *American Indian Treaties: The History of a Political Anomaly* (Berkeley: University of California Press, 1994) pp. 2-14, 246-255, quote on p. 10.

[145] Beckham, S.D., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, pp. 180-181; Coan, C.R., in *Oregon Historical Quarterly*, 1921, pp. 46-89, quote on p. 68.

the treaties allowed the speedy transfer of the land base to the territory, which encompassed the area north of the lower Columbia River and north of the 46th parallel east of the Columbia. Gradually, over the long-term, the planners assumed Native societies would shed their hunting and gathering attributes and morph into an agrarian lifestyle. But for now the objective was to get them immediately out of the way of the incoming settlers with as little friction as possible.[146]

Congress appointed Isaac Stevens as the territory's governor and ex officio superintendent of Indian affairs. The outdated system of combining the two offices was begun in 1787 when the Northwest Territory was created, well before the region's affairs would have deemed the two jobs irreconcilable. Governor Stevens, responsible for advancing the interests of settlers, was also superintendent Stevens, guardian of the rights and welfare of Native peoples. Under pressure to regard the Native as an obstacle of settlement, Stevens' allegiance was to the expansionist interests of the territory.[147] He spent most of 1853 leading a government survey to map a railroad route across the northern part of the country. Arriving to the capital Olympia in November, the new governor exclaimed: "I have come here not as an official for mere station, but as a citizen as well as your chief magistrate to do my part toward the development of the resources of this territory."[148]

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[146] Coan, C.R., in *Oregon Historical Quarterly*, 1921, pp. 46-89; Prucha, F.P., 1994, pp. 246-249; Wilkinson, C., 2000, p. 10.

[147] Neil, W.M., "The Territorial Governor as Indian Superintendent in the trans-Mississippi West," *The Mississippi Valley Historical Review* 43(September 1956):213- 237, p. 213; Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, p. 169.

[148] George Pierre Castile, editor, *The Indians of Puget Sound: The Notebooks of Myron Eells* (Seattle: University of Washington Press, 1985), p. xv; Kent D. Richards, *Isaac I. Stevens: Young Man in a Hurry* (Pullman, WA: Washington State University Press, 1993), p. 157.

Stevens quickly did his part. Between December 1854 and January 1856 Washington Territory officials completed treaty campaigns at Medicine Creek, Point Elliott, Point No Point, Neah Bay and the Quinault River. These comprised all Native territories west of the Cascade Mountains to the Pacific Ocean, from Canada south to Grays Harbor and the Nisqually River. The treaties were similar in content. They lumped together as many groups as possible onto ten small reservation parcels, ceding the rest of territory to the government.[149] The land transfer was staggering. Native lands comprising millions of acres were reduced to tens of thousands of acres on specified reserved lands. Some groups such as the Quinault and Twana happened to get reservations within their homelands. But they had to share their lands with other groups told to relocate regardless of their territorial and social affiliations. The Makah, however, received their own reservation.[150]

The treaties also required the government to provide reservations with agents, schools and teachers. This included annuity payments toward clothing, goods, agriculture and schooling with the purpose of "civilizing" the Natives. Alcohol, inter-group warring and slavery were forbidden. Planners hoped these provisions and requirements would gradually wean Native peoples from their subsistence lifestyle, help to assimilate them into a new culture, and put them on "the white man's road."[151]

Perhaps most essential were treaty stipulations allowing the Natives to hunt and

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[149] Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, pp. 169-171; Ruby, R.H. and Brown, J.A., 1992, p. 176.

[150] Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, pp. 169-171; Ruby, R.H. and Brown, J.A., 1992, pp. 126, 176, 249.

[151] Prucha, F.P., 1994, pp. 2-10, 250-255; Hazard Stevens, *The Life of Isaac Ingalls Stevens, Volume 1* (Boston: Houghton, Mifflin and Company, 1901), pp. 453-454, quote on p. 478.

fish “at usual and accustomed grounds and stations” including off-reservation sites “in common with all citizens of the Territory.”[152] The inclusion of these provisions seems to have benefited both sides, but for different reasons and with different expectations. Stevens realized that Native groups would not agree to cede their lands without securing the right to continue fishing and hunting as they always had. The Natives viewed their access to and control over migratory subsistence activities as most important to their way of life. So long as they could fish where and when and however they wanted, they believed they could continue to live as they always had. Treaty provisions with the government guaranteed them this right in spite of the newcomers’ presence. The strategy was sensible, as understood by advisor George Gibbs, a lawyer and ethnographer who had helped with previous Northwest treaties. “What is necessary for them,” he advised “and just in itself, is . . . the use of their customary fisheries.”

But to the Stevens treaty commission this was merely a short-term concession in order to gain instant acquisition of land, which was the real prize. The government plan of assimilation—dating back to Jacksonian era trans-Mississippi Indian policies in the 1830s—assumed annuities toward schools and farms would eventually replace Native hunting and fishing. Stevens believed that Northwest Coast Natives needed at least a generation to learn how to feed themselves through agriculture. In the meantime, traditional subsistence patterns could remain part of their lifestyle to avoid the government having to feed them during the transition period. The Stevens administration also saw the value of having Native fishing expertise, labor and trade contribute to the

[152] Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, p. 169; Wilkinson, C., 2000, p. 12; Lane, B., 1973, p. 26; Fay G. Cohen, *Treaties on Trial* (Seattle: University of Washington Press, 1986), quote on page 37 (George Gibbs to Captain McClelland).

young territory's development.[153]

Even with these provisions, the conduct and intent of the treaty proceedings in Washington Territory was controversial. This interface with the new American society was far more threatening to the Northwest Coast Natives than the trade negotiations with maritime fur crews had been at the turn of the century. Treaty negotiations were truly alien events to the Native peoples, who had not conceived of land as being owned or sold in paper transaction. As such, Natives were unfamiliar with the use of legal language as a means of effecting permanent land exchange. "It is a folly to think of treating these wild Indians of the Northwest with the same formality we are wont to adopt toward a foreign nation," James Swan wrote, having attended the failed Chehalis River council in 1855. "They know nothing of law or law terms: all they want is to have matters as simple as possible."[154]

The Americans viewed treaty making as a means of stripping Native societies of autonomy and subjecting them to a new power. Likely some groups did not even realize this was an objective. Using well-established paternal tactics from seventeenth century dealings with eastern Natives, Stevens suggested his society could better care for the Natives. They had succumbed to diseases and alcohol, could not defend themselves against abusive Whites, and would only suffer more as settlement accelerated. In other words, the Americans argued, the Native survival strategies were failing to contend with

[153] Ronald N. Satz, *American Indian Policy in the Jacksonian Era* (Norman: University of Oklahoma Press, 2002), pp. 247-249; Ficken, R.E., 2002, pp. 45-46; Wilkinson, C., 2000, p. 12; Lane, B., 1973, p. 26; Trafzer, C.E., 1986, p. 3.

[154] Wilkinson, C., 2000, p. 11; Alexandra Harmon, *Indians in the Making: Ethnic Relations and Indian Identities around Puget Sound* (Berkeley: University of California Press, 1998), pp. 82-83; James G. Swan, *The Northwest Coast, or Three Years' Residence in Washington Territory* (New York: Harper and Brothers, 1857), p. 350.

new dangers and needed to be substituted, else they would perish.[155]

Confusing matters even more, the treaty conditions Stevens established were inimical to Native social structure and concepts of property. The commission haphazardly carved Native landscapes into imprecise political and physical units that had no bearing in reality. They ignored long established cultural and social mores that guided subsistence access to and use of properties. These included the role of inter-group relations, obligations and hospitality in guiding permissive and common use patterns. This mistaken view likely reflected a deep-seated misunderstanding held by the newcomers. "The Indian makes no fixed habitation, really occupies no land, and surely reduces none to possession," a prominent historian of Washington later remarked soon after statehood was attained. And yet, the Native "jealously watches the encroachment of others, not because he needs lands but because he has learned to regard it as his hunting ground." In contrast, the settler "required the exclusive occupancy of the land."[156]

Treaty officials also restructured Native groups and individuals into "tribes" and "chiefs." These terms overly aggregated and simplified the complex organization of kinship, residence, dialect, traditions and family ties that actually structured inter-village relationships and social stratification across the region. Treaties likewise merged groups with different socioeconomic systems or long-standing animosities. Stevens even selected unauthorized individuals to represent independent groups that the commission wrongly

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[155] Wilkinson, C., 2000, p. 11; Harmon, A., 1998, pp. 82-83.

[156] Riley, C.L., in *Coast Salish and Western Washington Indians, Volume II,* 1974, p. 78; Indian Claims Commission, "Commission Findings on the Coast Salish and Western Washington Indians," in *Coast Salish and Western Washington Indians, Volume V* (New York: Garland Publishing, Inc., 1974), pp. 368-369; Elwood Evans and Edmond S. Meany, editors, *State of Washington: A Brief History of the Discovery, Settlement and Organization of Washington, the "Evergreen State," as well as a Compilation of Official Statistics Showing the Material Development of the State Up to Date* (Tacoma: Worlds Fair Commission of the State of Washington, 1893), p. 39.

combined into one unit.[157]

Stevens further disregarded good faith protocol by communicating in Chinook jargon, a northwest lingua franca of about 500 simple words mixed in English, French and various Native languages. According to Ezra Meeker, a contemporary who was familiar with and critical of Stevens' treaty efforts, "I could talk the Indian languages, but Stevens did not seem to want anyone to interpret in their own tongue, and had that done in Chinook. Of course, it was utterly impossible to explain the treaties to them in Chinook."[158] Speaking of the crude trade language, legal and Indian scholar Charles Wilkinson asks, "how could it possibly speak to sovereignty, land ownership, fishing rights, assimilation, freedom, or the futures of societies?"[159]

Some Natives were put off by the young governor's manners and attitude—paternalistic, disrespectful, bullying and inflexible. As observed by biographer Kent Richards: "Stevens ran the treaty sessions as if he were a judge in a court of law. Though all had the opportunity to speak, to ask questions, and to demand explanations, and though there was room for minor modifications of the treaty drafts, the end result of the councils was inevitable." This behavior elicited different reactions from Native participants. Some acknowledge their dwindling status and wished to live in peace with the newcomers and viewed treaty signing as a means to co-existence. They were willing to sell their lands but they wanted to live within their homelands and continue to fish and

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[157] Suttles, W., 1987, pp. 16-20; Harmon, A., 1998, p. 85.

[158] Wilkinson, C., 2000, p. 11; Lane, B., "The records of the Stevens Treaty Commission," in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, Jerry Gorsline, editor (Port Townsend, WA: Empty Bowl, 1992), pp. 36-37 (Meeker quote on p. 37).

[159] Wilkinson, C., 2000, p. 11.

hunt as they always had. Where others strongly dissented or walked away, it has been suggested that the Stevens commission forged the names of signatories.[160] Present-day scholars continue to question the equity of Stevens' treaty process for lack of transparency. The official record of proceedings contains no Chinook translations, presents limited explanation as to how the Natives' objections were overcome, and was later censored and denounced by two members of the commission.[161]

At Stevens' first council at Medicine Creek, for example, a Nisqually leader named Leschi found the proposed reservation location and size for his group preposterous. He left the treaty grounds and claimed he did not sign any documents. But the final treaty contained his mark. Resentment against settlement and the treaties led Leschi to form an anti-American Native coalition. They warred against Puget Sound settlers and twice attacked the town of Seattle during the winter of 1855-1856. Leschi was unable to expand a general Native war across western Washington, and the uprising was over by spring.[162] In February 1855, several groups meeting with Stevens on the Chehalis River near Grays Harbor refused to accept treaty terms. They opposed removal provisions and land cession and walked away. Some of these groups, from the western Olympic Peninsula south of the Makah territory, later agreed to a separate treaty in

[160] Richards, K.D., 1993, p. 206; Wilkinson, C., 2000, p. 11; Trafzer, C.E., 1986, pp. 4-5; Fisher, R., in *The Pacific Historical Review,* 1981, p. 43; Stevens, H., 1901, p. 463; Harmon, A., 1998, pp. 82-83, 85; Swan, J.G., 1857, pp. 345-346; Seeman, C., in *Indians, Superintendents, and Councils: Northwestern Indian Policy, 1850*-1855, 1986, p. 25.

[161] Ezra Meeker, *Pioneer Reminiscences of Puget Sound: The Tragedy of Leschi* (Seattle: Washington, 1905), pp. 250-257; Charles M. Gates, editor, "The Indian Treaty of Point No Point," *Pacific Northwest Quarterly* 46(April 1955):52-58; Lane, B., in *Shadows of Our Ancestors,* 1992, pp. 38-40.

[162] Wilkinson, C., 2000, p. 12; Ruby, R.H. and Brown, J.A., 1992, pp. 150-151; Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, pp. 170-172.

July.[163]

During the Treaty of Point No Point on the northeastern shore of Puget Sound, Stevens secured treaty signatures from Klallam, Chemakum and Twana representatives in January 1855. The commission assured the Native groups that their fishing rights would not be threatened. The Klallam had believed the treaty agreement would provide them with reservation lands on the north peninsula in the vicinity of Dungeness Spit. But government efforts to set land aside, farther west at Crescent Bay, failed. Altogether, the Indians ceded away 438,430 acres and received a reservation of 3,840 acres at the mouth of the Skokomish River at the head of Hood's Canal. This site was some 150 shoreline miles from the westernmost Klallam lands on the Strait of Juan de Fuca and about 70 miles from the Chemakum at Port Townsend Bay.[164]

The Klallam saw little reason to move to the reservation. It was in the heart of Twana country, their traditional rivals, and some 3,300 of its acres were boggy. Even if they had wanted to farm the land was unsuitable and could not accommodate the nearly 1,000 Indians called on to relocate there. Lumbermen had also removed timber from the site—with no compensation paid to the Indians—as congressional failure to ratify the treaty left the land boundaries unmarked for four years. This also held up the promised annuity payments. Perhaps most significantly, the reservation was too far from Klallam

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[163] Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, p. 171.

[164] Gorsline, J., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, p. 37; Gibbs, G., "Treaty of Hahd-Skus, or Point No Point," in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, Jerry Gorsline, editor (Port Townsend, WA: Empty Bowl, 1992), pp. 41-46; Stevens, I.I., "The Point No Point Treaty," in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, Jerry Gorsline, editor (Port Townsend, WA: Empty Bowl, 1992), pp. 46-50; Lane, B., 1973, p. 26; Bureau of Indian Affairs, "Anthropological report on the Jamestown Clallam," in *Memorandum, Subject: Recommendation and summary of evidence for proposed finding for federal acknowledgment of the Jamestown Band of Clallam Indians of Washington pursuant to 25 CFR 54* (Tribal Government Services, May 16, 1980), p. 5.

fishing grounds, which extended 80 miles along the southern shores of the Strait from Port Townsend west to the Hoko River bordering the Makah territory at Cape Flattery. Still distant from the flow of settlement to the east, the Klallam possessed about a dozen villages at the time of the treaty. These locations were strategically situated at the mouths of rivers and bays and may have been home to about 900 people, although there is no consensus on population estimates (Table 8.1). Even the local Indian agent admitted that had the Klallams moved they probably would not have survived. By 1861 no more than 15 percent of the total Native population in the original treaty area was living at the reservation. Executive order increased its size to 4,170 acres in 1874 after a railroad land grant prevented an attempt to enlarge the reservation a couple years earlier.[165]

Northwest Coast treaty making in the 1850s served as the first of many interfaces between Native groups and territorial government over land use and ownership. The United States government used treaties as a type of land transfer mechanism to mediate the claims of two colliding societies. It was grappling with threats to settler development posed by Indians, as well as threats to Native groups posed by non-Indians. Although formal treaty making soon ceased, the process of land transfer continued for decades in the form of executive orders, statutes and other ways. It created new reservations and altered the size of existing ones. As settlement burgeoned, the government allocated the

[165] Ruby, R.H. and Brown, J.A., 1992, p. 28; Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, p. 171; Indian Claims Commission, in *Coast Salish and Western Washington Indians, Volume V,* 1974, pp. 346-357, 368-369 (table at pp. 349-350); Bureau of Indian Affairs, "Anthropological report on the Jamestown Clallam," in *Memorandum, Subject: Recommendation and summary of evidence for proposed finding for federal acknowledgment of the Jamestown Band of Clallam Indians of Washington pursuant to 25 CFR 54* (Tribal Government Services, May 16, 1980), p. 6; Bureau of Indian Affairs, "Report on History of the Jamestown Clallam Band of Indians," in *Memorandum, Subject: Recommendation and summary of evidence for proposed finding for federal acknowledgment of the Jamestown Band of Clallam Indians of Washington pursuant to 25 CFR 54* (Tribal Government Services, May 16, 1980), p. 2.

remaining increasingly valuable public lands.[166]

Table 8.1. Selected Klallam Villages along the north shore of the Strait of Juan de Fuca, 1855

Name[1]	Location
Kakaitl	Port Discovery
Tsey'spat	Old Dungeness
Ey'eynes	east end of Port Angeles, at mouth of Ennis Creek
Wyeywheytsen	west end of Port Angeles, base of Ediz Hook
Elwha	mouth of Elwha River
Stey'alh	mouth of Indian Creek, on Elwha
T'lhtsent	Port Crescent
Wha'wham'ma	mouth of Lyre River
Neywho'	mouth of Pysht River
Whengeynet	east end of Clallam Bay
T'lhat'lhaways	west end of Clallam Bay
Hoqe	mouth of Hoko River

[1]The rendering of village names varies throughout historical documented literature and can differ from present spellings.[167] Source: selected from Indian Claims Commission, in *Coast Salish and Western Washington Indians, Volume V*, 1974, pp. 346-357, 368-369 (table at pp. 349-350).

The immediate success or failure of treaties partly depended on whether settlement was already underway or had not yet begun. South of the Columbia River, even before 1855 a number of settlers had already reached Oregon, claiming the land upon which Natives had lived for millennia. Those whose lands were in the path of this first wave of newcomers—before formal government intervention—did not fare well. Oregon treaty officials failed to convince some Native groups to cede their lands amid

[166] Coggins, G.C., Wilkinson, C.F., Leshy, J.D., 2002, p. 44.

[167] For example, as listed in Table 3.1, Suttles' testimony used by the Indian Claims Commission in 1960 spells the Native village site at Ennis Creek, Port Angeles bay as Ey'eynes (Indian Claims Commission, in *Coast Salish and Western Washington Indians, Volume V*, 1974, p. 349). More recently, Olympic Peninsula Intertribal Cultural Advisory Committee, 2002, p. 17 and Boyd (Colleen Boyd, *Changer is Coming: Land, History and Identity Among the Lower Elwha Klallam Tribe of the North Olympic Peninsula* (Unpublished Ph.D. dissertation, University of Washington, 2001), pp. 215, 217) refer to the site as spelled ʔiʔínəs or I-enn-nus.

hostile settlers. In response, federal executive order established two Indian reservations on the coast and eastern base of the Coast Range in 1855 and 1857. The government relocated thousands of Natives and bounty hunters rounded up or killed those who refused to go. Army forts surrounded the reservations until the Civil War.[168]

North of the Columbia, many Native groups continued to live as they had and largely ignored the new reservations established by the Stevens treaties. Because of western Washington's remoteness, the influx of settlers that had beset Natives to the south had not yet reached the area. Puget Sound and Straits Natives remained somewhat cushioned until the Fraser River gold discoveries in British Columbia in the late 1850s. Over the next few decades, immigrants arriving from the Oregon Trail moved to the Columbia River and farther northward into western Washington.

To the newly arrived pioneers, in the 1850s western Washington was a wild land, an impenetrable wilderness accessible only by water. Confined to small boats, they explored the Puget Sound region with the idea of recreating survival conditions that resembled those they had left behind. They searched for suitable deep water harbors where they could slide timber easily into ships, for navigable streams where they could access alluvial river bottoms to farm, and for strategic sites where they imagined thriving export cities connected to railroads from the east. Once points of entry were found, the colonizers claimed and registered sites, declared and platted nascent towns, established basic industries, and started communities. Small settlements emerged at Olympia, Steilacoom, Seattle, Tacoma and Bellingham.

While the government used treaties to clear Native title to lands for the settlers, it

[168] Beckham, S.D., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 183.

also viewed treaty making as a means of influencing the direction of Native societies. It was hoped that over time Natives would assimilate or adapt to the new society. One might frame this as an attempt to eradicate the cultural and economic moorings of these groups. Or one could see it as a belief that the traditional Native lifestyle would inevitably go extinct and should be replaced by means of a sweeping humanitarian intervention.[169] Whatever mix of objectives government officials had, as settlements developed in the Northwest Coast region the effect they had on Native peoples was indeed great. But the effects were sometimes unexpected. To be sure, the settler society would imprint its economic, cultural and social stamp—sometimes with great pressure and indelible marking. But so, too, would Native societies devise new survival strategies to cope with these changes.

Chapter 9 Imprinting a New Society

The pioneers who settled the Pacific Northwest Coast all shared the same impression about the new territory: they were awestruck by the size and scale of its natural resources. Seeing this country for the first time, many were confounded. They had hoped to overlay accustomed old-world patterns onto this new environment. Work the land with farms and mills for profit, build roads for commerce, settle towns for stability and growth—they understood these economic and social survival strategies. But impassible forest covered the bottom lands and hills, dangerous mud flats clogged the bays and estuaries, and woody debris jammed the rivers.

[169] Satz, R.N., 2002, p. 246; Wilkinson, C., 2000, p. 10; Trafzer, C.E., 1986, p. 2; Stevens, H., 1901, p. 478.

The trees were the first to go. For those wishing to homestead, the giant fir and spruce forests were in the way. James Swan and his friends at Schoalwater Bay could not walk their land claims without great difficulty. The giant tangle of downed trunks was nearly impossible to cross. Even sideways the logs were taller than a standing person. On one excursion they slipped through the ground into a worm hole revealing a 30-foot ravine, long covered over by a matt of wood and bushes. During winter they spent days trying to clear enough space for a garden next to their house. First they had to saw a few dozen spruce trees over a hundred feet high—no small feat and just the beginning of the work. They next used blasting powder, hammers, wedges and saws to reduce the logs into manageable pieces, which they piled around the stumps to burn. "We usually kept these fires going all night, and the light of these tremendous bonfires made could be seen for miles."[170]

To the north, in 1853 early pioneer Ezra Meeker explored southern Puget Sound's numerous channels and fingers while prospecting resources to exploit. He, too, was awed and frustrated. Everything was so immense it was hard to know where to start or how to get it. Near where the small settlement of Tacoma was forming, fallen trees blocked his ascent upriver:

> We floated into the mouth of the Puyallup River with a vague feeling as to its value, but did not proceed far until we were interrupted by a solid drift of monster trees and logs, extending from bank to bank up the river for a quarter of a mile or more. . . . It was a discouraging outlook, even if there had been roads. Such timber! It seemed an appalling undertaking.[171]

As Meeker boated around the lower Sound he saw the beginnings of pioneer

[170] Swan, J.G., 1857, pp. 50-54, quote on p. 54.

[171] Ezra Meeker, *The Busy Life of Eighty-Five Years of Ezra Meeker* (Seattle: self-published, 1916), pp. 88-89.

enterprise, the region's first new economy. A few settlers had already shouldered onto the shores of the thickly wooded land, where they cut back enough forest to form a sort of beachhead on which they erected water-powered sawmills. "The descent of timber on the roll-ways," he wrote, "sounded like distant thunder, and could be heard almost all hours of the day."[172] The unending coastal forests the eighteenth century fur traders had observed from their ship decks were finally being put to commercial use.[173]

The California Gold Rush, starting in 1848, soon turned Puget Sound into a timber colony. Starved for building materials, San Francisco merchants were scrambling to find desperately needed wood for the booming region, and relied heavily on imports from New England.[174] The Pacific Coast rainforests seemed like an obvious alternative. Intensive lumbering was the first example of how the Northwest Coast settlers viewed the environment as they built a new society in this new land. In order to survive they employed risk strategies distinctly different from Native societies. Two strategies stand out in particular—methods of behavior that guided their actions well into the next century. First, they regarded natural resources as completely expendable. Second, they considered laws that restricted resource exploitation as violable.

There were plenty of forests on the wooded coastline north of San Francisco to Canada, but Puget Sound exported the most timber in the first phase of logging. Unlike the maritime fur trade, which largely ignored the Sound, the lumbering industry converged here to the near exclusion of the rest of the outer coast. The small and exposed

[172] Meeker, E., 1916, p. 81; Ficken, R.E., 1987, p. xiii.

[173] Ficken, R.E., 1987, pp. 21, 26, 34.

[174] Ficken, R.E., 1987, pp. xiii, 21-22.

harbors along the California and Oregon shoreline were unsafe to navigate. The Washington and Oregon border region was avoided on account of the dangerous Columbia River bar, the site of frequent ship wrecks. North of the Strait of Juan de Fuca, American tariff laws restricting trade with California ruled out access to the forests of Vancouver Island and the British Columbia mainland. But the inland sea of the Sound was easy to access with its numerous natural harbors and protected waters. And the trees were abundant and thick.[175]

They cut as much as they could and sold as much as they could until they ran out of raw material or the market failed. With demand strong and profits high nearly everyone participated. Those who hoped to farm their land made money clearing its trees or working in nearby sawmills when short of money. Others dropped their plans to farm altogether and set up primitive mill operations. When it became evident that California and foreign markets could make big money, the experienced and capitalized lumbermen from the Midwest and New England joined with San Francisco investors. They scouted the Sound to find the choicest harbors, where they erected steam-driven mills and labor camps and went to work.[176]

While the mill owners had overcome the numerous logistical challenges of setting up lumbering operations on the remote Northwest Coast, the local Indian threat was their greatest immediate danger. The Puget Sound uprisings of 1855 drained their labor supply when half of the territory's white males volunteered to fight. Mill production idled and remained low until the war was over. To help get rid of the Indian problem the mills

[175] Ficken, R.E., 1987, pp. 22-23, 38-39.

[176] Ficken, R.E., 1987, pp. 23-28.

joined the fight. They built defensive fortifications to protect their equipment, buildings and camps, bought small arms and cannon, and became the principal supplier of provisions to the volunteers and army contingents. Too much was invested to cease cutting the forests.[177]

Over the next few decades the Puget Sound mills steadily converted wilderness into wealth for their San Francisco investors. By the 1860s the Strait of Juan de Fuca had become a thoroughfare for lumber ships. The Sound's waters were "whitening with the sails of commerce," in the words of Isaac Stevens. Most vessels sailed to California, but Puget Sound mills also sold lumber to distant markets in Hawaii and western South America. By the 1870s investment in Washington manufacturing was primarily in lumbering. Sawmill workers earned two-thirds of the territory's manufacturing wages. Within 20 years the settlers had refashioned the landscape, stripping the tidewater forests and shipping cut timber to distant markets.[178]

Laws were strikingly ineffective in preventing the mills from stealing timber from public lands. Mill owners had an uncanny ability to influence events and decision making in the territory. This was partly because of their prominent status in an isolated land far from outside oversight. Visitors described the lumber ports and mill towns as self-contained little empires where management controlled everyone and everything. The company towns were like "semi-civilized little bits of New England," the historian Robert Ficken wrote, where "lumbermen occupied important positions in local

[177] Ficken, R.E., 1987, p. 37.

[178] Ficken, R.E., 1987, pp. 33-36, quote on p. 37.

government" and "county government was manipulated with ease."[179]

Flawed governmental policies, poor regulatory enforcement and local corruption—three key failings that plagued the region for decades to come—all played a role in this great swindling. Early federal legislation promoted agrarian settlement in Oregon Territory through the Donation Land Act, followed by the 1862 Homestead Act. Neither law considered the importance of timberlands in the heavily forested Northwest Coast as a means of economic development. Such policies were a disadvantage to lumbering businesses such as the Puget Mill Company, whose operation at Port Gamble, which started production in 1853, would become the most important mill in the Sound.[180]

The mills used a variety of fraudulent tactics to get hold of timber. When United States attorney John McGilvra reached Puget Sound in 1861, he found that illegal cutting of government lands supplied the majority of raw material to the mills. Loggers simply trespassed onto federal property and hauled away the trees. In 1865 McGilvra left his post to become a land speculator, now associating with the very businessmen he had once watched over. The government was finally able to reduce timber stealing by shifting enforcement duties from local representatives to special agents from Washington D.C. Mills wishing to buy timberland typically manipulated whatever system was in place to prevent private enterprise from gobbling up valuable property. When the government sold reserved land at $1.50 per acre to support a territorial university, the Puget Mill Company acquired one-seventh of the total amount sold, or 7,000 acres, likely through conspiracy with public officials. To circumvent the homestead law the mills purchased

[179] Ficken, R.E., 1987, pp. 31, 34; Ficken, R.E., 2002 (first quote, 2002, on p. 36; second and third quotes, 1987, on p. 34).

[180] Ficken, R.E., 1987, pp. 29, 41-44; Ficken, R.E., 2002, p. 36.

claims through third parties—"dummy entrymen" pretending to buy the lands for personal use. Similar tactics were used to outwit the Timber and Stone Act of 1878, which had been designed to reduce timber fraud. By the late 1870s private loggers may have stolen upwards of $40 million of timber from Puget Sound's public forests.[181]

Early settlement patterns in western Washington predictably changed the lifestyle of Native groups. As towns grew and the lumbering industry gained momentum, the pioneer society needed Indian labor and know-how to survive. This new way of life increasingly overlapped with traditional Native pursuits. Native muscle and skill first cleared the trees, unclogged the river deltas, transported settlers and wares in canoes and harvested food. An emerging industry employed Natives in a wage labor economy to work in the forests and waters as the commercial timber and fishing rapidly expanded. Whatever benefits Indians gained from this new form of wealth did not last long as their hold and control over natural resources ebbed. The balance of power shifted as more immigrants and investors arrived, when land development and resource use intensified. And now that the Indians were connected to the larger settler economy, they were often the first to lose work opportunities when economic conditions deteriorated.[182]

It is difficult to tease apart the cause and effect sequences that marked the spiraling downward of Native societies because their economic, social and cultural systems were highly intertwined. Simultaneous threats to these systems caused many

[181] Ficken, R.E., 1987, pp. 41-51. It is difficult to calculate what this sum would be today. An approximate relative value of $40 million in 1880 equals $908 million in 2013. The estimated value was determined using a purchasing power calculator at http://www.measuringworth.com/ [viewed February 23, 2013]. See Table A.1 for year 2013 relative price valuations (initial years spanning 1870-1990) representing a cross-section of years and sums found in this text.

[182] Brad Asher, *Beyond the Reservation: Indians, Settlers, and the Law in Washington Territory, 1853-1889* (Norman: University of Oklahoma Press, 1999), pp. 51, 53-56, 195; Fisher, R., in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part 2*, 1996, pp. 163-164.

forms of havoc as settlement moved deeper into once remote Native territories. For some groups the loss of land was perhaps the trigger leading to the most critical problems, which could cascade across all three systems. Seasonal migrations to subsistence sites and permanent village locations had for centuries provided economic stability, cultural bearing and social structure to Native societies. As their autonomy over access points and villages eroded, so too did their food stores, wealth, security, prestige and power dissolve. Groups both on and off reservations were affected. Those who did not move onto reservation lands were especially vulnerable as settlement eventually swept them aside. While they were mostly free of federal supervision, they were also unprotected. Those who stayed on reservations were often subject to strong pressures to assimilate to new social conventions that radically altered their relationship to the lands they occupied. Making matters worse, government policies opened up reservation lands to accommodate settler desire to acquire more property.

The first whites to reach Klallam territory on the north Olympic Peninsula started fledgling settlements at Port Townsend, on the Quimper Peninsula at the head of Puget Sound, and farther west at Dungeness, a prairie area along the Strait of Juan de Fuca. They were surrounded by Indians, and often selected desirable spots already occupied. An observer in 1853 described the Klallam as “more primitive” than Native groups to the east at Puget Sound. They had “seen little of the whites and crowded with great curiosity about our camp.” In 1851 Port Townsend’s earliest arrival found 500 Indians living on the beach. In 1852, a lone settler claimed heavily timbered land on the Dungeness River. By 1853 a small settlement was started at the mouth of the Dungeness nearby a Klallam village. In his 1854 report, *Indian Tribes of Washington Territory,* George Gibbs found

that no whites had yet settled as far west as Neah Bay among the Makah. He found that the Klallam were "the most formidable tribe now remaining," and populated at least eight main villages numbering perhaps 800 persons. In 1859, settlers formed Clallam County—the new geographical and political name for part of the Klallam territory extending from eastern Dungeness and Makah territory to the Pacific Ocean. Newcomers continued to arrive—claiming lands at nearly every Native village site, introducing disease and liquor, and starting logging operations and farms—as their small settlements increased in size. The largest concentration of non-Indians lived at Port Townsend while smaller numbers penetrated westward to Dungeness and beyond.[183]

Over the next few decades the Klallam modified their survival strategies to meet the dizzying barrage of new threats. One historian described the period of 1875-1900 as "a curious mixture of the old and new." In spite of their reservation on the lower Hood Canal, most Klallam groups avoided it, preferring to carry on without government interference. In lieu of reservation life they leased, homesteaded or purchased land claims within the new system of property rights. When settlers displaced Native villages some members scattered while others regrouped to start new communities nearby. As control over their traditional economy unraveled many found niches and created opportunities in the new one. There were successes and failures; the various Native bands experienced

[183] Paul J. Martin, *Port Angeles, Washington: A History. Volume 1* (Port Angeles, WA: Peninsula Publishing Inc., 1983), p. 11; Gorsline, J., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, pp. 34-35; Langness, L.L., "A case of post contact reform among the Klallam," in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, Jerry Gorsline, editor (Port Townsend, WA: Empty Bowl, 1992), pp. 169-175, 194-200, quote on p. 170; Gorsline, J., 1992, p. 236; *Port Angeles Evening News*, November 28, 1953; George Gibbs, *Indian Tribes of Washington Territory* (Fairfield, WA: Ye Galleon Press, 1999 [1855]), pp. 35-36, quote on p. 35.

different outcomes. By the turn of the century, as white populations grew and pressures to acquire land and exploit the environment increased, the tolls on the Klallam mounted.[184]

Nevertheless, a common refrain was Native determination to remain in their homelands. Skokomish Indian agent Edwin Eells wrote in his 1872 annual report how at "some considerable expense and effort" he had forcibly moved some leading Klallam chiefs to the reservation. He had hoped more Indians would follow. But they did not. "They have never, so far as I can learn, accepted the terms of the treaty so far as to reside any considerable portion of the time upon the reservation." In 1879, Eells predicted it was impossible to bring the Klallams into the fold. Their "love of home is so strong," he wrote, "that rather than leave their own country and have the use of land free on the reservation, they have in many instances bought land near home." And rather than procure free lumber and tools from the reservation to build homes, he noted, they purchased their own materials.[185]

Eells' 1880-1881 census found most Klallam groups spread out across their territory, far from the reservation which he oversaw (Table 9.1). Nearly ten years later, missionary Myron Eells, brother of Edwin, described what amounted to Klallam strategic adaptations to survive, which combined the continuance of some traditional pursuits with participation in "civilized" behaviors (Table 9.2). Some groups moved closer to or remained near settlements to work at sawmills, such as at Port Gamble, Port Ludlow and

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[184] Langness L.L., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, pp. 192-200, quote on p. 185; Asher, B., 1999, pp. 4, 45, 56; Eells, M., "The Indians of Puget Sound," *The American Antiquarian and Oriental Journal* 9,1(January 1887):1-9, pp. 1-9; Eells, M., "The decrease of the Indians," *The American Antiquarian and Oriental Journal* 25,3(May/Jun 1903):145-149, p. 145.

[185] Bureau of Indian Affairs, *Annual Report of the Commissioner of Indian Affairs* (U.S. Department of the Interior, 1872), first quote on p. 352; Asher, B., 1999, second quote on p. 45; Ruby, R.H. and Brown, J.A., 1992, p. 28; Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, p. 171; Harmon, A., 1998, pp. 119-120.

Port Discovery. Others fished, canoed, dug clams and farmed near settlements at Sequim and Port Townsend. More remote groups at the Elwha River, Clallam Bay and Pysht were fishing, sealing, canoeing and raising crops. The Indians on the Strait of Juan de Fuca, he concluded, "have never been moved, and probably never will be." Indeed, the Klallam desire to stay on their north peninsula lands was so strong it eventually secured them reservation status on or near their ancestral homes.[186]

Table 9.1 Klallam village locations and populations, 1880-1881 Eells census

Residence	Number
Skokomish reservation	6
Seabeck	10
Port Gamble	96
Port Ludlow	6
Port Townsend	12
Port Discovery	22
Sequim	18
Jamestown	86
Dungeness	36
Port Angeles	57
Elwha	67
Pyscht	24
Clallam Bay	46
Hoko	3

Source: Eells, M., "Census of the Clallam and Twana Indians of Washington Territory," *The American Antiquarian and Oriental Journal* 6,1(January 1884):35-38.

[186] Eells, M., in *The American Antiquarian and Oriental Journal*, 1887, quote on p. 7; Data in Tables 3.2 and 3.3 selected from: Eells, M., "Census of the Clallam and Twana Indians of Washington Territory," *The American Antiquarian and Oriental Journal* 6,1(January 1884):35-38, pp. 35-38. Eells conducted the census between November 29, 1880 and May 1, 1881.

Table 9.2 Klallam attributes, 1880-1881 Eells census

Attribute	Number
Population	485[1]
Adults	330
Children	155
Inter-marriage	
Full-blooded Klallam	290
Intermingled with other Native groups	"the rest"
Part white	15
Health	
Too sick to perform ordinary duties	27
Blind or half blind	9
Vaccinated	126
Vaccination status uncertain	84
Education	
Can speak English	135
Have been in school in past year	41
Employment	
Sawmill laborers	34
Farmers	22
Fishermen	80
Laborers	23
Mat and basket makers	40
Sealers	17
Canoe men or makers	21
Hunters	6
Medicine men or women	15
Land	
Patented title (576 acres total)	28
Homestead (475 acres total)	4
Expect to homestead (640 acres total)	4
Under cultivation (46 acres total)	22
Products of labor	
Agriculture, vegetables and fruit	~2,500 bushels
Agriculture, hay	14 tons
Cut wood	250 cords
Sealing	$1,994
Salmon for cannery at Clallam Bay	$ 332
Fish elsewhere	$ 345
Work at Port Discovery sawmill	$1,000
Buildings	
Framed houses	113
Log houses	4
Out houses (barns, canoe and chicken)	29
Jails and churches	4

[1] 62 of the total 435 Klallam were "absent" visiting the north side of Straits. Source: Selected from Eells, M., in *The American Antiquarian and Oriental Journal*, 1884, pp. 35-38.

Two Klallam bands that would eventually secure reservations on the north peninsula concentrated near Port Gamble and Dungeness. At Port Gamble, where the Puget Mill Company set up its operations, a nearby Native settlement provided labor as loggers and workers in the sawmill.[187] Klallams at Dungeness likely maintained their traditional pursuits for a while along with supplemental odd jobs for settlers, but amid increasing tensions. Liquor trafficking was one of the first economic pursuits by settlers in this area and had adverse effects on Natives. Intemperance, or the abuse of liquor peddled by whites to some Indians led settlers to threaten sending them to the Skokomish reservation. Driven to leave the Dungeness area, Klallam set up an independent communal venture a few miles distant called Jamestown, in 1874. Their leader James Balch organized the purchase of 210 acres of recently logged land, upon which about 120 Indians set up a permanent village. While subject to reservation law, they functioned autonomously, even constructing a jail as punishment for drinking. The residents built homes and planted crops and gardens. Some worked as wage laborers for nearby sawmills and farmers, while others made money canoeing for whites and harvesting crabs and fish.[188]

Although Klallam were able to stay in their territory and even make a reasonable living during the early stage of settlement, a period of social dissolution gradually overtook many Native groups in the Puget Sound region. As the nineteenth century came

[187] Ficken, R.E., 1987, p. 36; Ruby, R.H. and Brown, J.A., 1992, pp. 28, 164; Elmendorf, W.W., 1993, p. 64.

[188] Langness, L.L., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, pp. 175-178, 196; Boyd, C.E., "That Government Man Tried to Poison All the Klallam Indians: metanarratives of history and colonialism on the Central Northwest Coast," *Ethnohistory* 53,2(2006):331-354, pp. 343-344; Ruby, R.H. and Brown, J.A., 1992, pp. 28, 84; Asher, B., 1999, p. 45; Castile, G.P., 1985, p. 17.

to a close, amid increasing settlement pressures and industrial growth Indians were relegated to a marginal and insecure status. The arrival of the transcontinental Northern Pacific railroad to Portland and Tacoma in 1883, and the Great Northern to Everett and Seattle in 1893, flooded Puget Sound with immigrants and investment capital. During the 1880s the Sound's population increased 600 percent, and grew from about 1,100 persons to nearly 43,000 between 1870 to 1890. Within ten years of the Northern Pacific's terminus completion Washington Territory's population quadruped—with statehood achieved in 1889—and rose again after the 1893 national depression gave way to the Klondike Gold Rush in 1897. Both Seattle and Tacoma became major population centers.[189]

This rapid economic and demographic change further undermined the viability of Native societies. A new class of businessmen and industrialists controlled the means and manner of exploiting natural resources, supplanting Native self-sufficiency and leaving little room for participation. And a new immigrant workforce, along with technological innovations, competed with Indian wage laborers, rendering them expendable and subordinate. Valuable shore and river valley property was claimed to fuel the growth, leading to the disappearance of Native villages and seasonal sites both on and off reservations. Even Indian tidelands and near-shore fishing sites were overrun as white fishermen set up harvesting operations, fish traps and seines. Together, these threats undermined Native ownership and claim to valuable natural resources. They blocked Indians from partaking in the tremendous wealth generated in the new economy. They

[189] Robert E. Ficken and Charles P. LeWarne, *Washington: A Centennial History* (Seattle: University of Washington Press, 1988), pp. 33-34; Harmon, A., 1998, pp. 105, 132, 134.

also displaced Native families and communities, who faced an increasingly precarious existence.[190]

Public lands policies often exacerbated the problem. The 1887 General Allotment or Dawes Act enabled Indians to set up individual homesteads to farm on reservation lands. The idea was to give them a chance to become independent yeoman. But it also opened these lands to white homesteaders, who over the next 30 years acquired about 3 million acres from Indian reserves that were declared surplus. On valuable waterfront of the Puyallup Reservation near Tacoma, business, industrial and developer interests pressured the government to enable a massive sale of property, nearly 40 percent or about 7,000 acres of the tribe's allotted lands. In the face of these threats, some Native groups sought state and federal legal protection, notwithstanding the difficult odds of success in a legal system that accommodated settler interests.[191]

The economic decline and mounting landlessness of many Native groups coincided with the deterioration of cultural customs and practices. Partly this was a consequence of the younger generation of Indians becoming acculturated to different ways of living. The new economy offered wage-based cash and an abundance of ready-made staples to purchase. Land allotment policies broke up social hierarchy and

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[190] Fisher, R., in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America, Part 2*, 1996, pp. 160-164, 175-176; Pamela Amoss, *Coast Salish Spirit Dancing. The Survival of an Ancestral Religion* (Seattle: University of Washington Press, 1978), p. 25; Boxberger, D.L., "In and out of the labor force: The Lummi Indians and the development of the commercial salmon fishery of North Puget Sound, 1880-1900," *Ethnohistory* 35,2(Spring, 1988):161-190, pp. 169-186; Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 172; Harmon, A., 1998, pp. 105, 135-136.

[191] Harmon, A., 1998, pp. 105, 132, 134-136; Robert M. Utley, *The Indian Frontier of the American West 1846-1890* (Albuquerque: University of New Mexico Press, 1984), pp. 214-215; Ruby, R.H. and Brown, J.A., 1992, pp. 168-169; Asher, B., 1999, pp. 152-153; See generally: Wilcomb E. Washburn, *The Assault on Indian Tribalism: The General Allotment Law (Dawes Act) of 1887* (New York: J. B. Lippincott Co., 1975).

communal dwelling in favor of individual family units. Reservation life discouraged subsistence activities such as fishing while promoting farming and the production of "civilized foods." And government Indian agents, missionaries and settlers scorned and even banned Native traditions such as the use of shamans for healing, ceremonies to placate the spiritual world, and potlatching to maintain inter-village social relations.[192]

The process varied in scope and time among different groups and across territories, but the final outcomes were similar. As the older generations died off important sources of cultural knowledge and know-how disappeared. Among the Twana on the lower Hood Canal, Elmendorf found that the "old ways" had begun to diminish as early as the 1870s. By 1940 less than a handful of individuals "could even recollect old customs as things long ago participated in or witnessed or sometimes merely heard of but which had for decades existed only in memory."[193] At about the same time Sing reported similar all-encompassing losses on the western shores of the Olympic Peninsula:

> Today the economy of all the Indians is totally different. The ancient life-way is not only gone, it is forgotten by most; only a few elders in each tribe remember it. Almost everybody speaks English, and native languages are known only to aged and some middle-aged persons. Houses and villages are different. Means of livelihood are wholly unlike earlier native methods. Only a few recall old ways of hunting, fishing, and berry picking. A very few remember how much trouble they had to undergo to get whale, elk, and deer hunting power.[194]

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[192] Langness, L.L., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, pp. 185, 188, 200; Singh, R.R.P., 1966, p. 2; Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 176.

[193] Elmendorf, W.W., in *Coast Salish and Western Washington Indians, Volume IV*, 1974, pp. 275-276.

[194] Singh, R.R.P., 1966, p. 8.

Elmendorf offered a provisional three-phase assessment of acculturation forces on the Twana, as shown in Table 9.3.[195] He attributed a cultural breakdown to several factors: reservation schools, missionaries, land allotment farming, breakup of multi-family households and the gravitation of youth to a non-Native lifestyle. During the first phase, the Twana experienced indirect influences from the seaborne European fur traders. Even their distant Hood Canal territory felt the repercussions of behavior change in neighboring territories closer to the epicenters of trading. In phase two, establishment of the Skokomish Reservation in 1859 had an immediate effect throughout Twana territory when the government forced Twana villages to consolidate onto the reservation and later burned down some non-reservation villages. Their former living sites were abandoned and whatever social and cultural variation existed was "ironed out" on the reservation. Over the next few decades, reservation influences continued to weaken Twana culture. But the process was somewhat delayed up to the early twentieth century because settlements had not yet concentrated in this part of southern Puget Sound. By the third phase the final tipping point or "death blow" took place when communal households were gone and the settler economy had been largely adopted.[196]

[195] Elmendorf, W.W., in *Coast Salish and Western Washington Indians, Volume IV*, 1974, pp. 275-276.

[196] Elmendorf, W.W., in *Coast Salish and Western Washington Indians, Volume IV*, 1974, pp. 274-276, (quotes on pp. 273, 275); Elmendorf, W.W., 1993, p. 4.

Table 9.3 Post-white contact history acculturation stages of the Twana

Stage 1 1790-1850	Stage 2 (a) 1850-1860	Stage 2 (b) 1860-1890	Stage 3 1890-1940
Indirect and early direct contact with new Native groups via enhanced trade and war and mass raiding by distant groups; introduction of European materials and goods	First whites in number; covert hostility but avoidance of overt action; treaty signing	Intensified contact	
Population shifts		Reservation established, residence dislocation	
Shifts in cultural emphases but no change in cultural content		Breakdown of old culture structure	Disintegration and loss of cultural heritage, with lingering elements preserved; death of older-culture participants, apathy
		Attempts at new formulation of parts of the old culture, particularly religion	Waning survival of Indian Shaker religion

Source: Adapted from Elmendorf, W.W., in *Coast Salish and Western Washington Indians, Volume IV*, 1974, pp. 275-276.

The extensive changes forced upon the Twana and other Native societies on the Northwest Coast took a heavy psychological toll. The seeming impotence of long-held survival strategies likely had a dispiriting and confusing effect on individual and group self-worth. A sort of melancholy gripped many Indians as the newcomer society downgraded their economic, cultural and social status. It seems the majority of whites denigrated nearly everything about the Indians: their language, diet, medicine, behavior, family and kin structures, social strata, ceremonies and spiritualism, and religion. Some groups that tried to adapt to white ways found their participation was unwelcome. Pamela Amoss's mid-twentieth century study of the Nooksack Coast Salish described this

process as a "shift from aggressive adaptation to passive nonparticipation accompanied by many signs of social disorganization." On Vancouver Island during the 1860s, Canadian Gilbert Sproat similarly observed a despondency that gradually overtook the Natives—he described the "symptoms of a change amongst the Indians living nearest to the white settlement." Those with a "former free independent way" now "lived listlessly" and were "brooding seemingly over heavy thoughts." The historian Robin Fisher called it an apparent "malaise that came from the loss of cultural self-confidence" rooted in an interconnected decline of property, wealth and power. Within many groups, other forms of discontent surfaced including anger, hostility and alcoholism.[197]

Continuing disease morbidity and mortality losses likely exacerbated the unwinding of Native societies into the twentieth century. Along with the periodic smallpox epidemics, Native medicine techniques and shamans were unable to cure the compounding ravages of tuberculosis and venereal disease. Among the Nooksack, for example, tuberculosis killed many adolescents and young adults; the disease was epidemic among some Northwest Coast populations by the late 1800s. Venereal disease, which proliferated in areas of heavy settlement contact, could have contributed to the general Native population decline from loss of fertility. Between 1860 and 1890 the estimated number of Indians in Washington and Oregon dropped from 38,000 to about 16,000 persons. This decline coincided with an upsurge of whites. Starting in 1860 in the

[197] Amoss, P., 1978, pp. viii, 25, quote on p. 25; Sproat, G.M., "The West Coast Indians in Vancouver Island," *Transactions of the Ethnological Society of London* 5 (1867):243-254, pp. 253-254, first quote on pp. 254-255, second quote on p. 255; Fisher, R., in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part 2*, 1996, pp. 164-166, quote on p.165; Gorsline, J., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, pp. xviii-xix.

Puget Sound basin, Natives comprised one-half of total inhabitants. By 1890 they were only one-twentieth of the total number.[198]

A chief indicator of the far-reaching changes thrust upon Native groups was the decline of potlatching—a ceremonial apex that embodied a culmination of their cultural, economic and social institutions. Government policy makers, Indian agents, missionaries and settlers alike attacked it, perhaps realizing the event was at the core of the lifestyle of many Native groups. Canadian and United States authorities banned it in the late nineteenth century, but with varying effectiveness. Prohibition laws notwithstanding, the pressures of settlement and acculturation undermined the pillars of Native society that supported and gave rise to the potlatch: economic autonomy over the control and production of food and wealth generation; class structure, inter-village relations, and social prestige; and sophisticated cultural observances and practices crystallized in spiritual beliefs and ceremonies. Potlatches survived among the Klallam longer than many other groups, but by 1885 were reduced in number, scale and importance. In their 1916-1917 fieldwork among Natives in Puget Sound, Gunther and Hermann Haeberlin were hard-pressed to find information on "any of the finer details" of the potlatch.[199]

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[198] Amoss, 1978, pp. 24-25; Boyd, R., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 137; Cole, D. and Darling, D., in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, p. 133; Fisher, R., in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part 2*, 1996, p. 167; Harmon, A., 1998, p. 105.

[199] Ames, K.M. and Maschner, H.D.G., 1999, p. 16; Douglas Cole and Ira Chaikin, *An Iron Hand Upon the People: The Law Against the Potlatch on the Northwest Coast* (Vancouver: Douglas & McIntyre; Seattle, WA: University of Washington Press, 1990), p. 15; Fisher, R., in *Approaches to Native History in Canada: Papers of a Conference held at the National Museum of Man*, 1977, pp. 206-207; Suttles, W., 1987, p. 207; Langness, L.L., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, pp. 185, 188; Cole, D. and Darling, D., in *Handbook of North American Indians, Northwest Coast, Volume 7*, 1990, p. 133; Gunther, E., in *University of Washington Publications in Anthropology*, 1927, p. 310; Haeberlin, H. and Gunther, E., in *University of Washington Publications in Anthropology*, 1930, quote on p. 59.

Amid the economic turmoil and social disorganization afflicting the Native Northwest Coast, in Coast Salish country a successful attempt to reclaim some measure of cultural bearing developed in the early 1880s. A lower Puget Sound Squaxin Indian created the Shaker Church, a movement that quickly diffused throughout much of the region, beyond Washington into Oregon and British Columbia. By 1885 the church had reached Klallam villages at Port Gamble and Jamestown, and soon after Becher Bay on Vancouver Island, Neah Bay and the Quinaults on the western peninsula. Shakerism—which had no connection to the Euro-American Christian Shakers of the eastern United States—offered healing powers to participants using a blend of old shamanistic medicine and new Christian doctrine. The incorporation of Christianity and promotion of temperance legitimized the Indian religion in the eyes of some settlers and government agents. Suttles suggests the church was especially important because it successfully resisted white suppression of Native religion. It managed to introduce a new form of shamanism that helped to revive Native spiritual beliefs and ceremonial practices. Washington Territory agents had banned shaman doctoring, which many Natives had already begun to question as helpful against white disease. This altered form allowed all participants to engage in collective curing rather than through individual shamans or white doctors. It was considered to be more effective and empowering medicine, and was considered an especially useful treatment for alcoholism. While Reverend Eells had spent over 20 years trying in vain to turn Klallams into Christians at the Skokomish Reservation, the indigenous Shaker movement flourished in some areas into the twentieth century.[200]

[200] Gunther, E., "The Shaker Religion of the Northwest," in *Indians of the Urban Northwest*, Marian W. Smith, editor (New York: Columbia University Press, 1949), pp. 37, 42, 58-59; Langness, L.L., in *Shadows*

For some Native groups the difficult and tortuous experience of government treaty making and acculturation policies shifted direction with passage of the Wheeler-Howard Act, or Indian Reorganization Act in 1934. The new policy attempted to invert the Dawes Act's earlier promotion of private property on reservations that shifted nearly 90 million acres into white hands. After nearly 80 years of aggressive attempts to assimilate Indians into white society, federal policy makers found they had created dependent wards rather than self-sufficient agricultural tribes. The act, also called the Indian New Deal, was an attempt to reverse course by permitting tribes to set up formal self-governments with constitutions and pool common assets and land holdings. These new governance and community structures provided a legal backing for tribes, helping them to protect their property interests from outside threats. The government also committed to increase support for economic development on reservations and allow tribal cultural activities.[201]

The new policy had major implications for the Klallam. In 1936-1937 the United States government purchased and placed in trust about 1,600 acres that formed new reservations for Native groups at their homelands on the north Olympic Peninsula. These were partitioned among the landless Port Gamble and Elwha River bands who had maintained their independence since the Stevens Treaties, defying reservation provisions to remain in their ancestral lands in spite of settlement forces. Local white governance in

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of Our Ancestors: Readings in the History of Klallam-White Relations, 1992, pp. 98-100, 188; Ruby, R.H. and Brown, J.A., 1992, p. 84; Suttles, W., 1987, p. 207; Suttles, W., 1987, p. 228; H.G. Barnett, *Indian Shakers. A Messianic Cult of the Pacific Northwest* (Carbondale: Southern Illinois University Press, 1957), pp. 43-44, 61; Gunther, E., in *University of Washington Publications in Anthropology*, 1927, p. 289; Boyd, C., 2001, p. 207; Boyd, C.E., in *Ethnohistory*, 2006, pp. 344, 351.

[201] Harmon, A., 1998, p. 195; Ortiz, A., "Half a century of Indian administration: An overview," in *American Indian Policy and Cultural Values: Conflict and Accommodation*, Jennie R. Joe, editor (Los Angeles: University of California, 1986), pp. 11-12.

part fueled the motivation behind the land purchase by pressuring the U.S. Bureau of Indian Affairs to create the reservation tracts. In the Port Angeles and Port Gamble waterfront areas, Indian squatters were in the way of development. The government purchased and put in trust about 1,230 acres near Port Gamble and about 370 acres on the lower Elwha River.[202]

But the federal action was not without controversy. By the 1930s some pioneer families had been living in the lower Elwha valley for nearly 70 years. These immigrants and their offspring had devoted their lives to establishing farms and businesses and creating a viable community. As well, area sport fishermen had been using the river for decades for recreation, and Port Angeles industry had harnessed the river's water to feed a thriving pulp and paper industry. Following chapters will expand upon each of these themes. Altogether, a vastly different society now possessed much of the Elwha. It did not welcome the return of the Elwha Klallam. The river was too valuable to share. Against the backdrop of the larger Puget Sound and Pacific Northwest settlement experience, the story of the Elwha pioneers provides a detailed account of the risk strategies used by these newcomers to survive up until about 1910, which marked the close of the river's settlement phase.

[202] Ruby, R.H. and Brown, J.A., 1992, pp. 28, 106-107, 164; Harmon, A., 1998, p. 202. The Lower Elwha band, currently the Lower Elwha Klallam Tribal Community on the Lower Elwha Reservation, would not secure formal reservation status until 1968. The Port Gamble Indian Community's Port Gamble Reservation was established in 1936-1937. The Jamestown band, currently the Jamestown S'Klallam Tribe, would not be acknowledged as an entity having government-to-government relations with the United States until 1981 (See: Harmon, A., 1998, p. 204; Marino, C., in *Handbook of North American Indians, Volume 7: Northwest Coast*, 1990, p. 176; Ruby, R.H. and Brown, J.A., 1992, pp. 28-29, 84-85, 106-107, 164-165.)

Chapter 10 Pioneering the Elwha River Valley

Those who settled the lower Elwha River valley and nearby Port Angeles waterfront followed the accustomed survival patterns of the newcomers: they took control of the choice sites, cleared the land, wrested from the environment anything that could make money, and for the most part ignored or discounted Native tenure. Far from the Puget Sound immigrant influx, the remote area was left undisturbed for a while. But it was only a matter of time, as pioneers worked their way west erecting sawmills and starting settlements at each inlet along the northern peninsula coastline.

The bay at Port Angeles first drew their attention. In 1791 a Spanish navigator named the deep, protected harbor Puerto de Nuestra Señora de los Angeles (Port of Our Lady of the Angels), "which is very much sheltered for any large vessel." James Swan later described the area in 1859 in settler's terms for the *San Francisco Evening Bulletin*. In the northern tier of Washington Territory there was a long spit, he wrote, that "makes out like an arm from the main land, forming a most excellent harbor, with plenty of water and good holding ground." He imagined the North Pacific whaling fleet might locate at Port Angeles, and also envisioned a new settlement. "The locality offers peculiar advantages for building up a commercial town," Swan advised.[203]

The harbor was by no means an unsettled site. The Klallam used the waterfront as a focal point for villages and a thriving hub of regional activity and trade. Doubtless the Natives had long valued many of the same features the settlers now eyed. A wide crescent of beach stretched about four miles from end to end. On the western extreme

[203] Wagner, H.R., 1933, pp. 152-153; James G. Swan, *Almost Out of the World, Scenes From Washington Territory The Strait of Juan de Fuca 1859-61* (Tacoma: Washington State Historical Society, 1971), pp. 26-27.

steep bluffs rose above a saltwater lagoon. From here the long slender hook Swan described extended four miles out into the harbor, its terminal point about 1.5 miles north of the coastline. Three creeks drained into the harbor. On the eastern end, two more streams converged to form Ennis Creek (see map at Figure 10.1). Overlooking the bay with views of Vancouver Island to the north, bluffs and bench-like terraces gave way to forested slopes, foothills and distant white-capped mountains to the south. It was a perfect site: strategically located against surprise raids, shielded from the Strait's harsh westerly winds and richly endowed with marine, freshwater and terrestrial resources. In 1847 the Irish-Canadian artist Paul Kane visited the Klallam village of I'eh'nus at the mouth of Ennis Creek. His journal described a defensive scene with the Klallams expecting a retribution Makah attack. They had built semi-permanent picket fortifications with an enclosed space that could hold about 200 people.[204]

About ten years after Kane's visit, settlers reached Port Angeles bay and the Elwha River. A few men set up a fishing base at the western end of the harbor near another Klallam village. Their efforts to homestead a site close to the village cemetery provoked Native hostility.[205] Even the United States government took notice of the area, establishing a 3,520 acre reserve at the harbor in the early 1860s with plans to build a lighthouse on the spit. The hope was to sell off reservation lots to settlers by promoting a newly created Port Angeles as a "second national city," a platted town site laid out by government surveyors. But with free lands still available through the Homestead Act it

[204] Gunther, E. in *University of Washington Publications in Anthropology*, 1927, p. 184; Paul Kane, *Wanderings of an Artist Among the Indians of North America* (Mineola, NY: Dover Publications, Inc., 1996[1859]), p. 159.

[205] Martin, P.J., 1983, p. 11; *Port Angeles Evening News*, November 28, 1953.

only had the effect of stifling settlement. A 12-foot-wide road was cut through the forest from Sequim to the small village outpost at Port Angeles in 1864, but real development would not take place for several decades. To the west, in the lower Elwha River valley, a small enclave of squatters survived through trade with Victoria, canoeing "hogs, beef, vegetables and so forth" across the Strait. [206]

Appreciable settlement finally reached Port Angeles in the 1880s when eastern immigrants reached the Seattle terminus of the Northern Pacific railroad. Several hundred newcomers established two sites at the harbor, locating close to both Klallam villages. One group concentrated on the "West End" of the harbor at the base of Ediz Hook. On the "East End" a utopian experiment in communal living called the Puget Sound Co-operative Colony started on 50 acres at the mouth of Ennis Creek. Port Angeles soon boasted new homes, an opera house, school, church, printing press, boat construction yard and sawmill. The settlers also hacked a small road through the dense fir forests of the federal reserve to connect their villages. "The progress of the country has been marvelous" the *Clallam County Courier* wrote in the winter of 1896.[207]

Settlement in the Elwha valley and estuary was also increasing. Survival

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[206] Martin, P.J., 1983, pp. 25, 26, 29; Langness, L.L., in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, 1992, p. 174; Oldham, K., "Port Angeles settlers jump the federal reserve and claim squatters' rights to lots on July 4, 1890," (The State of Washington, Washington State Department of Archeology and Historic Preservation, 2007):1-2, pp. 1-2. http://www.historylink.org [viewed December 22, 2008]; "Report of the Secretary of the Interior, 1885," in Gail E.H. Evans, *Historic Resource Study. Olympic National Park, Washington* (National Park Service, Pacific Northwest Region, 1983), p. 77; *The Olympic-Tribune*, December 19, 1924.

[207] Ficken, R.E. and LeWarne, C.P., 1988, pp. 33-34; Oldham, K., "The Puget Sound Co-operative Colony is established at Port Angeles in June 1887," (The State of Washington, Washington State Department of Archeology and Historic Preservation, 2007):1-2, pp. 1-2. http://www.historylink.org [viewed December 24, 2008]; Murray Morgan, *The Last Wilderness* (Seattle: University of Washington Press, 1976[1955]), p. 87; "Report of the Secretary of the Interior, 1885," in *Historic Resource Study. Olympic National Park, Washington*, 1983, p. 77; *The Olympic-Tribune*, December 19, 1924; *Clallam County Courier*, February 21, 1896.

depended on finding suitable land to farm and log, and developing reliable transportation routes to facilitate commerce. As the area began to gear its resource use and production to meet the demands of Port Angeles, the future of the two communities evolved in tandem. New arrivals set out to establish ranches and grow a variety of crops to sell in the nearby town. But the Elwha pioneers lacked infrastructure, and so busily set out to accomplish a number of necessary but overlapping tasks.

The conversion of a wilderness river valley into a farming hamlet was hard work and fraught with risk. Gradually pushing south into the foothills, stream by stream the Elwha homesteaders first scraped out wooded bottom lands for cultivating and grazing, felled timber stands a mile or two up creek beds, and set up riparian mills. Silas Goodwin, whose Maine family moved to the Elwha about 1870, built the valley's first saw mill. He moved, however, because dangerous breakers on the beach kept toppling his scows and scattering shingles into the surf. Other small water-powered mills soon followed, set up on tributaries along the stem of the lower river.[208]

There was a great deal of toil and no guarantee of success. Often unable to support themselves or families, men frequently left their claims to find cash paying jobs at the nearest logging camps, Port Angeles and Seattle. Those left behind struggled to maintain an existence. At times their efforts to make a life on the Elwha seemed counter to the river. It seemed as if the settlers were blindly determined to coerce forces more superior. Although they arrived from Kansas, New York, Canada, England and Germany, they all held a similar, predestined view of land use. Government surveyors catalogued these attributes in 1891, reducing to a few sentences what for several settlers had

[208] Forsberg, A.E., "Lower Elwha Valley," in *Jimmy Come Lately: History of Clallam County*, Jervis Russell, editor (Port Angeles, WA: Clallam County Historical Society, 1971), p. 321.

comprised a 30-year effort: "The soil is well adapted to agriculture. The bottom lands to grasses, vegetables and small fruits, and the hill lands to orchards. There are several settlers who have made quite extensive improvements."[209] Indeed, within a generation the newcomers transformed the Elwha valley natural resource base. They burned out or logged thickly wooded low valley shelves to make hay fields, plant orchards and build paddocks; they erected little mills and earthen dams at creek mouths to turn the felled timber into planks and shakes; they diverted springs to channel fresh water to cabins and troughs; and they filled the landscape with houses, barns, outbuildings, trails, wagon roads and bridges.

When upstate New York brothers Will and Martin Humes arrived with their cousin Ward Sanders in 1897, for example, they were both impressed and confused. "We think we could do well hunting, even if no gold was found," Will wrote home.

> But we have nearly decided, under the circumstances, that if we find a place suitable, we will settle down in the sheep business. There is doubtless a good deal of money in it, if managed right. There is no end to good pasture land on the sides of the mountains here, but the trouble is to get enough meadow land. There are two or three places which we like very well—beautiful scenery and all that, good looking gray clay land, but we do not know what it will raise. If it can be irrigated, it is all right, but if not, it may get too dry in summer. Then, too, this may not be a good fruit section. We want to be where we can raise in quantity, of fruit as well as sheep. However we may be tempted to try it here. It is a charming place to live in, grand scenery, plenty of trout, elk, deer & bear etc. But what can we raise? that is the question [sic].[210]

In order to sell their goods in Port Angeles the settlers had to figure out how to get there. Like most Puget Sound communities, what came to Port Angeles from afar arrived

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[209] Wessen, G.C. and Welch, J.M., "Archaeology and Historical Resources," in *Draft Request for Additional Information of May 28, 1987, Volume 2 of 4*, James River Corporation, February 12, 1988, p. X-27.

[210] Will Humes to Brother and Sister Lurie, December 5, 1897 (Humes File, Olympic National Park, Port Angeles, WA).

by water. Easy ground travel on the north peninsula was impossible because of the dense forests and terrain. Indian canoes first shuttled the settlers about the Strait and Puget Sound, followed later by daily steamers. Movement between Port Angeles and the Elwha River was difficult. Using boats or primitive trails, the farmers persevered.[211] "The best vegetables brought to this market come from the Elwah valley," *The Model Commonwealth* reported in August, 1888. "Mr. Petty was in town again last week with another boatload of farm produce, eggs, plums, beef and a variety of vegetables from that rich section." In the summer of 1890, Elwha farmers argued for the construction of a wagon road, which the mayor of Port Angeles promised to survey.[212]

Crossing the river was a constant problem. Silas Goodwin built the first bridge across the Elwha in 1887. But after it washed out in 1894 the west side settlers had to raft across by means of a rope, only to join the east-side settlers who then straddled their wagon wheels around low-cut stumps all the way to Port Angeles. Bert Herrick, who arrived in 1892, remembered, "it was pretty rough riding, however you could by careful driving get over it and we were quite pleased to have anything we could drive a rig over." When the raft that replaced Goodwin's washed out bridge accidentally unroped and floated Herrick, his companion and veal downriver, the settlers adapted yet again. Ed Isbell, a native of Iowa, built a cedar scow until another bridge was built three years later.[213] As Herrick recalled:

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[211] G.M. Lauridsen and A.A. Smith, editors, *The Story of Port Angeles and Clallam County, Washington* (Seattle: Lowman & Hanford Company, 1937), pp. 256-257.

[212] *The Model Commonwealth*, August 17, 1888; Lauridsen, G.M. and Smith, A.A., 1937, pp. 256-257.

[213] Herrick, H.B., "Early and Recent History of Elwha District Shows a Decade of Hardships," in *The Olympic-Tribune*, February 20, 1925; Alice Bretches Alexander, *A Pioneer Family: Homesteading the Upper Elwha River Valley* (Port Angeles, WA: Alice Alexander, 1993), p. 23.

> The worst difficulty about this ferrying business was that you would start for town and when you got to the river you would more than likely find the boat nicely tied up on the opposite shore. In this case most of them would postpone their trip till some other day. . . . [M]any a time I have left my clothes on the shore, swam across the river and brought the boat back, put on my clothes and gone on to town. But as before stated we were progressive and this condition did not fully suit us so we finally introduced a double rope running through a pulley on each shore and had the boat tied to this so if you found it on the opposite shore all you had to do was to pull it across to you.[214]

Such inconveniences were typical. The successful homesteaders understood there were few quick resolutions to the problems that regularly beset them. Those who survived—many gave up and left—both accepted the continuous regimen of laborious work and learned how to tailor their existence to a responsive environment. "He was a hard worker, and would put in from sixteen to eighteen hours daily around the mill," Walter Goodwin's friend wrote after the Goodwins had dismantled their poorly sited saw mill and moved it to Freshwater Bay to try again.[215]

By the early 1900s the homesteading period of the Elwha River was nearly finished. Settlers had filled in much of the lower valley, creating an almost seamless series of residential farms and dwellings. Only the southernmost outreaching claims had the appearance of earlier times, patch-like clearings connected by trails. The valley was now a domain and the Port Angeles paper began to chronicle the small community's activities in a weekly column. The lower river was the heart of the locale. Farmers to the west lived in Eden Valley, and Humes and his neighbors lived in Geyser Valley. The land was distinguished by its natural and constructed landmarks, byways and roads, products

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[214] Herrick, H.B., "Early and Recent History of Elwha District Shows a Decade of Hardships," in *The Olympic-Tribune*, February 20, 1925.

[215] Forsberg, A.E., in *Jimmy Come Lately: History of Clallam County*, 1971, p. 321; Lauridsen, G.M. and Smith, A.A., 1937, p. 139.

and people, and it was endowed with custom, history and possibilities—the characteristics and qualities that furnish tradition. The newcomers had formed a successful society.

During the first decade of the twentieth century, the area's timber and farm economy remained tied to Port Angeles. During the summer of 1911, for example, the Elwha Lumber & Shingle Company sometimes ran night shifts to meet its orders, and by the following year the Little River Logging Company had laid seven miles of railroad and employed 175 men. In 1899, farmer Lew Thompson had built up his stock to 150 head, and in 1904 installed the valley's first power dairy outfit. Inadequate roads, however, remained a problem. "They feel they are being discriminated in the matter of roads," the paper wrote about two Elwha dairy farmers in 1912. "[T]heir branch road although a county road, would disgrace a back woods community. It is rough and crooked. It dodges around stumps that could be removed with a dollar's worth of powder." And hazardous river crossings continued to plague the west-side residents. "It is a matter of common knowledge that the Elwha bridge is likely to go out at any high water," Ben Epperson warned in August 1912. "When it does, you had just as well tie our hands behind our backs and turn us loose; as far as our trade with Port Angeles is concerned."[216]

The valley's residents increasingly patterned their lives with social and cultural routines. In 1908, the dirt-floored cabin school was replaced when Ed Isbell built a new school house that served as a banquet room, stage and meeting center for the Elwha Social Club. In 1911, the Elwha column advertised a weekly event: "If you wish to be really pleased, attend the E. S. Club entertainment, May 13th, 8:30 p. m. Cantata

[216] *The Olympic-Leader*, May 19, 1911; *The Seattle Daily Times*, Thursday Evening, June 27, 1912; *The Port Angeles Evening News*, November 28, 1953; *The Olympic-Leader*, August 2, 1912.

'Goldenhair,' followed by one of the good time dances and supper the locality is noted for." Later that summer, "[t]he Elwha people gathered at Lake Sutherland for a picnic on the Fourth. A fine drive, lovely grounds, the usual banquet of good things and a more perfect day for boating could not be wished for. It was a day to dream of. Beautiful Lake Sutherland!"[217]

Tourism soon replaced many Elwha homesteads with camps and travel lodges. The river became a designation spot for Seattle visitors and Port Angeles outings. The most recent Elwha settlers in the southern outlying areas were the first to profit. Urbanites saw their river ranches as comfortable hinterlands from which to embark into the mountains. And mountaineering and sport hunting groups relied on packers and guides to transport them to the interior peninsula. "The route will be up the Elwha Valley. . . . Here a good trail, in most part long traveled, leads up the valley to the heart of the delta," one of 65 Mountaineers wrote soon before the club's July 1907 excursion. When the group of hikers arrived, the Humes men were ready. Will and his brother Grant had been taming the valley for almost ten years with continual trail maintenance, favorably placed interior camps, and a campaign to eliminate cougars and bobcats.[218]

Farther north in the more settled part of the valley, residents converted their ranches to hostelries to accommodate summer visitors. In 1910, Herrick built a general store and later operated a pack train to the Olympic Hot Springs, a natural formation

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[217] *The Olympic-Leader*, May 12, 1911; *The Olympic-Leader*, July 14, 1911.

[218] Smith, A.A., "The Olympics," *Steel Points* 1,4 (July 1907):141-145, quote on p. 144; Will Humes to Brother, March 24, 1911 (Humes File, Olympic National Park, Port Angeles, WA).

where hot water seeped out of ledges on a narrow bench above Boulder Creek.[219] In May 1911, *The Olympic-Leader* reported that "Mrs. Hansen is having her home papered and newly fitted, in preparation for the summer boarders who will soon be here to enjoy the excellent table, the beauty of Elwha scenery and pleasures of rod and gun."[220] Seattle visitors also bought homesteads for summer use.[221]

Dating back to the 1870s, within a few decades sawmills, farms and vacation homes now populated the lower Elwha valley. Ed Isbell's granddaughter later reflected in a family memoir that the pioneer families had accomplished "a daunting task" by building homesteads in the Elwha "wilderness" using "only axes, and the occasional crosscut saw… as best they could."[222] But cutting down trees was not their only task. The settlers also had to contend with the Elwha Klallam who already lived there. At least for a while, the groups got along according to their needs. Native expertise and labor contributed to the new economy while they maintained access to their subsistence fishery resources. Early settler recollections describe Indian help with hunting, proving up claims and river transport. Largely because the Elwha homesteaders did not value the river's fishery—focusing instead on agriculture and timber—the Elwha Klallam were free to continue their lifestyles so long as they were not in the way.

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[219] Evans, G.E.H., 1983, p. 281; Emily Thomas, "Interview with Phrania Jacobsen, June 1995" (Cultural Resources Division, Olympic National Park, Port Angeles, WA); *The Olympic-Leader*, September 1, 1911.

[220] *The Olympic-Leader*, May 19, 1911; *The Olympic-Leader*, September 1, 1911.

[221] *The Olympic-Leader*, August 11, 1911; *The Olympic-Leader*, May 12, 1911; *The Olympic-Leader*, July 14, 1911.

[222] Alexander, A.B., 1993, p. 11.

But homesteading laws had opened their lands to transfer. Anyone who was eligible within the framework of the federal act could acquire their traditional properties. Eventually government surveyors squared up the entire lower valley, platting and titling each parcel. "The best vegetables brought to this market come from the Elwah valley, and still there is a good deal of government land there unclaimed by settlers," *The Model Commonwealth* reported in 1888. Those who wanted it had only to follow the guidelines and establish their claims. As more settlers moved in the choice lands diminished. In turn, Klallam presence diminished.[223]

Some Klallam families attempted to establish homestead claims and tried to adapt. The process was not easy—the scales seemed tipped. Before 1870 Indians could not acquire public lands because they were not citizens. By 1871 they could homestead, but only if they cut off their tribal relations, as stipulated in the Indian Appropriations Act. In the first instance they were denied legal status, and in the second they were forced either to renounce their long-held identity or face dispossession of their homes. And even if they managed to follow the laws, there was often a sense of uncertainty and caprice about their fate. When citizens grew tired of Native presence, such as in the Dungeness area in the 1870s, they pressured federal agents to remove them.[224]

Following the passage of the Indian Homestead Act in 1884, and with the assistance of white homesteaders and advice of federal agents, by 1894 ten Klallam

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[223] *The Model Commonwealth*, August 17, 1888.

[224] Bureau of Indian Affairs, "Anthropological report on the Jamestown Clallam," in *Memorandum, Subject: Recommendation and summary of evidence for proposed finding for federal acknowledgment of the Jamestown Band of Clallam Indians of Washington pursuant to 25 CFR 54* (Tribal Government Services, May 16, 1980), p. 7; Bureau of Indian Affairs, "Report on History of the Jamestown Clallam Band of Indians," in *Memorandum, Subject: Recommendation and summary of evidence for proposed finding for federal acknowledgment of the Jamestown Band of Clallam Indians of Washington pursuant to 25 CFR 54* (Tribal Government Services, May 16, 1980) p. 16.

families had received trust patents to about 1,300 acres of Elwha valley and nearby Freshwater Bay land. Six parcels were located along the river.[225] Nevertheless, the settlers pushed away others who had managed to hang on to valuable parcels, forcing them into inhospitable areas such as rugged coastline or undesirable inland spots. Myron Eells noted in 1886 that a few families had managed to obtain homestead sites on poor quality land away from the Strait, as they were unable "to procure good land on the beach." Years later, Klallam deponents told the Office of Indian Affairs that the early settlers had driven their group from the east side to the west side of the river. Even so, they continued to hold on to whatever they could. Eells described their strategy as a sort of defensive maneuver. Although they could not obtain "first class land," what land they did acquire they used for gardens and permanent homes rather than farming or logging, "so that they should not be driven from one place to another." On the whole, however, many had become uprooted. By 1892 Edwin Eells observed that most of the Klallam were now "scattered about the country." Few had accumulated much of their former lands under the new system of property law.[226]

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[225] National Park Service, *Elwha River Ecosystem Restoration: Final Environmental Impact Statement* (Washington, D.C.: U.S. Department of the Interior, 1995), p. 76; Valadez, J., in *Native Peoples of the Olympic Peninsula: Who We Are*, 2002, p. 25.

[226] Eells, Rev. M., "Ten years of missionary work among the Indians at Skokomish, Washington Territory, 1874-1884," in *Shadows of Our Ancestors: Readings in the History of Klallam-White Relations*, Jerry Gorsline, editor (Port Townsend, WA: Empty Bowl, 1992), first quote on p. 76, second and third quotes on p. 82; Office of Indian Affairs, "Report on Source, Nature and Extent of the Fishing, Hunting and Miscellaneous Related Rights of Certain Indian Tribes in Washington and Oregon Together with Affidavits Showing Locations of a Number of Usual and Accustomed Fishing Grounds and Stations," (Los Angeles, CA: U.S. Department of the Interior, Office of Indian Affairs, Division of Forestry and Grazing, July 1942 [Reprint: Portland, OR: U.S. Department of the Interior, Office of Indian Affairs, Bureau of Indian Affairs, Branch of Land Services, September 1975]), p. 142; Homer L. Morrison, "A Clallam Community: A Study of the Rehabilitation Program of the Clallam Indians in the Valley of the Lower Elwha in Clallam County, Washington," (Superintendent of Indian Education, 1939), p. 17; Castile, G.P., 1985, p. 18; Bureau of Indian Affairs, *Annual Report of the Commissioner of Indian Affairs* (U.S. Department of the Interior, 1892), fourth quote on p. 500.

While the newcomers had shattered much of the Klallam economic, cultural and social systems, Edwin Eells still found that even in the face of their situation many Klallam had managed to remain "self-supporting." Natives west of Port Angeles continued to hunt and fish, canoe freight and passengers and grow food. They held on, however tenuously, and survived the settlement phase in their river basin. Their history was too deep to erase. Over the preceding centuries they had claimed and marked the Elwha landscape—establishing subsistence spots, setting up food processing locations, building villages and endowing special sites with sacred meaning. Within their domain this band of Klallams had built a stable and enduring society: achieving a balance between exploitation and use, administering community affairs and managing inter-village relations within and across territories. The Elwha basin's natural resources had formed the backbone of their economic and cultural achievement. Unwilling to leave, they had refused to move to the Skokomish Reservation. They insisted on staying on their lands, although the government now considered them to be "landless" people.[227]

[227] Bureau of Indian Affairs, *Annual Report of the Commissioner of Indian Affairs* (U.S. Department of the Interior, 1892), p. 500; Morrison, H.L., 1939, p. 17; Castile, G.P. 1985, p. 18.

Figure 10.1 Elwha River and Port Angeles coastal area



Source: City of Port Angeles, Cnes/Spot Image, DigitalGlobe, GeoEye, USDA Farm Service Agency, Google Maps, 2013. Quadrant pictured about 7 x 16 miles.

Chapter 11 Systemic Risk

Accounts of the Northwest Coast settlement period describe a time of extreme misfortune for many Native societies. The arrival of newcomer groups—maritime crews and later immigrant pioneers and settlers—precipitated serious changes that affected nearly every part of Native life. By the late nineteenth century some Native groups had experienced partial or total collapse. The process started with the fur traders who introduced lethal infectious diseases and initiated alterations in what had been long-established Native lifeways. Moreover, the annihilation of fur-bearing mammals forewarned new exploitation and economic patterns. An early historian considered this period to be "a looting of the coast." But for the most part the Indians successfully adapted. Falling short of any real settlement, the explorers introduced their home countries to a new land and

provided "a fleeting vision of the wondrous wealth of this western world."[228]

Eventually the settlers came, by the mid-1800s reaching Oregon's fertile Willamette Valley and then fanning out across the region. Within two decades heavy numbers swelled the Puget Sound area after the completion of cross country railroads. The accelerating effects of settlement overwhelmed the Natives. Immigrants would tirelessly build a new society by radically altering the land and connecting resource use to distant markets. These were their first survival strategies. One historian called them "invaders" that interacted with the new environment with a "desire for personal gain." Another called it an "overwhelming desire" for "'advancement.'" Nothing could stop them. Most anything or anyone in the way—such as forests or preexisting villages, for example—was flattened. During this second phase of contact the well-being and material and spiritual identity of the Indians was threatened. The Native experience in coping with and adapting to these threats could be reduced to three words: survival under pressure. A timeline of major events affecting Klallam Native groups during this period is presented in Figure 11.1.[229]

By the early nineteen hundreds Native societies on the Northwest Coast had succumbed to "systemic risk." The term generally refers to simultaneous breakdowns or losses throughout an entire system rather than its discrete parts. It is often used to describe a worst-case risk scenario in economic, financial and banking structures. A systemic risk in banking or currencies, for example, could result in a national or

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[228] Howay F.W., in *The Canadian Historical Association, Report of the Annual Meeting Held at Ottawa, May 24-25, 1932*, 1932, quote on p. 14.

[229] Peter G. Boag, *Environment and Experience, Settlement Culture in Nineteenth-Century Oregon* (Berkeley: University of California Press, 1992), quote on p. 97; Fisher, R., 1992, pp. 102-103, 177, quote on p. 102.

transnational clustering of bank failures across many institutions, or a high correlation of global exchange rate depreciations. While the cause of such crises can sometimes be difficult to elaborate, the net result is massive and widespread failure. It may be a severe shock that adversely affects many components at nearly the same time. Or it could be the result of a jolt to one part of the system, which in turn triggers a series of adverse events across the system, as if one domino's fall set off all the others. In both circumstances the interconnectedness of the elements or parts that comprise the total system became a liability.[230]

For Native societies, integrated risk management mechanisms comprised the culmination of an adaptive survival strategy that had probably worked for many centuries if not millennia. Their cultural, economic and social systems had evolved to form a mutually supportive base of societal equilibrium and stability. These systems kept in check potential threats to existence such as over-exploitation of the environment, wealth disparity within and among villages, and loss of respect for the natural world. They also effectively coped with "big threat events" that periodically endangered their way of life—dramatic fluctuations in natural systems beyond their control. These might include especially poor salmon runs or hard winter weather that beached off-shore activity. The risk management systems were so intertwined that it is hard to identify exact root or source features that coalesced over time into a strong, successful society.

But the interconnectedness of these survival assets was the very quality that contributed to the weakening and collapse of Native societies. Unique or specific threats unleashed by the forces of invasion and settlement nearly always had chain reaction

[230] Kaufman, G.G., "Banking and currency crises and systemic risk: a taxonomy and review," *Financial Markets, Institutions & Instruments* 9,2(2000):69-131, pp. 92-93.

effects because everything was cohesively related. The settlers' desire for natural resources and land, for example, destabilized Native subsistence activities and food processing sites. It also thwarted their ability to generate excess wealth and potlatch. This in turn upended their intra- and inter-village social relations and alliances. It also reduced their capacity to give and receive possessions throughout periods of abundance and shortage. These were critical social activities that helped to ensure parity among different groups during good times, and which served as insurance policies or guarantees of help during hard times. As did expertise in highly developed food capture and processing technologies, cultural customs such as ceremonies, rituals and taboos withered away. Likewise, government acculturation policies that sought to undermine Native kinship arrangements and spiritual practices indirectly compromised their economic endeavors. Hence in both examples direct threats to one part of Native society indirectly endangered other important components of the overall system.

In these ways threats to their survival and self-control manifested from every direction. A list of risks encountered by Native groups is provided in Table 11.1 to show the variety and intensity of threats that characterized the Native-settler interface in the nineteenth century. Adverse effects could be especially debilitating when Native response or adaptation to one hazard exacerbated others. Loss of hunting grounds leading to lack of food and wealth, for example, could create dependence on "civilized foods" and wage jobs. In turn, Native hunting techniques, food preservation technologies, spiritual preparations and trading networks could fall into disuse and eventual obsolescence. As Indians increasingly became dependent on the new settler economy, their knowledge and skills disappeared. The process solidified when the next generation's cultural heritage

was stunted or lost. Across the Northwest the process varied by location and group. But typically wherever settlement occurred the results were similar: psychological turmoil, disease and death; dispossession of land, resource access, village sites and material wealth; and the marginalization or disappearance of cultural sophistication and social structure. Within a lifetime some groups had virtually lost control of their societies.

By contemporary standards the Natives experienced nothing less than a catastrophe. Such risks are characterized as extreme events marked by a large degree of uncertainty and potential damage. One risk scholar, reflecting on the 2001 World Trade Center attack in New York City, listed a few would-be catastrophes: the city of Seattle having an earthquake of magnitude 7.0 or greater, a severe nuclear power accident somewhere in the United States, or a terrorist-caused smallpox epidemic. Such devastating events have a low probability of occurring, but if they do occur the consequences are colossal and can include physical, social, political, economic, cultural and psychological harms to individuals and societies.[231] Catastrophes, the legal scholar Richard Posner writes, can "produce a harm so great and sudden as to seem discontinuous with the flow of events that preceded it." Indeed, catastrophes are so infrequent, but so feared, that risk experts are challenged to develop rational responses to them. They are in many respects an "unknown probability."[232]

This aspect of managing risk—the chance and probability of events occurring—

[231] Kunreuther, H., "Risk analysis and risk management in an uncertain world," *Risk Analysis* 22,4 (2002):655-664, pp. 651, 657.

[232] Richard A. Posner, *Catastrophe. Risk and Response* (New York: Oxford University Press, 2004), p. 6.

necessarily requires coping with uncertainty.[233] Before contact, perhaps the most significant uncertainty facing Native risk managers was how to deal with unpredictable variations in natural abundance. The seasonal harvest of salmon runs, for example, was critical to Native survival. Acute shortages in fish stemming from poor migration returns could lead to food scarcity, even famine. But these events were unpredictable. Such uncertainty is called *epistemic*, which reflects a lack of knowledge about the world, perhaps due to the inability to measure or observe phenomena that vary over space and time. It also relates to how humans attempt to compensate—by means of their perception and understanding of the problem—and what outcomes they expect from possible solutions.[234] In response, likely through trial and error the Natives had developed versatile and adaptable socioeconomic strategies to mitigate the worst case scenario. These included communal and private property rights, highly regulated and controlled exploitation, alternative food sources and preservation, the sharing of excess food, reciprocal gifting of wealth, and a deep spiritual relationship with nature. This mix of strategies sustained their societies through lean times.

Aleatory uncertainty also reflects incomplete information, but about immeasurable random variations and chance outcomes that could be infeasible to understand or situated in a system without pattern. Also called stochastic uncertainty, it can signify unknowable circumstances within the limits of present and foreseeable

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[233] M. Granger Morgan and Max Henrion, *Uncertainty. A Guide to Dealing with Uncertainty in Quantitative Risk and Policy Analysis* (New York: Cambridge University Press, 1990), p. 1.

[234] Colyvan, M., "Is probability the only coherent approach to uncertainty?" *Risk Analysis* 28,3(2008):645-652, p. 646; Pielke Jr., R.A., "The role of models in prediction for decision," in *Understanding Ecosystems: The Role of Quantitative Models in Observations, Synthesis, and Prediction,* C. Canham and W. Lauenroth, editors (Princeton, NJ: Princeton University Press, 2003), p. 116.

knowledge.[235] The coming of mariners and settlers from distant lands could be construed as aleatory. But to the extent one construes the newcomers' arrival as a predictable event and not a random act, one could find a blurred distinction between aleatory and epistemic uncertainty. In this case, the arrival might be viewed as an unexamined but wholly deterministic possibility, however remote.[236] Moving beyond these categories, the onset of settlement could also be interpreted as a truly unexpected risk, one beyond the realm of even uncertainty—a therefore unknowable event.[237]

Throughout history, societies that have survived in the face of unknown threats such as catastrophic risks have relied on flexible institutions and individuals, as well as the ability to experiment with alternative forms of adaptation.[238] Native societies on the Northwest Coast clearly demonstrated these qualities during the latter half of the nineteenth century. In Klallam country on the north Olympic Peninsula, some groups and individuals managed to hold on in spite of harsh forces of marginalization and pressures to move out of the path of settlement. They countered these threats by developing niche trades or taking labor jobs in the pioneer economy, raising their own crops to supplement hunting and fishing, participating in homesteading to acquire their former lands, and modifying their concepts of medicine to form a revivalistic healing-based religion. They

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[235] National Research Council, 1996, pp. 106-107; Ascher, W., "Scientific information and uncertainty: challenges for the use of science in policymaking," *Science and Engineering Ethics* 10(2004):437-455, pp. 440-441; Rowe, W.D., 1975, p. 21; Wilson, R. and Shlyakhter, A, in *Fundamentals of Risk Analysis and Risk Management*, 1997, p. 35. See also Fischhoff et al.'s discussion of unknown risk, comparing observable and known (or old) risks to not observable and unknown (or new) risks: Fischhoff, B., Watson, S.R., Hope, C., 1984, pp. 129-133.

[236] Ascher, W., in *Science and Engineering Ethics*, 2004, pp. 440-441.

[237] National Research Council, 1996, p. 116.

[238] Clark, W.C., in *Societal Risk Assessment: How Safe is Safe Enough?*, 1980, p. 288.

were firm and unyielding in their refusal to leave their homelands, and adept and resilient in figuring out how to survive under radically altered economic, cultural and social conditions.

Overall, however, Native casualties were significant—and despite the damages wrought no end was in sight. Archeological evidence on the Olympic Peninsula indicates these peoples had achieved a continuity of lifestyle for at least 1,000 years before present. But the process of systemic risk set off a simultaneous and relatively rapid breakdown of their society within the span of a lifetime. Myron Eells, whose missionary work at the Skokomish Reservation lasted from 1874 to 1907, witnessed some of the change. By the turn of the century, for example, much of the Native crafts and customs he had known 25 years earlier had disappeared. An entire store of cultural knowledge had been wiped out.[239] Even more hardship would continue well into the twentieth century. The settler economy was only just emerging. New advances in technology gave rise to more exhaustive and permanent resource extraction regimes. Perhaps most significantly, the rivers and fisheries of the Pacific Northwest—the nucleus of Native material and spiritual survival—served as raw material to feed and power industrial and commercial-scale enterprise.

[239] Castile, G.P., 1985, pp. xiii-xiv, 451, 454.

Figure 11.1 Timeline of notable events affecting Klallam Native groups on northern Olympic Peninsula area of Northwest Coast, 1770-1900

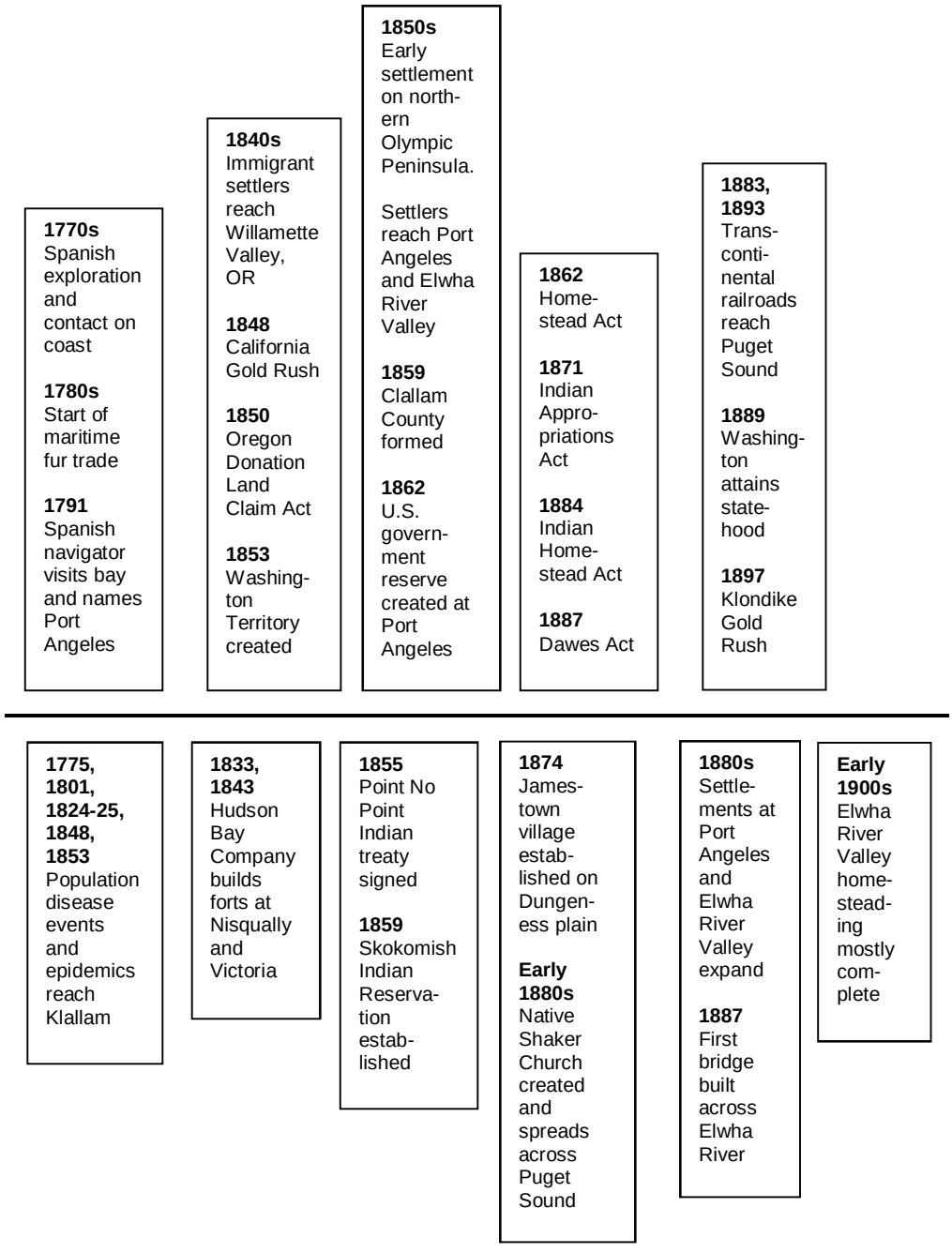


Table 11.1 Risks to Native groups during settlement phase of Northwest Coast[240]

Demography	Property	Economic	Cultural and Social
Disease, alcoholism and senescence ► severe morbidity and mortality events with individual and collective psychological ramifications ► possible adverse effects on fertility rates ► termination of knowledge and skills with passing of older generation **Population redistribution** ► abandonment or forced removal from traditional villages and multi-family dwellings ► relocation and consolidation to reservations ► formation of villages near white settlements ► "landless" status of some individuals and groups with no legal status or safeguards	**Ceding of land and control of natural resource base** ► reduced access to natural resources (e.g., subsistence fishing and gathering sites) ► termination of food processing points (e.g., winter salmon smoking facilities and villages) ► loss of proximity to traditional neighboring groups/territories for trade, sharing and gifting **Creation of new property systems** ► reservations under government control and subject to public lands laws ► pushed into inferior locations exposed to weather, lacking fortification protection from enemies, and limited access to or containing scarce natural resources ► dissolution of communal orientation within villages and households	**Change in food and materials production** ► failure of traditional surplus food/materials collection and related socio-cultural networks (e.g., sharing of food, wealth and stature transfer, ceremonial and spiritual connection to natural world) ► increase in agricultural pursuits, "civilized foods" and "ready-made" products as substitute for fishing, hunting and gathering, craftwork and other skilled and technical pursuits **Introduction of cash wage labor** ► hastened decline and disuse of traditional products ► increased economic marginalization and precarious footing as dependent participants in "new" economy	**Attempts to eradicate or modify traditional belief, behavior and organizational systems** ► disapproval or banning of ritual and spiritual expressions and performances (e.g., potlatch ceremonies, shamanism) ► discouragement of kinship and other communal family structures and relations ► disapproval or banning of use of Native languages, attempt to inculcate literacy ► establishment of reservation schools, churches, agriculture, and single-family housing ► disapproval of social stratification, including use of slaves ► disapproval of inter-group warfare and other intra- and inter-village retribution and justice systems ► disapproval of traditional foods obtained from hunting/gathering ► disapproval or banning of tribal affiliation, organization and self-governance

[240] While the four general headings provide some level of basic structure, the organization reduces a spectrum of interfaces into artificially discrete cells. A multidimensional matrix might provide a more accurate display were it possible to delineate the true complexity of the situations confronted by Native groups. The tabular presentations of risk categories should not be construed as preceding or subsequent to other categories. More likely, specific threats varied temporally and spatially depending on the unique circumstances of different groups. The list is neither exhaustive nor representative.

Part 4. The Olympic Power Company and City of Port Angeles

Chapter 12 A Battle Royal from Start to Finish

In 1890, nearly 40 years after Bostonian James Swan landed at Schoalwater Bay on the lower Washington coast, Toronto native Thomas Aldwell came ashore to the north, at Port Angeles harbor. He had traveled on board the *George E. Starr*, departing from Seattle with frequent unscheduled stops to fetch wood for its boiler. As the sidewheel steamer slowly picked its way west along the Straits inland water passage, the young immigrant bypassed destinations like Port Townsend "that were not the frontier any more." Aldwell was instead looking for a western outpost, and stepping off the wharf at Port Angeles he liked what he saw—muddy streets, cabins, a few hundred Indians living on the beach, and at least 16 saloons.[241]

He arrived anonymously, and like Swan he staked his future in a new land far distant from his eastern home. But unlike James Swan, no one would remember Thomas Aldwell as a man of letters and friend of Native groups.[242] His life's legacy was wholly different. Walking the length of the harbor and then climbing the bluff to survey the port, he had found what he wanted: untapped potential. In his words, Port Angeles was still "a wild frontier town" surrounded by "undeveloped country" and enough "raw material" to build a "harbor rimmed with vital industry." Ambitious and energized, Aldwell immediately set to work "to help build a happy and prosperous community."[243] He

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[241] Thomas T. Aldwell, *Conquering the Last Frontier* (Seattle: Artcraft Superior Publishing Company, 1950), pp. 17-18.

[242] McDonald L., 1972, p XX.

[243] Aldwell, T.T., 1950, pp. 18-20.

labored hard, and many decades later near the twilight of his life, Port Angeles honored Aldwell as the primary force responsible for turning a fledgling waterfront of possibility into a regional hub of pulp and paper manufacturing.[244]

The story of Aldwell's path to success chronicles a lifelong fight that took nearly 30 years to play out. It was not easy. In his 1950 autobiography, *Conquering the Last Frontier,* Aldwell portrayed nature as an adversary, a force to control. He believed that individual and community success was rooted in the domination of natural forces. Indeed for him and his business peers early survival boiled down to a series of skirmishes with anyone or anything that blocked their way. Entrepreneurs wrestled with nature to turn a profit by whatever means, and in so doing attempt to create economic stability for their new society. On the remote Olympic Peninsula early twentieth century life among the pioneer immigrants was a drawn out conflict between their little city and the surrounding environment.

Aldwell's grand match—an experience that would define his life—was with the Elwha River. He wanted to build a hydroelectric dam in a steep canyon where the water ran fast, and then sell electricity to consumers on the north peninsula and east of Hood Canal. But the contest did not always go well. Erecting the dam and finding markets for the electricity proved to be a daunting challenge. Early on, construction setbacks nearly bankrupted him. Moreover, initial power contracts were not enough to cover his debts. The financially stressed power company set about to attract pulp and paper companies to the north peninsula by marketing unlimited electricity, water and timber raw materials for the taking. Altogether it took 20 years for him to plan for and finally build the dam, and

[244] *Port Angeles Evening News,* April 24, 1940; November 18, 1949; Lauridsen, G.M. and Smith, A.A., 1937, p. 204; Aldwell, T.T., 1950, pp. xi-xii.

another decade to generate sufficient income. Power development on the Elwha, Aldwell later reflected, was "a battle royal from start to finish."[245]

Aldwell's effort to produce hydroelectric power on the Elwha River started in 1894. He met an Oregon pulp mill entrepreneur, R.M. Brayne, who ten years earlier had built one of the region's first facilities on the Youngs River. Aldwell owned a small riverside claim on a stretch of the Elwha notable for its steep and narrow canyon. He called it Aldwell's Canyon. This natural funnel was an ideal natural formation for a dam site. The two men kept their partnership and intentions secret—they needed to buy up three miles of land along the river south of the canyon for a reservoir. Brayne provided part of the capital—eventually leaving the partnership—and Aldwell quietly acquired the land. "It was purchased at a nominal price," he recalled, "and for our purposes it was naturally worth a great many times what we paid for it."[246]

Land acquisition was perhaps the easiest part of the project. As chronicled by Aldwell, the local newspapers and professional trade journals, actual construction of the Elwha Dam between 1910 and 1914 went anything but smoothly. At times it seemed like the scheme was never meant to happen. Or perhaps the river was throwing everything it could back at Aldwell. He traced all his problems to L.L. Summers and Company, the construction outfit hired to build the dam. Financing was necessary in order for Aldwell's power company to build the dam. They found it from a large Chicago investing firm, Peabody, Houghteling and Company. The firm handled a $750,000 bond issue to finance construction, incorporating the Olympic Power Company with Aldwell as vice president

[245] Aldwell, T.T., 1950, p. 77.

[246] Aldwell, T.T., 1950, p. 81.

and general manager. George Glines, who had helped Aldwell purchase land on the Elwha to encompass the site after Braynes pulled out, was President.[247] But the financing critical to undertaking the project came with what proved to be two costly conditions. First, Peabody, Houghteling retained ultimate decision-making powers including the selection of the construction company, thus marginalizing Aldwell's management role and control. Second, Aldwell and Glines had to endorse the bonds, which meant they incurred considerable personal risk. "My financial fate was tied up in this dam but I couldn't do a damn thing," Aldwell later complained.[248]

Preliminary construction began in September 1910. The contract called for the building of a concrete dam approximately 110 feet high and 50 feet wide between the walls of the canyon with "a safe, approved foundation going down to bedrock." Penstocks conveyed water down to two 10,000 horsepower turbines placed in a power house. A large spillway controlled by gates directed surplus water. The Olympic Power Company expected to be generating electricity within a year.[249]

Soon at odds with Summers, Aldwell was concerned that slow progress and questionable work methods would exceed original cost estimates. Month after month he admonished both Summers and Peabody, Houghteling. There was a sense of desperation in his communications. His own fate, not just the dam project's, was in play. "The worst waste of money has been in throwing in cement into the bottom of the river by the thousands of barrels, in place of putting in a caisson," Aldwell wrote in December. "Had

[247] *The Seattle Post-Intelligencer*, December 4, 1910.

[248] Aldwell, T.T., 1950, p. 93-94.

[249] Aldwell, T.T., 1950, pp. 90-93, quote on p. 92.

a good, seasoned construction man been here, this would never have been done without testing the bottom of the river at least."[250] By early 1911 Aldwell was searching for more money to replenish expended funds.[251] To make matters worse, severe accidents beset the worksite. In early 1911 a worker drowned and two were seriously injured. Three weeks after this misfortune the Port Angeles *Tribune-Times* reported another:

> A second life was forfeited to the swirling current of the Elwha river at the canyon site of the Olympic Power Company when . . . Johanes Bengston, an employe[e] of the company, met death in the swift running waters of that stream. Bengston met a very similar fate to that which overtook young Werhoing at the same place three weeks ago. He was working on a platform on the canyon wall where the timbers for the dam are going in, and in some manner lost his footing and fell into the river.[252]

Things became dire when Aldwell learned of deficient practices deviating from the contract's provision to carry the dam's foundation down to bedrock. When an engineer tried to convince Aldwell the cut-off wall was sound, he took a pick to it "and with a few strokes broke through the 'impervious' material."[253] In a 22-page letter to Peabody, Houghteling he calculated a one in ten odds the dam would rupture. A tally of Summers' delinquencies included "extra costs, incomplete machinery, lack of capable management, and doubt as to the foundation of the dam."[254] Aldwell was fed up.

The year 1912 may well have been the worst year of Aldwell's life. The construction site was chaotic, the dam was falling apart and his finances unraveled. In

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[250] Aldwell to "Sullivan," November 7, 1911, in Aldwell, T.T., 1950, p. 98.

[251] Aldwell, T.T., 1950, pp. 93-94.

[252] *The Olympic-Leader*, February 3, 1911; *Tribune-Times*, February 24, 1911.

[253] Aldwell, T.T., 1950, p. 92, quote on p. 102.

[254] Aldwell, T.T., 1950, pp. 99-100.

March two more men drowned and a crashing derrick severely injured E.B. Webster, one of the owners and publishers of the *Olympic-Leader* newspaper. The victims were bystanders among a crowd of regular Sunday visitors. "One glance back at the toppling timber, its top a hundred feet overhead, and they started to run," the paper reported. "Just then the flying cables were seen and they had not taken more than a step or two when Webster, a few feet to the rear of his wife and Mr. Fitts, was struck by a cable, and Berg and Ritchter were swept over the edge."[255] In May, water leakage beneath the dam required workers to lay 3,000 bags of sand and gravel along its heel. According to the *Journal of Electricity, Power and Gas*, excavation revealed that what should have been solid concrete was more like a slurry of sand and gravel.[256] And in July a consulting engineer's report vindicated Aldwell by noting that Summers had not carried the dam's foundation to bed rock. But the good news was tempered by bad: there was, in truth, a real possibility of a "blowout." This menacing term aptly described a worst case scenario in which reservoir water backed up behind the dam ruptured the bottom of the structure's foundation in a massive release of pressure. If a blowout happened then expensive reconstruction of the foundation was necessary.[257]

Fearing legal action against themselves in the event of dam failure, Peabody, Houghteling finally agreed to Aldwell's demands for a new construction company. They terminated the contract with Summers in August. Soon after Aldwell learned the company all along had been financially strapped and had hoped to revitalize itself on the

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[255] *Tribune-Times*, March 8, 1912.

[256] *Journal of Electricity, Power and Gas* 35,16(October 16, 1915):297-298 (reporting on May 17, 1912).

[257] N.A. Carle to E.M. Milles [sic], July 16, 1912 (Thomas T. Aldwell Papers. Box 1, Folder 1-5. University of Washington Libraries, Seattle, WA).

Elwha dam project. Presumably this explained Summers' cutting corners and shoddy work—all at Aldwell and Glines' expense.[258] But the measure was too late. While the new construction company tried to repair the foundation, natural forces took over. A rapid rise in the river's water level from heavy rains interrupted operations. Meanwhile, over-confident engineers made the fateful decision to close the sluiceway gates. Water began to pool behind the dam and fill the reservoir, creating a "full head."[259]

Within 12 days, by October 30, the reservoir was at capacity. Telltale bubbles emerged from below the dam, a sign of leakage from increased pressure. Darkness fell and the failure occurred that evening when 12,000 acre-feet of water passed under the dam in 90 minutes. A huge arch remained intact, spanning the gorge with a gaping cavity beneath it forming a 60-foot hole. Called from a meeting at the local bank in Port Angeles, a fretful Aldwell drove to the site. Viewing what destruction he could see, he returned home to telegraph Peabody, Houghteling. "Water went under dam. Lake gone out. Power House and machinary badly damaged and went out after dark [sic]." Only the day before Aldwell had advised the company that the project was nearly completed with power delivery expected by mid-November.[260]

Major problems now threatened Aldwell's power company. Likely an immediate concern was liability—the blowout not only released floodwaters upon the lower Elwha River valley, but also hundreds of large logs lifted from long-standing jams or lying on banks. The armored deluge obliterated the Clallam County bridge, tore out telegraph and

[258] Aldwell, T.T., 1950, p. 105.

[259] Aldwell, T.T., 1950, p. 106; *Journal of Electricity, Power and Gas* 35,16(October 16, 1915):298.

[260] Miscellaneous document (Thomas T. Aldwell Papers. Box 2, Folder 21. University of Washington Libraries, Seattle, WA).

telephone wires, washed away part of Port Crescent road, lifted Charlie Sampson's house from its foundation along with farm stock and caused $2,000 in damages to the Goodwin Lumber and Logging Company.[261] Aldwell also needed to find more money to rebuild the dam. And the delay meant that waiting customers would become more impatient and perhaps try to renegotiate contracts or find other power sources. "The news of the disaster fell like a wet blanket on the community. . . ." the *Tribune-Times* reported.[262] "The blow will fall heavy on the city, as well as the company as the present light plant is wholly insufficient and new machinery will have to be installed to carry it through the winter," a paper in nearby Sequim noted.[263]

Aldwell tried to assure everyone that things would work out. "The accident is to be regretted," he commented the next day, "but will be a benefit outside the damage done part of the machinery, as it enables us now to readily reach bedrock."[264] Nevertheless he and Glines were scrambling to survive: finding more money, shoring up contracts, figuring out whether they could even rebuild the existing foundation. The men were so desperate that Glines mortgaged two of his properties to raise additional funds. The company brought restraining orders against Port Angeles when the city council tried to cancel its original franchise to get a better rate. And engineers drilled bore holes in river

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[261] Clipping, unidentified paper, November 1, 1912 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA); *Tribune-Times*, November 1, 1912 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA); *Port Angeles Olympic*, March 11, 1913; *The Olympic-Leader*, November 1, 1912 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA); *Journal of Electricity, Power and Gas* 35,16(October 16, 1915):298.

[262] *Tribune-Times*, November 1, 1912 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA).

[263] *Sequim Press*, November 9, 1912.

[264] Clipping, unidentified paper, November 1, 1912 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA).

strata downstream and upstream of the dam site to try to find a better location for a new dam.[265]

By all accounts the project should have died. The Olympic Power Company spent every cent of its hard-earned capital on building a dam on a rough patch of river that proved too difficult to stop. Two years later all the company had to show for itself was a concrete structure not worth fixing and a string of damaged county and private properties downstream. People would have understood: He was dealt a poor hand, management decisions were beyond his control, the physical integrity of the stream bed was uncertain. Aldwell took a big chance, after all, and sometimes failure accompanies risk.

But 1913 proved to be a good year for the Olympic Power Company. Thirteen months after the accident, on November 5th a final construction explosion threw 47,000 cubic yards of material into the river bed. One could say Aldwell's new engineers literally blasted away his problems.[266] Attempts to find a different site to build a new dam at less expense than repairing the blown out foundation had proven futile.[267] Instead of starting over they resorted to blowing apart canyon walls to use as filler above, below and beneath the existing dam site. Concrete stubbing downstream along with fabricated timber mattresses laid upstream reinforced the sluiced and crushed material. It was mishmash engineering with the intent of functionality rather than perfection—surround the old foundation with as much stuff as possible to hold it in place.[268] "The muffled roar

[265] Aldwell, T.T., 1950, pp. 109, 117; *Journal of Electricity, Power and Gas* 35,16(October 16, 1915):298-299.

[266] Aldwell, T.T., 1950, pp. 111-112.

[267] *Journal of Electricity, Power and Gas* 35,16(October 16, 1915):298-299.

[268] *Journal of Electricity, Power and Gas* 35,15(October 9, 1915):280-282.

of the blasts," Aldwell later wrote, "was music."[269]

The cheap reconstruction did have drawbacks. Seepage under the dam continued, as did repairs over the years. The power plant only produced 9,600 horsepower, far less than the desired 25,000 but more than sufficient for contracts already held. Regardless, the completed structure could impound water for a sufficient head to spin the turbines of the Westinghouse generators, and it held. The company had solved its problem "efficiently and economically," in the words of the *Journal of Electricity, Power and Gas*. Opening for business in December 1913, by the close of 1914 transmission lines carried Elwha River electricity across the peninsula as far as Bremerton.[270] As one paper reported, "there will be no such thing again as business houses and residences struggling along with candles and coal oil lamps for light and bucking and unreliable gas engines for power. We will now have all kinds of juice, day as well as night."[271]

Aldwell had built his dam. And as measured by the dominant standards of his community, he had succeeded in controlling a river to serve economic progress. His company had helped to bring new technologies to the north Peninsula that created new sources of wealth. Other standards, however, had not been measured and went largely unnoticed. There were costs to the environment and to those who valued the river's fisheries, for example. But these were not calculated as the region and country rushed to embrace electricity and all that it could provide.

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[269] Aldwell, T.T., 1950, quote on p. 112.

[270] *Journal of Electricity, Power and Gas* 35,15(October 9, 1915):280-282; *Journal of Electricity, Power and Gas* 35,15(October 9, 1915), p. 280; *Journal of Electricity, Power and Gas* 35,16(October 16, 1915), p. 301; *Tribune-Times*, 1914.

[271] Aldwell, T.T., 1950, p. 77; Clipping, unidentified paper, December 6, 1913 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA).

Certainly Aldwell's perseverance and resolve played a major role in salvaging the Olympic Power Company. So, too, did larger social forces help guide the project to completion. What could not be underestimated was just how much the region craved electricity and needed developments such as the Elwha Dam. As the nineteenth century had come to a close cities began to light their business districts, run traction cars and string lines to residences with electricity generated by steam-powered plants. Once the public got a taste of it, they insisted on more. In 1886, for example, Seattle's first electric display "astonished spectators at a special exhibition held in honor of the special occasion."[272] By 1902 the city was clamoring for the completion of a municipal hydroelectric plant at Cedar Falls to bring "speedy and deserved relief to the homes, stores and factories" of the city. The inevitable calls for extra power outpaced generating capacities and brought on hurried and often bitterly fought attempts to increase loads from a constrained supply. For the next 30 years municipal and private efforts struggled to provide enough electricity for the region. There was no end to the demand.[273]

The electrical engineers were especially boastful. They said hydroelectricity could guarantee prosperity to any community that was fortunate enough to have it. Electrification, they marveled, would transform American life. A 1913 issue of the *Journal of Electricity, Power and Gas* predicted that electricity would "bring about better and more advanced methods of living," enlarge manufacturing, improve transportation

[272] *Seattle Post-Intelligencer,* July 24, 1938; *Dunbar Scrapbook,* No. 80, pp. 6-7 (Special Collections, University of Washington Libraries, Seattle, WA).

[273] *Seattle Mail and Herald* 5,12(February 1, 1902).

and "remove the drudgery and make farm and home life more attractive."[274] Five cents of electricity, the journal boasted in 1909, will:

> warm a woman's curling iron every day in the year for 3 minutes and twice on Sunday. It will warm a man's shaving water every morning for a month. It will fry four eggs every morning for a month. It will boil four eggs every morning for one-half month. It will warm your bed and prevent cold feet. It will brew the morning coffee in an average household for more than two weeks. It will run a sewing machine for 21 hours. It will do the average family ironing. It will pump 960 gallons of water. It will light 5 16-candle power lamps over two hours in one evening.[275]

Thus, reflecting common sentiment, Aldwell argued that a "wild stream crashing down to the Strait" was of little value to the growing state of Washington. But an Elwha River that could generate plenty of electricity would become "peace and power and civilization."[276] His vision, grandiose as it was, adequately conveyed what a powerful social force the prospect of electrification was for his time. "This river will be made a power for good," the neighboring *Sequim Press* extolled.

> In the growth of new communities, the planting of new industries, the bettering of transportation, in fact, in all the activities called into action by the settlement, cultivation and improvement of a new country by an industrious people nothing more helpful and desirable could be installed among us than the great power of the river converted from its waste and loss into a magnificent source of energy and strength. The use of electricity is something just begun. Its possibilities for helpful service are as yet really unknown.[277]

America's rivers had always been used to generate power—the use of water as a prime mover was actually older than the country. It was no coincidence that for 250 years

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[274] *Journal of Electricity, Power and Gas* 30,20(May 17, 1913), p. 450.

[275] *Journal of Electricity, Power and Gas* 22,23(June 5, 1909), p. 449.

[276] Aldwell, T.T., 1950, pp. 79-80.

[277] *Sequim Press,* April 8, 1911.

most New England settlements were located near good water power sites. Anywhere humans wanted to live they needed to be sure they were close enough to moving water if they wished to have agriculture or manufacturing. The impulse of a stream's water turned grindstones, saw blades and other hardware attached to a primitive wheel mechanism, accomplishing labor-intensive tasks for farmers and craftsmen. Water mills generating mechanical power were therefore necessary fixtures wherever humans dwelled. By the mid-nineteenth century the total number of mills in America may have approached 100,000. They often preceded such basic community facilities as schools, churches and stores. An economy could not exist without them.[278]

The dominant industrial economy that mill power created in New England during the nineteenth century owed much of its existence to property and water laws. From the start of the century until about the Civil War, American society's conception of private property changed as higher levels of economic activity challenged traditional agrarian land uses. The legal vanguard of these sweeping changes appeared in the area of water rights because the construction of mills and dams soared as the nineteenth century began. In turn, common law moved from a feudal conception of property to promote instead a doctrine of economic growth based on manufacturing and development. Up to that time, laws had conferred on a land owner the power to prevent any use of his neighbor's land that conflicted with his own. But an evolving legal system would make it possible for private interests to use and control water resources previously shared by many.[279]

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[278] Louis C. Hunter, *A History of Industrial Power in the United States, 1780-1930. Volume One: Waterpower in the Century of the Steam Engine* (Charlottesville: University Press of Virginia, 1979), p. 1.

[279] M.J. Horwitz, *The Transformation of American Law, 1780-1860* (Cambridge: Harvard University Press, 1977), pp. 31-40.

The emergence of new economies based on the exploitation of water resources set off a clash of interests between landowners that influenced all forms of property law throughout the century. As demand for and use of water power intensified laws would serve to support the developers. Early cases such as Palmer v. Mulligan promoted the idea that the ownership of property implies above all the right to develop that property for business purposes.[280] In 1805, the New York Supreme Court for the first time held that an upper riparian landowner could obstruct the flow of water for mill purposes. In the heavily watered Northeast, there were so many cotton and textile mills on some streams that new technologies were invented to build higher dams. By impounding more water mills could generate additional power. There was little water left over for other users, but law emphasized the needs of manufacturers. As each decade passed, more and more cases introduced and cemented into American common law "the entirely novel view that an explicit consideration of the relative efficiencies of conflicting property uses should be the paramount test of what constitutes legally justifiable injury," one legal historian concluded.[281] In other words, law served to protect the interests of and promote the most valuable perceived economic needs of the nineteenth century Northeast: manufacturing and industry.

This view, moreover, made plain law's willingness to sacrifice long-held tenets of private property, measures that would have provided more equity to the needs of competing water users. A Massachusetts law, for example, not only allowed mill owners to flood neighbors' land, but also authorized the mill owner to flood the lands without

[280] Horwitz, M.J., 1977, pp. 37-38.

[281] Horwitz, M.J., 1977, 38.

seeking prior court permission. Such procedures foreclosed four important alternative avenues to relief: land trespass, punitive damages, self-help to abate a nuisance, and permanently enjoining a mill owner for having created a nuisance. Thus, the extraordinary powers these mill acts delegated to mill owners was not balanced with competing legal recourse by those adversely affected. In addition, the rapid evolution of dam-building technologies to accommodate industrial expansion aggravated the disparity gap. As dam systems started to encompass entire river basins the ramifications of these laws became more severe. Small earthen grist mills constructed on tributary creeks in the late 1700s were one thing. But a series of high dams owned by private enterprises that would later integrate operations along a large river was quite different. Such early events in the eastern United States would have pivotal implications looking forward to the twentieth century development of power dams in the amply watered Pacific Northwest.[282] Water developers enjoyed a ready-to-use system of property rights conducive to private industrial interests.

Willard Hurst, who studied how changing conceptions of law similarly facilitated the nineteenth century logging off of Wisconsin's virgin forests, wrote that this century had valued change as a force for the better, and preferred "property in motion or at risk rather than property secure and at rest." This difference between "dynamic" property and "static" property was especially pronounced in capital-scarce frontier areas, where entrants taking the greatest risks required legal and economic certainty to back their enterprise.[283]

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[282] Horwitz, M.J., 1977, pp. 40-43, 47-53, 31-62.

[283] Hurst, J.W., 1956, p. 24; Horwitz, M.J., 1977, pp. 31-62.

Accordingly, by the 1860s the new arrivals to the Pacific Northwest came not only with the technological proficiency to build dams, but also the legal footholds to exploit common water resources. When they reached the north Peninsula, it was only natural that they valued the numerous streams coursing through shallow ravines as a source of mechanical power. "[T]he country has a most extraordinary water system," *The Model Commonwealth* wrote in 1888. "The small creeks have ample fall to furnish unlimited water power for many factories."[284] Elwha River settlers like Silas Goodwin simply followed customary development patterns by applying the energy of falling water to the satisfaction of their needs. Fortunately for Aldwell, by the turn of the century the nation's legal system was in place to support his plans for the Elwha. With such assurances, small businessmen could now partner with financing institutions for necessary capital to build large-scale projects in the western United States.

Recent advances in energy distribution made this new rush of development possible. Energy became mobile in the 1880s when inventors introduced hydroelectric systems that could convert water power to electricity and distribute it through lines using alternating current. Formerly the delivery of electrical energy from its generation site to markets was limited to short distances. Now that hydroelectric plants could transfer electricity efficiently 100 miles to industrial and community users, distant population centers could tap into previously unusable water power sites situated in remote areas. "Ten years ago," an electrical engineer wrote in 1906, "that falling water in the Sierra Nevada Mountains should light the streets and operate electric cars in San Francisco

[284] *The Model Commonwealth,* August 31, 1888.

seemed impossible."[285]

Across much of the Pacific Northwest mountainous terrain, abundant rainfall and powerful rivers took on new meaning as the economic viability of hydroelectricity and transmission lines was demonstrated at specific sites. The first hydroelectric plant built in the United States was installed on the Willamette River at Oregon City, Oregon in 1889 and transmitted 4,000 volts 13 miles to Portland. In 1899 the Snoqualamie Power Company developed Puget Sound's first power plant at Snoqualamie Falls to supply Seattle and Tacoma with 7,000 kilowatts. By 1915 over 34 hydroelectric power developments produced more than 180,000 kilowatts for privately owned plants and 31,750 kilowatts for municipalities across the state.[286] Hydroelectricity would redefine the northwest, precipitating its industrial and commercial growth.[287] Entrepreneurs like Aldwell could produce and sell hydroelectric power to growing markets, giving economic life to towns and cities.

Government engineers crisscrossed the region to produce detailed reports of every viable energy-producing river. *Electrical World's* June 1912 issue alone devoted over 50 pages to Puget Sound's hydroelectric infrastructure and possibilities. "Nature has done most of the work on the greater part of the sites," the periodical noted, impressed by the area's mountainous terrain that provided snow year round to feed many large rivers like

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[285] Alton D. Adams. *Electric Transmission of Water Power* (New York: McGraw-Hill Book Co., 1906), p. 3.

[286] *Journal of Electricity, Power and Gas* 34,23(June 5, 1915):442-52; *Journal of Electricity, Power and Gas* 34,1(January 2, 1915), p. 6.

[287] National Park Service, "Hydroelectric Power Plants in Washington State, 1890-1938," National Register of Historic Places Multiple Property Documentation Form (U.S. Department of the Interior, 1988), p. F-8.

the Cedar, Nisqually, Puyallup and White that were "within easy reach of the cities."[288]

As early as 1897 and 1898 the U.S. Geological Survey advised the construction of dams on the Elwha River, highlighting the basin's series of canyons that extended along most of the mainstem. "It is a tortuous and turbulent stream, winding between high and precipitous mountains," the agency wrote, "cutting its way through rocky ridges, and forming deep and narrow canyons." The report included specifications for potential dam sites, including a 30 foot-high structure creating 1,000 horsepower (cost $47,000) and a 130 foot-high dam creating 10,000 horsepower ($250,000). "There appears to be an excellent opportunity for the development of water power," the Survey concluded, "particularly by the construction of a dam at a narrow point of the river known as Aldwells Canyon."[289]

As if on cue, in September 1898 Aldwell and Glines announced development plans for hydroelectricity on the Elwha at Aldwell's Canyon. The men launched their intentions in a long newspaper article titled "Pacific Niagara," in which they promised "cheap power to any person wishing to put in a manufacturing plant at Port Angeles."[290] Their timing was good because Port Angeles was ripe for a new source of electricity. But they encountered challenges. The potential value of the Elwha was no secret, especially after the *Seattle Post-Intelligencer* ran a story in 1901 with photographs of favorable canyons for power development along the river. The Elwha was without equal in western

[288] *Electrical World* 59,22(June 1, 1912), p. 1161.

[289] U.S. Geological Survey, *19th Annual Report, 1897-98, Part IV, Hydrography*, pp. 505-508; U.S. Geological Survey, *20th Annual Report, 1898-99, Part IV, Hydrography*, pp. 519-521.

[290] Clipping, unidentified paper, September 16, 1898 (Aldwell Scrapbook. University of Washington Libraries, Seattle, WA).

Washington," the paper said, "with the grand future before it, with its immense possibilities, with the undeveloped energy or with the natural facilities that this river has."[291] Other area businessmen likewise saw money to be made in electricity and vied for development sites and franchises. Aldwell would have to contend with a field of players.

Port Angeles had been introduced to electricity in February 1891, less than one year after Aldwell immigrated to the north peninsula. "On Saturday evening the Washington Electric Light & Motor company first turned on the current and the city presented the appearance of being studded by stars," the *Port Angeles Tribune* reported. Like so many other places, the enthralled little town soon tried to expand its power production. But over the next two decades failed development efforts coupled with inadequate and expensive electrical service frustrated the community.[292] In 1892, for example, the citizenry voted down a bond issue to buy the existing plant and develop 500 more horsepower on nearby Morse Creek. Within a year the city began to deliver electricity from another steam-powered plant that was insufficient. And in 1893 an attempt was made to build a hydroelectric plant on Little River, a tributary of the Elwha.[293] The plan did not survive the national depression of the mid-1890s and residents continued to press for the replacement of the "wheezing old electric light plant."[294] In 1903 the city built a new steam-powered light plant. But a few years later the city council

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[291] *Seattle Post-Intelligencer*, December 1, 1901.

[292] Reproduced in *1890-1949, More Power to You... Port Angeles and Clallam County* (Port Angeles Division, Crown Zellerbach Corporation, no date); Lauridsen, G.M. and Smith, A.A., 1937, pp. 258-259.

[293] Reproduced in *1890-1949, More Power to You... Port Angeles and Clallam County* (Port Angeles Division, Crown Zellerbach Corporation, no date); Lauridsen, G.M. and Smith, A.A., 1937, pp. 258-259.

[294] Lauridsen, G.M. and Smith, A.A., 1937, p. 263.

attempted to replace it by passing an ordinance to provide for the construction of a water works and power plant.[295]

Finally, in 1910, Aldwell's power company was at long last ready to act. In February the *Tribune-Times* headlined "Elwha Power to be Developed," making public the company's purchase of three power sites on the river. The aim was to produce electricity for towns stretching 50 miles from Port Crescent to Irondale, and "to supply power to industries seeking a location and at a price so low that it will mean great things to Port Angeles and the whole straits region." But others had also responded to the town's call for more electricity. In the same issue the paper reported the plan of two Seattle engineers and Port Angeles mayor F.S. Lewis to develop power on the Elwha's Little River. [296]

The community was now poised to make something happen. Reflecting common sentiment, the newspapers were fed up. Why had Port Angeles citizens for "so long been paying taxes to maintain a plant from which they receive little benefit," the *Olympic-Leader* asked.[297] Even more assertive was the *Tribune-Times*, which called the city's light plant a $500 per month "makeshift" that likely would fall apart in a year or so and which could not even provide electricity 24 hours a day: "an antiquated outfit, in danger of breaking down at any and all times, requiring renewal in part from time to time as long as it is owned, now burdened to and beyond its capacity during rush hours of the lighting

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[295] Lauridsen, G.M. and Smith, A.A., 1937, pp. 258-259; *Tribune-Times*, January 11, 1907.

[296] *Tribune-Times*, February 11, 1910 (Thomas T. Aldwell Power Co., File, Special Collections, University of Washington Libraries, Seattle, WA).

[297] *The Olympic-Leader*, March 4, 1910 (Thomas T. Aldwell Power Co., File, Special Collections, University of Washington Libraries, Seattle, WA).

period."[298] Over the next few months, Aldwell and Lewis sparred, each trying to get hold of the coveted Port Angeles contract that would solidify a market and attract potential investors.

It seems Tom Aldwell was a born competitor. He had a knack for getting his way by using any means available—and he always fought to the end. Not only had he spent nearly 15 years secretly acquiring the necessary Elwha land acre by acre, but just as importantly he had honed other tactics that served his company well in this final round. First, he had assembled an influential board of directors including some of the most important men in western Washington—regional industrialists, bankers and attorneys who invested monies and extended influence. It was like a roll call of the elites: R.D. Merrill, principal owner in the logging and timber firm Merrill and Ring; Joshua Green, general manager of the Puget Sound Navigation Company and Chairman of the Board of the People's National Bank of Washington; Michael Earles, a Seattle banker and owner of the Puget Sound Mills and Timber Company in Port Angeles; William Perkins, private banker and property owner in Seattle; James Kerr, Seattle attorney for Kerr and McCord; and William Jennings, attorney in Jefferson County and Seattle. They helped to procure the franchise from the Port Angeles city council, contracts with future customers and financing for construction, and they smoothed away any legal issues that arose.[299]

In addition Aldwell was himself an influential Port Angeles resident of 20 years with local and regional ties. His civic resume was impressive, including service as

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[298] *Tribune-Times*, April 8, 1910 (Thomas T. Aldwell Power Co., File, Special Collections, University of Washington Libraries, Seattle, WA).

[299] Aldwell, T.T., 1950, pp. 89-90; Lottie Roeder Roth, editor, *History of Whatcom County, Volume 1* (Seattle: Pioneer Historical Publishing Company, 1926), p. 582; Hon. C.H. Hanford, editor, *Seattle and Environs 1852-1924, Volume 1* (Seattle: Pioneer Historical Publishing Company, 1924) pp. 573-574.

secretary of the chamber of commerce and county auditor. His main profession was selling real estate, and through it he knew the city and outlying country intimately, having amassed several town site lots in addition to waterfront and timber west of Port Angeles. But if he had had a secret weapon, it might have been his penchant for orchestrating publicity campaigns. Early on he had honed his skills as assistant manager, city editor and treasurer for the town's newspapers. And as a former newspaper man with connections he regularly solicited the peninsula and Seattle press to propagandize his work. During the Elwha construction, for example, he persuaded the Blethen family, owner of the Times Publishing Company of Seattle, to give the power company free publicity in articles rather than charge for advertising. Likewise, he made sure the *Seattle Post-Intelligencer* and north peninsula papers assigned correspondents to promote the project.[300]

So it was perhaps no surprise that Aldwell successfully discredited the Little River project and won the city's franchise. His argument was simple and yet forceful: his company would produce the most power—more power, in fact, than the peninsula needed. No one would ever run out again. According to the *Olympic-Leader* there was really no other choice for the city council to make. "The Seattle promoters can do little more than light the city," the editors criticized. But "the Aldwell & Glines power means industrial development and general advancement."[301] In Port Angeles as in so many early twentieth century cities, the strong desire for electrification had galvanized civic priority.

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[300] Aldwell, T.T., 1950, pp. 89-90; Roth, L.R., 1926, p. 582.; Hanford, C.H., 1924, pp. 573-574; *The Seattle Daily Times*, November 15, 1925.

[301] *Olympic Leader*, March 3, 1910 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA); *Tribune-Times*, April 8, 1910 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA).

Chapter 14 The Pulp Economy

In February 1914 the Olympic Power Company formally celebrated the completion of its Elwha power project. The guest list at the Port Angeles Olympic Hotel's banquet included several western Washington leaders: Governor Ernest Lister, state legislators, the Seattle Chamber of Commerce, timber and railroad executives and newspaper editors. It was a long journey to a remote corner of the state for an evening's occasion—especially for such busy men. But Lister was no stranger to these events. Part of his job was to promote the growth of the developing region. In 1915 a contemporary had described the governor's schedule of site visits as a "never-ending strain," a series of nonstop functions across the expansive region.[302]

Likely there was something else driving this prominent group of politicians and businessmen to travel far out onto the north peninsula in the heart of winter. Yes, they recognized and applauded the power company. In addition, they were paying tribute to a vitally important feat. They believed that the work of men like Tom Aldwell was indispensable, essential to the region's survival. As the local paper reported, the power company was "a life-blood factor in the developing industrial life" of the area economy. And yet it was more. The hydroelectric dam, Lister praised, was not only an accomplishment to be proud of, but it was also "something to be emulated by the rest of the state."[303] Indeed, a few years later in his annual message to the state legislature the

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[302] Edmond S. Meany, *Governors of Washington, Territorial and State* (Seattle: Department of Printing, University of Washington, 1915) pp. 113-114. www.sos.wa.gov/history/publications_detail.aspx?p=30 [viewed December 16, 2009].

[303] *Tribune-Times*, February 13, 1914 (Aldwell Scrapbook, Special Collections, University of Washington Libraries, Seattle, WA); *Tribune-Times*, 1914 (Aldwell Scrapbook, Special Collections, University of Washington Libraries, Seattle, WA).

governor called for further hydroelectric power development. "We have no more valuable asset in the State than its water power," he said. "Let us assist in bringing it into service."[304]

While Aldwell and Glines were toasting the project's completion their bottom line augured little cheer. "I had to appear happy" at the celebration, Aldwell later wrote, "while I alone knew that our Company was in very serious financial difficulties." Total costs had risen to over $1.7 million.[305] The company was in debt to creditors and bondholders but without sufficient contracts to pay the bills.[306] They needed to sell the dam to a user that required a lot of electricity. One idea was to unload the power plant at slightly less than development costs to the City of Seattle, which owned Cascades hydroelectric projects that could not keep up with demand. This would have been an easy way out, but the sale fell through.[307]

Another aim was to market the north peninsula as an opportunity for private enterprise. Implicit in this thinking was what was good for the Olympic Power Company was good for the region. This had long been Aldwell's vision: to unite industrial manufacturing and civic advancement. Ever since the first stages of dam construction he and city boosters had been busy promoting the peninsula's untapped abundant natural resource base by equating it with prosperity. In early 1911 they organized a media fanfare

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[304] *State of Washington. Fourth Message of Governor Ernest Lister to the State Legislature. Sixteenth Session. 1919* (Olympia, WA: Frank M. Lamborn Public Printer, 1919), p. 43. http://books.google.com/ [viewed December 16, 2009].

[305] Aldwell, T.T., 1950, pp. 110, 117-118, quote on p. 118.

[306] *1890-1949, More Power to You... Port Angeles and Clallam County* (Port Angeles Division, Crown Zellerbach Corporation, no date); Aldwell, T.T., 1950, pp. 109-118; *Tribune-Times*, 1914.

[307] *The Olympic-Leader*, July 9, 1915; Aldwell, T.T., 1950, pp. 118-119.

using local and Seattle papers to proclaim a "campaign of development." The venture hosted a gathering of officials from all over western Washington to show what the Port Angeles locality could offer. The centerpiece was the Elwha River project that would "prove a boon to that whole section of the country," the *Tribune-Times* wrote, and which was "expected to mark the beginning of a new order of things," *The Seattle Times* reported. As the paper made clear, Port Angeles leaders wanted investors to know they were ready and willing.

> The long-awaited opening of the resources of the country tributary to Port Angeles is now in sight, it is believed, owing to the large undertakings of capitalists who have gone into Clallam County and ascertained for themselves the dormant opportunities for exploitation and development in a country having vast timber, agricultural, mining and other sources of wealth.[308]

By 1915, Aldwell had no choice but to start another promotional blitz. Straddled with an expensive dam no one wanted to buy and not enough contracts to pay off debt, Peabody, Houghteling reorganized the company and arranged for the Northwestern Power and Manufacturing Company to purchase its assets.[309] They had sought counsel about what to do and a British Columbian cohort suggested they turn Port Angeles into a pulp and paper works to develop revenue.[310] Such advice was by no means novel to Aldwell. His original inspiration to dam the Elwha came from an Oregon pulp and paper executive 20 years earlier. He and fellow businessmen had always hoped the Elwha

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[308] *Tribune-Times*, September 8, 1911; *The Seattle Times*, March 12, 1911; *Seattle Post-Intelligencer*, March 19, 1911; *The Seattle Sunday Times*, March 12, 1911; *Seattle Post-Intelligencer*, no date (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA).

[309] *Olympic-Leader*, July 9, 1915; Aldwell, T.T., 1950, pp. 118-119.

[310] Western Canada Power Company to G.A. Glines, December 23, 1914 (Thomas T. Aldwell Papers. Box 1, Folder 2-6. University of Washington Libraries, Seattle, WA).

hydro project could form the economic backbone of Port Angeles, and that they would get wealthy from it. But now that the dam was finished the fate of the company and the city was sealed—it seemed their only way forward was to work together.

If Aldwell and the city elites had a clear-cut survival strategy, it could have been packed into twin goals: get industry to come and make sure it stayed. The means to this end was sort of like preparing for a very long dance. Port Angeles first had to figure out how to attract partners and then make sure it could keep a sustained tempo with the right footwork. Pulp and paper facilities were not cheap dates. They wanted generous amounts of power, fresh water and wood. These along with chemicals were the raw materials they consumed. Also necessary was a place to throw away their leftovers—prodigious volumes of contaminated water, air and solids. Shipping or rail infrastructure was required to get the finished product to distant markets. They demanded choice waterfront property, favorable lease terms and direct right of ways for transport and water lines. It was up to Port Angeles to convince would-be manufacturers their conditions could be met. To make this happen, civic leaders embedded industrial views into community decision making. Because industry was considered essential to the community's existence, a total commitment to industry was needed.

Over the next quarter century Aldwell and Peabody, Houghteling's Edward M. Mills set out to bring manufacturers to Port Angeles by marketing low-cost power and water from the Elwha and cut-rate land and ready infrastructure along the harbor. A large pulp mill was the desired prize but any timber products industry was welcome. Mills sounded out West Coast magnates while Aldwell mobilized local business and municipal leaders. The duo was relentless, often doing whatever it took to get results. They believed

their success would provide steady customers for the power dam, guarantee jobs for Port Angeles and help bring about economic and social wellbeing for the north Peninsula.

Aldwell devoted much of his time to orchestrating city provisions for property and infrastructure, along with hand-out packages including financing and access to raw material. His first string of efforts succeeded. By 1914 the city's chamber of commerce had raised $70,000 to purchase 30 acres for the Puget Sound Mills and Timber Company's sawmill operation, later called the "Big Mill." Peabody, Houghteling even financed the company's construction. It was a major consumer of Elwha power. Soon after, Port Angeles secured a 99-year lease from the federal government to use Ediz Hook. With so much valuable harbor front now open, the city started marketing the property aggressively as an industrial district, offering "manufacturing sites in this area virtually free."[311]

There were also false starts. In 1916 a Canadian company agreed to locate a $1.8 million dollar sulphite pulp and paper facility at Port Angeles and purchase the Northwestern Power and Manufacturing Company's Elwha power plant. It seemed Aldwell and Peabody, Houghteling had been rescued. The city had offered ten acres that included the lagoon and base of Ediz Hook, access to Elwha River water and a $15,000 donation by the chamber of commerce toward purchase of 70 additional acres. Aldwell's real estate office secured options to 260 lots and blocks comprising this land, enabling city council to vacate occupants of the site.[312] After the Canadians had abandoned their

[311] Aldwell, T.T., 1950, pp. 125-127; Seattle, Port Angeles & Western Railway Company, "A New Empire," (Seattle: Izzard Company, December 1915); *Port Angeles Evening News*, June 24, 1929.

[312] *Port Angeles Evening News*, December 11, 1916; December 12, 1916; Aldwell, T.T., 1950, pp. 125-127; Address made at Crown Zellerbach dinner, November 6, 1940 (Thomas T. Aldwell Papers. Box 3, Folder 3-20. University of Washington Libraries, Seattle, WA).

plans because of financial problems, Aldwell quickly lined up the Crescent Boxboard Company to build a plant on the eastern part of the industrial lot, in 1918, near the center of the Port Angeles waterfront. And farther east, on the other end of the harbor at Ennis Creek, Aldwell helped to persuade another company to locate a saw mill for warplane spruce lumber by having the city's chamber of commerce purchase and donate the site.[313]

Although small in scale, these early efforts to draw manufacturers to Port Angeles were nonetheless important accomplishments because they solidified the city's hold on properties along the waterfront. This made it possible for community leaders to control how these areas were used—to prioritize the location of manufacturing operations in the downtown area—for many decades to come. More immediately, it enabled the city to partner with perhaps the most important family in Port Angeles history.

In 1919 Aldwell's collaborator, Edward Mills, arranged for the Zellerbach Corporation of San Francisco to visit the north Peninsula. The Zellerbach family owned a paper company and was exploring opportunities to create a large manufacturing center in the Pacific Northwest. They needed to locate in an untapped area that could offer great quantities of "power, wood, and water." Aldwell, fittingly, handled the courtship duties. "It was my job," he wrote, "to convince them that it would be to their interest to build a newsprint mill here and purchase the Whalen site, their machinery and the power plant." First he showed them the site, which comprised part of the larger tract abandoned by the Canadians a few years earlier. It was ideally situated at the base of Ediz Hook, accessing rail and shipping points as well as offering pollution discharge into the lagoon, harbor and Strait of Juan de Fuca. Next Aldwell drove the Zellerbachs to the Elwha River,

[313] Aldwell, T.T., 1950, pp. 131-137.

touring the dam and power plant along with other canyon locations that could be developed. Finally he arranged for a U.S. Forest Service supervisor "to show them personally that there was more timber suitable for pulp and paper making tributary to Port Angeles than to any other place in America." It was a perfect match. In December 1921, the Zellerbach's newly formed Washington Pulp and Paper Corporation produced its first rolls of Port Angeles newsprint, with Mills as president. Aldwell was finally free of the Elwha Dam and Port Angeles was poised to become a pulp and paper center.[314]

The 1920s saw rapid industrial growth in the city—the arrival of new manufacturers and expansion of Washington Pulp and Paper. And with growth industry would pressure Port Angeles to meet its needs. The harbor works was deficient, for starters, and businessmen like Aldwell knew it had to be fixed. No sooner had Aldwell finished his match with the Elwha did he start a new one. He was elected Port Commissioner in 1925 by promising to modernize outdated facilities he believed threatened the city's economic progress. "Now we have the timber and it is up to us right now," he had argued to the rotary club in 1923 during a debate about the port's infrastructure, "to decide whether this timber shall be manufactured in this County and develop a prosperous community or logged and milled and maintain Aberdeen, Hoquiam, Everett, Bellingham, and other places."[315] Under Aldwell's eight years of leadership Port Angeles contoured its harbor with an 82,500 square foot dock with handling equipment, tidewaters lined with log booms, and acres of filled sites. He was relentless, overseeing "every bucketful of fill, every bit of riprapping along the water front, every industry that

[314] *1890-1949, More Power to You... Port Angeles and Clallam County* (Port Angeles Division, Crown Zellerbach Corporation, no date); Aldwell, T.T., 1950, pp. 118-119, 125, 129-130, quotes on p. 129.

[315] Aldwell, T.T., 1950, p. 143.

located."[316]

Another need was power—more electricity to supply Washington Pulp and Paper's expanding pulp operations and satisfy a growing customer base across the north Peninsula. The affiliated Northwestern Power and Light Company added two generators to the Elwha Dam power house and in 1925 began construction of a second dam on the Elwha River. The site was in Glines Canyon, formerly named Ware Canyon, which Aldwell and George Glines had bought and later sold to the Olympic Power Company in 1913. Thebo, Starr and Anderton, Inc. built the Glines Dam and powerhouse in a narrow gorge 7.5 miles upstream of the first dam, about 13 miles from the mouth of the Elwha. Unlike the lower dam, construction and engineering were sound and on schedule. In 1927 a concrete arch measuring 270 feet at the crest and over 200 feet high spanned the canyon alongside a power house generating 17,500 horsepower under a 180 foot head. [317]

There was one additional demand. Industry needed more water, and getting it required no small undertaking on the part of city officials. An enormous amount of fresh

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[316] Aldwell, T.T., 1950, pp. 142-145.

[317] *1890-1949, More Power to You... Port Angeles and Clallam County* (Port Angeles Division, Crown Zellerbach Corporation, no date); Philip H. Dater, *Engineer's Report on Application No. 588 for Preliminary Permit Elwha River, Clallam County, Washington* (U.S. Forest Service, District 6., 1925), pp. 9-10, 12, 14 (Glines File, Olympic National Park, Port Angeles, WA); Lauridsen, G.M. and Smith, A.A., 1937, p. 208; *Port Angeles Evening News*, March 1, 1929; Wessen, G.C. and Welch, J.M., in *Draft Request for Additional Information of May 28, 1987, Volume 2 of 4*, 1988, pp. X-46, X-53; *Six month report filed pursuant to the Federal Energy Regulatory Commission request for additional information, May 28, 1987-Elwha-Glines project* (Camas, OR: Crown Zellerbach Corporation 1987); Federal Energy Regulatory Commission, *Water Resources Appraisal for Hydroelectric Licensing: Elwha River Basin, Washington* (Office of Electric Power Regulation, San Francisco Regional Office, 1981), p. 25; Federal Energy Regulatory Commission, *Draft Staff Report: Glines Canyon (FERC No. 588) and Elwha (FERC No. 2683) Hydroelectric Projects, Washington, Volumes 1 and 2* (Washington, D.C.: Office of Hydropower Licensing, 1993), p. 2-1; Orville W. Campbell, personal communication, unrecorded, May 9, 1994; For a comprehensive review of hydroelectric dam construction on the Elwha River see David Louter, "Elwha River Hydroelectric System," in *Historic American Engineering Record, National Park Service (HAER No. WA-130)* (Washington, D.C.: U.S. Department of the Interior, National Park Service, 1995). A third power plant was anticipated at Rica Canyon, purchased from Aldwell's brother, but was never developed.

water, clean and free of sediment, was a necessary raw material for pulp and paper making. In 1925 the Ninemire Mill, operating on Ediz Hook, had sounded the alarm. "[I]f Port Angeles expected many more sawmills or other plants on the Hook a large water main must be laid and fresh water supplied," the plant manager told the *Evening News*. In 1927 the issue came up again when the city's mayor acknowledged the problem and suggested diverting water from the Elwha River.[318] Finally, the following year, the problem came to a head when the Zellerbach Corporation offered to build a $4 million pulp mill and timber operation in Port Angeles if the city built a ten-mile water line from the harbor to the Elwha. Zellerbach had recently merged with Crown Willamette Paper Company and directed Mills to find a suitable location for a new pulp facility. Crown Zellerbach's affiliate, the newly created Olympic Forest Products Company, would employ 900 persons and locate at the Ennis Creek site on the Port Angeles waterfront with the condition the city furnish 20 million gallons of water daily, the costs to be amortized by the company.[319]

In order to finance the water line Port Angeles business leaders had to convince the community to pass a bond vote. Leaving nothing to chance they prearranged most of the tasks to eliminate any barriers. Before the newspapers even reported the Zellerbach proposal city engineers and attorneys had started to design a water diversion dam and pipeline, secure right-of-way easements over Elwha valley farms and schedule an election to be held on a $500,000 water bond issue. It was as if the project were preordained. The local paper headlined the news in late June, 1929: "Olympic Products

[318] *Port Angeles Evening News*, June 26, 1925; March 18, 1927; August 16, 1927.

[319] Aldwell, T.T., 1950, pp. 137-138; *Port Angeles Evening News*, June 24, 1929.

Co. formed to start first units of big project on Olympic Peninsula, 'Directors favor Port Angeles if water bond issue carries,' E.M. Mills long distances Evening News editor from San Francisco."[320] A vote was scheduled for July 30th.

Over the next few weeks a city-wide public relations campaign mobilized to approve the bond. It was unlike anything ever seen in Port Angeles. The papers featured daily updates and advertisements as community businessmen worked together to build civic conformity in the name of their brand of progress. Aldwell had honed this tactic to great success 15 years earlier when building the Elwha Dam. Then, as now, the message was similar: Citizens of Port Angeles, you either support bringing industry to the city or you oppose the community's right to prosperity. Basically, they were saying you are either with us or against us.

In 1910, for example, when Aldwell launched the Olympic Power Company, the nearby *Morning Leader* editorialized:

> Any man in Port Townsend who knowingly throws as much as a straw in the way of the complete success of the Olympic Power and Development company should receive the unqualified censure of a united community, and should be consigned to the catalogue of undesirables of which this city, in company with every other community in the state of Washington, already has too many.[321]

And in 1913, when the dam was completed, a local paper exclaimed, "That everybody in Port Angeles rejoices with the Olympic Power Company in its success in damming the Elwha is beyond question."[322] Aldwell and Glines "have certainly earned

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[320] *Port Angeles Evening News*, June 24, 1929.

[321] *Morning Leader*, August 31, 1910 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA).

[322] *The Bee*, November 14, 1913 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA).

the hearty co-operation and support of all our citizens and everyone interested in the upbuilding of the peninsula," the *Olympic Leader* wrote.[323]

The 1929 campaign actually rekindled the earlier one by combining them into one message. First hydro power and now a water supply allowed economic expansion to the benefit of all. "Since 1912 the Elwha River has been closely associated with the industrial development of Port Angeles," a water-bond homage explained beneath a picture of the river in the *Evening News*. "This is essentially an industrial center and the town depends not only for its present but its future upon the developments of industry," the city's mayor argued in a call for pipeline votes.[324]

Bond fever intensified as the voting day approached:

June 25, 1929: "It is to be hoped that every business house in the city swings into the idea and evolves some window calling attention to the water bonds election July 30th."

July 18, 1929: "[I]t is planned to divide Port Angeles into districts for election day, and have a flying squadron of one hundred automobiles carry every registered voter to the polls. The mildly sick will be transported to the polls in ambulances if necessary."

July 25, 1929: "At least 1,409 Port Angeles people must forego their fishing and vacation trips for at least one day, Tuesday, July 30th, to furnish the legal number of votes necessary to carry the bond election."

July 29, 1929: "Are you taking part in keeping the Ship of Prosperity on schedule? The News believes you are. Walk up the gangplank to the voting booth and

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[323] *The Olympic-Leader*, May 16, 1913.

[324] *Port Angeles Evening News*, December 2, 1929; July 29, 1929.

give the election officials your ticket. It will entitle you to a ride on the Prosperity Ship, whether you are banker or logger, baker or boom-man, superintendent or mechanic."[325]

Most people likely knew the water line was foregone. City commissioners and legal staff had removed logistical obstacles before the election. Engineers had already chosen the diversion dam site, drilled test holes and surveyed a route through 1.5 miles of tunnel, across twelve farms, past the Ocean View cemetery, along the bluff tidelands and into town. Eleven individuals voted against the bond and 2,819 in favor. "[T]he black colors of grim defeat and chagrin hung limp at the staff in front of a punitive army of eleven, who were submerged under a tidal wave of civic progress," the *Evening News* observed.[326]

By October the Olympic Forest Products Company and Zellerbach mills had persuaded the city to hold a second vote to provide for a bond issue of $800,000 to deliver 45 million gallons of water daily. The company intended to secure additional water to supply the Washington Pulp and Paper and Fibreboard Products plants, the later acquired through a merger with Crescent Boxboard's successor, Paraffine Companies, Inc., in 1928. "[T]he contracts to be executed means the three industries of the Zellerbachs and allied interests will be served from the new Elwha plant, which leaves them ample room for expansion," the *Evening News* explained. On December 3, the bond passed by a wide margin, prompting Washington Pulp and Paper Corporation manager Norman B. Gibbs to state: "Our companies are planning big things for Port Angeles that will be made possible by this increased amount of water…. this plant with others just

[325] *Port Angeles Evening News*, June 25, 1929; July 18, 1929; July 25, 1929; July 26, 1929; July 29, 1929.

[326] *Port Angeles Evening News*, June 25, 1929; July 23, 1929; July 31, 1929; August 1, 1929; October 30, 1929; November 9, 1929; December 4, 1929; December 27, 1929.

over the horizon will make Port Angeles one of the greatest pulp and paper centers of the west."[327] The state granted the city a permit to feed up to 150 cubic feet of water per second to the three mills from a diversion works in the lower Elwha, carrying 97.2 million gallons per day. Good for 30 years at a fixed annual cost of $59,000, the contract affirmed the city's reputation as a viable location for forest products industry.[328]

With ample electricity and water the Olympic Forest Products Company was up and running, promising at least 450 jobs in the mill and hundreds more cutting timber in peninsula forests. Construction crews dredged 100,000 yards of the bay, erected a 220,000 square yard wharf and added three boilers to supplement power production, a chipping plant, bleached plant, digesters and wood and paper warehouses. With Mills as president the company started operations in June 1930, cutting lumber and producing sulphite pulp for paper manufacture. In 1932 the facility began producing dissolving-grade pulp, a purified cellulose used elsewhere to make rayon, cellophane and certain plastics. It was positioned to take advantage of recent discoveries that used chemicals to break apart hemlock wood fibers to make cellulose. Long ignored by the wood products industry, the hemlock forests of the Olympic Peninsula were now an important species. Expanding the site in 1936 to increase pulp production, a year later the Olympic Forest Products Company merged with Rainier Pulp and Paper Company and Grays Harbor Pulp and Paper Company to form Rayonier Incorporated, a trade name used to designate

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[327] *Port Angeles Evening News*, June 25, 1929; July 23, 1929; July 31, 1929; October 30, 1929; November 9, 1929; December 4, 1929; December 27, 1929; November 28, 1953.

[328] Charles W. Maib, *A Historical Note on the Elwha River, Its Power Development and Its Industrial Diversion* (Olympia, WA: Washington (State) Department of Fisheries, Stream Improvement Division, 1952a), p. 27.

its rayon type pulp.[329]

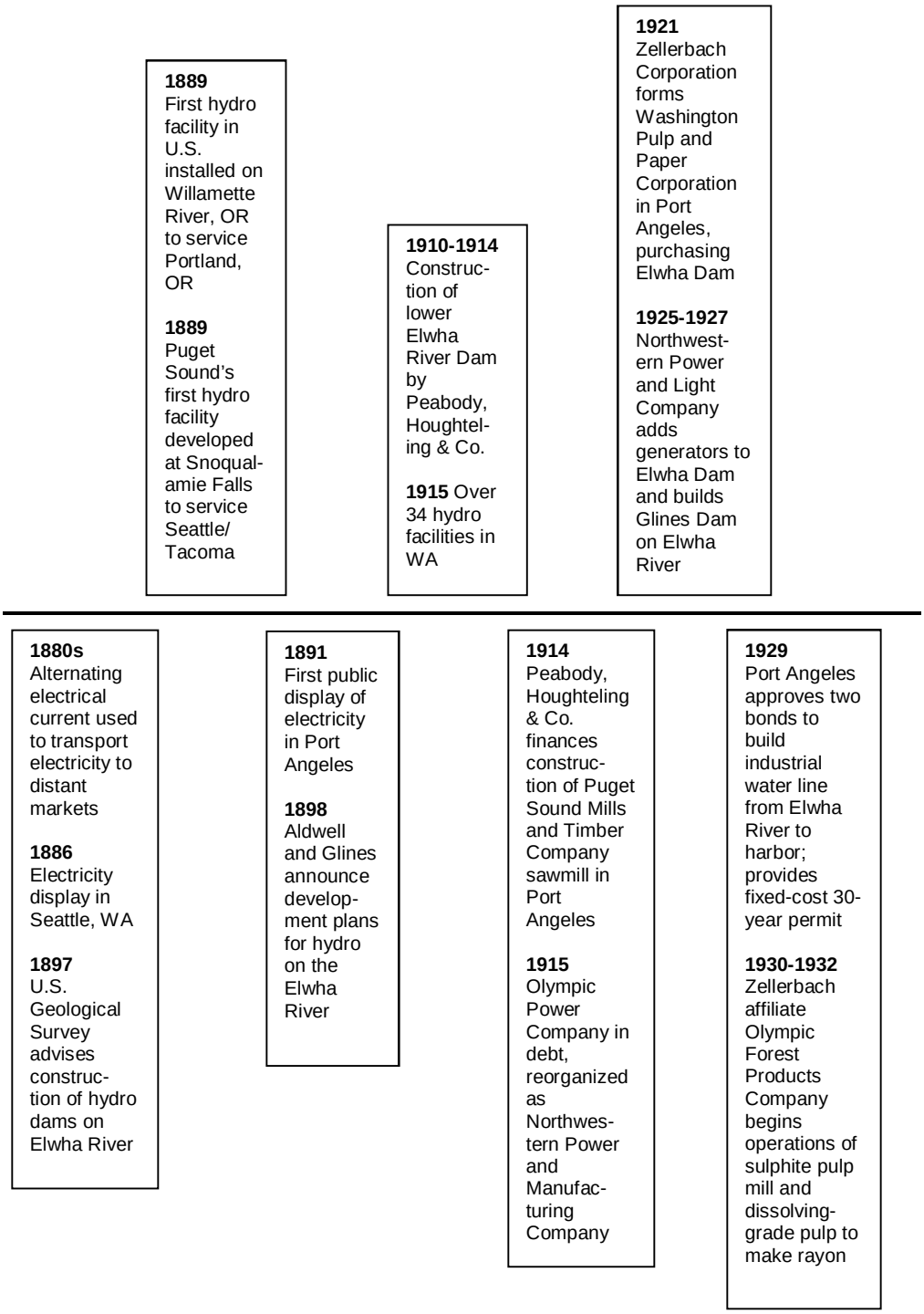
For decades to come Zellerbach subsidiaries formed the core of the city's economy. As predicted by Aldwell in 1913, the availability of electricity "in plenty and to spare" coupled with the community's willingness to provide manufacturers with "power and low leases for water and locations on the spit" brought prosperity.[330] In return for access to the north Peninsula's natural resource base Crown Zellerbach, Fibreboard and Rayonier employed a large force working around-the-clock shifts seven days per week.[331] Railroad spurs, log booms, wharves, warehouses, factory buildings and smokestacks dominated the waterfront. As shown in Figure 14.1, the Elwha River had made it possible by serving as an electric and water utility, spinning turbines and washing pulp. Thomas Aldwell played no small part in this feat. He had created a pulp economy.

[329] *Port Angeles Evening News*, August 31, 1929; November 28, 1953.

[330] Aldwell, T.T., 1950, p. 77; Clipping, unidentified source, December 6, 1913 (Thomas T. Aldwell Papers. University of Washington Libraries, Seattle, WA).

[331] *Port Angeles Evening News*, July 16, 1929; November 28, 1953.

Figure 14.1 Timeline of events relevant to industrial development in Port Angeles, WA, 1880s-1930s



Chapter 15 Equity and Risk

During the summer of 1866 Caroline Leighton lived in a lonely place. The wife of a federal courier, her lot was to be stationed at a lighthouse far out on the tip of Ediz Hook. "When we feel the need for company," she wrote in her journal, "we look across to the village of Port Angeles and the Indian ranch." Standing on the long sandy arm forming the harbor, Leighton's view of Port Angeles bay was in some respects timeless, a panorama that even today remains unchanged. Looking south over town, one can see the north slopes of the Olympic range rise abruptly above heavily forested hills. To the west and east, coastal bluffs recede into the Strait of Juan de Fuca. On the north horizon lie Vancouver Island and the Cascade Range.[332]

Likely the view of the waterfront Klallam communities had changed little over the centuries up until Leighton's time. But what may have seemed everlasting was changing before her eyes. It was the beginning of an abrupt interface. The first wave of newcomers had arrived. Contrasting societies—one very old, the other just forming—now shared this small stretch of shoreline on the north Olympic Peninsula. From her remote perch on the water, what struck Leighton was how different each group was. Heavy maple groves sheltered the Klallam lodges but the pioneer villagers had cut down all their trees. "Living so much out of doors as they do and in open lodges," she wrote of the Natives, "their little fires are often seen, giving their ranch a hospitable look, and making the appearance of the village very uninviting in comparison."[333]

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[332] Caroline C. Leighton, *Life At Puget Sound* (Fairfield, WA: Ye Galleon Press, 1980[1883]), p. 61.

[333] Leighton, C.C., 1980, p. 61.

By the time Aldwell arrived to Port Angeles nearly 25 years later, the view from Ediz Hook had transformed considerably. Leighton was but a memory, and so too had Klallam presence diminished. The Native groups held their last Port Angeles potlatch by 1890, gathering at a large long house near the mouth of Ennis Creek. On this occasion the visiting canoes from numerous villages lined the harbor for nearly a mile.[334] A climax social event—likely practiced annually for countless generations on that same beach—would be no more. During Aldwell's lifetime a manufacturing infrastructure came to dominate the shoreline, humming day and night, guided by the hands of hundreds of workers. By 1920, even the old pioneers did not recognize the landscape. Describing the Ennis Creek coastal area as "strangely altered" compared to her childhood memories of Native dwellings, Mary Gay Morse said that "the hand of enterprise" had made even the beach "strange and alien like."[335]

Aldwell's legacy defined the Port Angeles waterfront for generations to come. "At dusk, the outlines of industry along the sandspit are etched sharply against the sky," a historian described in 1971, some 15 years after his death.

> Tall smokestacks at Crown Zellerbach paper mill stand as sentinels of the night. Masts of massive paperloading boats docked at the mill are silhouetted in the moonlight. Night lights from the city of Port Angeles across the inner bay twinkle and sparkle like a Christmas wreath encircling the base of the purple-shadowed Olympic Mountain Range.[336]

The Port Angeles Thomas Aldwell had known welcomed risk takers—those who took chances, who faced hazard and uncertainty to build wealth. His community believed

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[334] *The Daily News*, November 8, 1981; *Port Angeles Evening News*, November 28, 1953.

[335] Quoted in Boyd, C., 2001, p. 217.

[336] Russell, J., 1971, p. 186.

that the private gain of successful businessmen served its economic interests. City leaders and company executives had promised "civic progress" in the form of jobs, well-being and security. The serious risk takers, men like Aldwell and Glines, promised all of this by turning over the Elwha River, peninsula forests and Port Angeles waterfront to industry. They had even secured large personal mortgages on their properties to help finance their power company. In turn, many thought these men deserved a rich return on their efforts. They were the drivers of a type of prosperity that reduced the risk that Port Angeles would face economic and social extinction.

But there were downsides. Some sacrificed more than others, and not everyone participated in the city's good fortune. The Klallam faced disproportionate impacts from industrial development and, moreover, shared little of the gains. Already a marginalized group on the north Peninsula, they confronted additional threats to their existence, in some respects more intense than what they had already experienced. Important Native areas were blasted away, buried under water, bulldozed over and built upon, and there was little they could do about it. The pulp economy left Native peoples by the wayside.

Almost from the start the north Peninsula settlers had pushed the Klallam around, shoving them into areas no one wanted. The first wave of settlers occupied choice sites where Natives already lived, at times using threat or display of force to remove them—including fire, guns and razing. While some managed to navigate the property laws and keep or reclaim their lands, many others subsisted on the fringes. But when heavy industry started to develop the coastline of Port Angeles, they had to get out of the way all over again. The mills secured zoning rights for desirable parcels, assisted by Port Angeles officials, brushing aside any occupants. The 1914 project to build the Puget

Sound Mills and Timber Company just east of the base of the Ediz Hook caused some inhabitants to move onto the spit.[337] The 1920 construction of the Washington Pulp and Paper Mill at the base of the Hook, on land the city leased from the federal government, led to the displacement of 15 families.[338] On the other side of the harbor, in 1929 city commissioners ordered the streets and alleys in the Ennis Creek area vacated for the new Olympic Forest Products Company.[339] Following the path of least resistance, the Klallam found unclaimed spots on Ediz Hook or on the shoreline—unprotected areas that heavy storms and winds frequently buffeted. It was far from ideal, but they had no choice.[340]

Federal agents who visited Port Angeles during the Great Depression described how non-Indian settlement and competing use of resources had created acute hardship for many Native peoples on the north Peninsula. "They were reduced to the status of squatters on their own ancestral home sites," Homer L. Morrison later noted after surveying the lower Elwha River. Despite the provision of some relief funds by the county and city hospital, many Klallam were tubercular and living "in the slums of the cities and towns along the water front, or in the poorest and most remote country districts," working "odd jobs" on farms, logging camps and saw mills, but only when whites did not take the work first.[341]

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[337] Boyd, C., 2001, p. 303; Aldwell, T.T., 1950, p. 125.

[338] Boyd, C., 2001, pp. 305-306; Morrison, H.L., 1939, pp. 15-17.

[339] *Port Angeles Evening News,* March 1, March 9, 1929; *Port Angeles Evening News,* October 4, November 23; December 11, 1929; Lauridsen, G.M. and Smith, A.A., 1937, p. 208.

[340] Boyd, C., 2001, pp. 233-234, 304-306, 320; Office of Indian Affairs, 1975, p. 142; Morrison, H.L., 1939, pp. 17, 19.

[341] Morrison, H.L., 1939, pp. 4-5, 17-19 (George G. Wrenn, December 18, 1935).

The culmination of events had led to a strange outcome—a diverse village formed on Ediz Hook comprised of displaced Native peoples from not only the north Peninsula, but also southern Vancouver Island and Puget Sound. In her study of the Elwha Klallam, anthropologist Colleen Boyd described how a "Diaspora of sorts occurred" as more families took up residence on the outer spit. "They were in many respects like refugees," she concluded, "whereby harsh economic and social circumstances created new communities from old parts."[342]

The area, also home to fishermen, smugglers and mill workers, represented something of a visual social blemish for the pulp economy. Customs agents, immigration officials and the police often circled the area to stem its black markets.[343] The federal agents who had visited the Elwha valley during the Great Depression had described its homes as "dilapidated make-shift shacks."[344] In 1929, on the outer spit, the U.S. Navy burned 36 homes located on its property, including those of five Native families.[345] "Just as the pioneers clearing lands in the forest drove the Indians to seek other hunting grounds, so it is the progress of Port Angeles driving the squatters from the government reservation on Ediz Hook," a *Port Angeles Evening News* had editorialized during the construction of the pulp mills.[346] Ediz Hook had become a gathering place of last resort for the casualties of progress.

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[342] Boyd, C., 2001, p. 296.

[343] Boyd, C., 2001, p. 298.

[344] Morrison, H.L., 1939, pp. 17-18 (George G. Wrenn, December 18, 1935).

[345] *Port Angeles Evening News*, September 17, 1929.

[346] *Port Angeles Evening News*, January 30, 1920 (cited in Boyd, 2001, pp. 303-304).

The industrial developers also did away with Native locations of cultural significance and economic activity, showing little regard for important spiritual places and areas used for commerce. On the Elwha River, the Klallam had long made use of accustomed fishing grounds and traditional spots. Up until the time of dam construction they may have had as many as 12 settlements, religious sites and landmarks.[347] Some of these areas were completely destroyed or altered. The reservoir behind the lower dam covered over a small permanent village that Native fishers heavily used as a seasonal harvesting location during salmon runs.[348] Below the dam a Klallam creation site was located, a sacred place where Klallam believed the human race was formed and where they went to get information about their future life. According to an 1864 ethnographer's report, updated sometime after the dam was completed, there were pits and hollows in which "the creator was shaping the first human beings" out of dirt, and where people could go "to get information about their future life."[349] The new Port Angeles accorded no recognition of the Native worldview that had shaped the region for centuries. The rich physical landscape, one endowed with social, economic and cultural worth, was obliterated.

Nevertheless, important evidence remained. Industrial development could move everyone out and rebuild on top of the shoreline, but in so doing it disturbed the burial grounds lying just beneath. Every so often pictures of the remains appeared in the local

[347] Wessen, G.C. and Welch, J.M., in *Draft Request for Additional Information of May 28, 1987, Volume 2 of 4*, 1988, p. X-23.

[348] Office of Indian Affairs, 1975, pp. 141-142.

[349] Lane and Lane Associates, *The Elwha River and Indian Fisheries* (Prepared for the Bureau of Indian Affairs, 1981), p. 111; Waterman, T.T., cited in Barbara S. Lane, *Identity, Treaty Status and Fisheries of the Lower Elwha Tribal Community* (Prepared for the Department of Interior and the Lower Elwha Tribal Community, 1975), pp. 23, 29-30.

papers, mostly as a bygone curiosity. A 1941 *Evening News* historical profile of the Crown Zellerbach mill included an inset "photo of some of the old Indian bones uncovered in excavation for the project."[350] Several years later, the paper's 1953 centennial edition remembered the Klallam had buried their dead on a flat near Ennis Creek and at the base of the spit: "Milwaukee Railroad tracks now run through the old burial ground" on the eastern site, the paper wrote, and the mill was built on top of the western graves.[351] These were by no means trivial matters, and future generations would revisit them.[352]

And so the burden of risk fell doubly hard on the have-nots of the north Peninsula. First, industrial development heavily damaged the Native society. Their economic and cultural life support systems—the rivers, forests and habitations—were displaced and spoiled. Second, they did not share in the gains of Aldwell's community. They realized

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[350] *Port Angeles Evening News,* April 1941; *The Olympic-Tribune*, December 19, 1924.

[351] *Port Angeles Evening News*, November 28, 1953.

[352] See, for example, accounts of new manufacturing and development activity on the city's waterfront during the 2000s: *Peninsula Daily News*, June 28, 2011. http://www.peninsuladailynews.com/apps/pbcs.dll/article?AID=2011306299984 [viewed February 1, 2013]; Washington Department of Ecology and Lower Elwha Klallam Tribe, *Former Rayonier Mill Port Angeles Responsiveness Summary for Agreed Order and Management Plans for the Remedial Investigation –Feasibility Study of the Uplands Environment* (March 2004); U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, *Public Health Assessment for Rayonier Incorporated, Port Angeles Mill (a/k/a Rayonier Mill) Port Angeles, Clallam County, Washington. EPA Facility ID: WAD000490169, May 13, 2004*, 2004. http://www.atsdr.cdc.gov/HAC/pha/RayonierInc_Final%20PHA_05-13-2004/RayonierInc_Final%20PHA_05-13-2004.pdf [viewed February 21, 2012 and February 1, 2013]; *Peninsula Daily News*, May 5, 2009. http://www.peninsuladailynews.com/article/20090506/news/305069991 [viewed February 1, 2013]; *Peninsula Daily News*, August 29, 2009. http://www.peninsuladailynews.com/article/20090830/news/308309990 [viewed February 1, 2013]; Lynda V. Mapes, *Breaking Ground. The Lower Elwha Klallam Tribe and the Unearthing of Tse-whit-zen Village* (Seattle: University of Washington Press, 2009); Boyd, C.E., "'You See Your Culture Coming Out of the Ground Like a Power': uncanny narratives in time and space on the Northwest Coast," *Ethnohistory* 56,4(Fall 2009):699-731.

few if any of the benefits or prosperity that was created. Whatever equity might have existed between these two societies was lost when the pulp economy was built.

Anthropologists Mary Douglas and Aaron Wildavsky have described key elements of this process. The emergence of new resources has the potential to shift wealth and power as differing groups compete over how best to use these materials. In so doing, they form their own "vision of the good society," or what they believe should be the ultimate purpose of resource utility. In turn, the groups splinter in their pursuit of mutually exclusive goals. Each side "shuts out perception of some dangers and highlights others." Ideally, everyone would agree about the risks involved and share a common end. But instead each group develops their own risk frame, or accounting of sacrifice and gain. One group eventually succumbs to the other group's control, and in so doing suffers a loss of prosperity relative to the dominating group.[353] Instead of reaching consensus, division and social rift occur within and across the community.

The Olympic Power Company and City of Port Angeles used specific strategies and mechanisms to establish the community's new industrial economy (Table 15.1). Principally, they believed that harnessing the Elwha River could create wealth for themselves and the region. To attract manufacturers to the north Peninsula, they removed barriers and provided financial incentives. To win the support of the community and its leaders, they appealed to broad social values such as economic growth, prestige and progress.[354]

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[353] Mary Douglas and A.B. Wildavsky, *Risk and Culture* (Berkeley: University of California Press, 1982), pp. 176, 37, 87, 5, 2, quotes on pp. 37, 87.

[354] Cole, G.A. and Withey, S.B., *Risk Analysis*, 1981, pp. 152, 155.

The decision to unleash such powerful and seemingly permanent technologies onto the north Peninsula would have serious repercussions for the region. Aldwell's society had placed its faith in technology "as the motor of all progress," holding an optimistic view of its destiny, emphasizing its benefits to the community rather than the costs. According to experts on technological impact, this is typical behavior: the promoter rarely calculates the full costs to society unless regulations or laws require it. In this sense, the true dimensions of the change become external to the selectively defined opportunities. Such externalized negatives, according to philosopher Emmanuel

Table 15.1 Strategies and mechanisms used by Olympic Power Company and City of Port Angeles to establish local industrial economy, 1910-1935

Strategic objective	Mechanism
Foster pulp and paper manufacturing enterprise	Favorable property laws for water use
	Technological advancements in hydroelectric power
	Shared priorities among city elite and local industry-business interests
	Personal and institutional financing
	Local governmental controls over property zoning
	Real estate expertise
Galvanize civic priority to support manufacturing	Regional imperatives centering on economic progress as a means to prosperity
	Regional demand for electrification
	Access to media through editorials and reporting
	Marginalization of adverse effects and impacted groups

Mesthene, fall "between the stools of innumerable individual decisions to develop individual technologies for individual purposes" without any explicit accounting of how "all these decisions add up to for society as a whole and for people as human beings."[355]

[355] Emmanuel G. Mesthene, *Technological Change. Its Impact on Man and Society* (New York: Mentor Books, 1970), pp. 21, 26, 39, first quote on p. 17, second quote on p. 40.

Moreover, the undeniable presence of the technological footprint would shape the future of the north Peninsula society. It set the region onto a new trajectory, with both positive and negative effects.[356]

There was dissent. Much of it came from non-Indian commercial fisheries and Native subsistence interests who valued the Elwha's natural resources, as chronicled in the following chapter. For their part the Native groups had little if any means to defend their claims to the river and waterfront—they could not force a balanced accounting. Once the Olympic Power Company and civic leaders had gained general community approval, they were less troubled by Indians and fishermen than by acute financing challenges. These concerns dominated their decision making from start to finish. At their zenith of vulnerability—soon after dam failure and because of excessive construction costs—Aldwell and Glines behaved like desperate men. Their personal survival was at stake. They accorded no consideration to others. During 1913 their risk management strategies intensified as they came close to losing everything. But these were only temporary setbacks. Ultimately they prevailed.

The hydroelectric dams and pulp and paper mills not only shifted the economic use of natural resources on the north Peninsula, but also they undermined many attributes of the Native groups that were not easily quantified in fiscal terms. These included aesthetic values, religious beliefs and even a sense of fairness in how wealth is shared. It did not make sense to these groups that they should be exposed to such serious risks

[356] Otway, H., "Public wisdom, expert fallibility: toward a contextual theory of risk," in *Social Theories of Risk*, 1992, p. 224, quote on p. 226.

without their permission and with no compensation. It was as if their entire reality were being ignored, as if everything they believed in were excluded from consideration.[357]

Fundamentally, the majority of Port Angeles residents and the Klallam Native groups held different priorities shaped by differing social, cultural and economic factors. These differences determined what they believed were acceptable risk tolerances and measures of success. The dominating values represented by Aldwell's community violated the value systems of others who had long depended on the Elwha River.[358]

Needed was an appropriate means to develop common definitions of risk that could resolve conflicts, spell out all the consequences and thereby accommodate the competing value systems. Tradeoffs between risks and net benefits should have been calculated for the entire community.[359] In the words of various risk scholars, there was "no common denominator for measuring cultural or social acceptability." There was "no impartial referee available to judge" these competing groups.[360] The decision-making process was not "inclusive enough to take into consideration the concerns of all interested parties"—especially those burdened with the heaviest risks. There was no "full and respectful treatment" of all views.[361] All told, a healthy discourse—the hallmark of

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[357] Rappaport, R.A., "Risk and the human environment," in *Annals of the American Academy of Political and Social Science, Challenges in Risk Assessment and Risk Management* 545(May, 1996):64-74, pp. 69-71.

[358] Rosa, E.A., *Journal of Risk Research*, 1998, p. 28; Cole, G.A. and Withey, S.B., *Risk Analysis*, 1981, p. 149.

[359] Fischhoff, B., Hope, C., Watson, S.R., "Defining risk," in *Readings in Risk*, Theodore S. Glickman and Michael Gough, editors (Washington, D.C.: Resources for the Future, 1990), pp. 31, 33, 40; Renn, O., in *Social Theories of Risk*, 1992, p. 78.

[360] Renn, O., in *Social Theories of Risk*, 1992, p. 78.

[361] Rappaport, R.A., in *Annals of the American Academy of Political and Social Science, Challenges in Risk Assessment and Risk Management*, 1996, pp. 64-74, quotes on pp. 66, 71.

successful conflict resolution in democratic societies—was virtually nonexistent.[362] As shown in Table 15.2, none of these things happened.

The imposition of risk caused by the Port Angeles pulp economy continued for decades. The Elwha River dams made vast portions of fisheries habitat inaccessible or of poor quality to freshwater and marine species. In order to feed the mills, the timber industry obliterated entire peninsula forests, rapidly placing ancient and complex terrestrial ecosystems into jeopardy. The pulp mills, churning out valuable product day and night, released insidious pollutants into the community's soil, harbor and air, creating mounting health hazards. But the city held on tight to its dance partner, believing the arrangement—however damaging to others—was necessary for the larger community's long-term survival. Without doubt, the Klallam were clear losers, gaining little from the prosperity enjoyed by many. And in time, however, Port Angeles and other Straits communities eventually bore their own economic and social ills as the health of the fisheries and forests further unraveled.

[362] Renn, O., in *Social Theories of Risk*, 1992, p. 78.

Table 15.2 Deficiencies in societal risk accounting during industrial development of Port Angeles

Deficiency	
Inadequate definition of total risk (Fischhoff et al. 1984)[363]	Definitive estimates of adverse effects with respect to magnitude and importance of risk to all affected groups were lacking.
Abuse of power in framing use of technology (Otway 1992)[364]	The selection and use of permanent technologies that would prospectively alter society without full consent of all affected interests was tantamount to an abuse of power.
Disregard for alternative worldview (Rappaport 1996)[365]	The full reality and environment as viewed and conceived of by affected groups was disregarded, rendering these categories of risk as inadmissible. Aesthetic considerations, religious beliefs and conceptions of equity and fairness were ignored.
Lack of inclusiveness (Rappaport 1996)[366]	Concerns of all interested parties were not taken into consideration, especially of parties directly and disproportionately impacted.
Violation of social and cultural values (Renn 1992)[367]	Common denominators were not used to measure different cultural or social norms across groups.

Part 5. Commercial Fisheries

Chapter 16 Salmon Export

Beginning in the late nineteenth century, the vast marine and freshwater ecosystem complex that had sustained Pacific Northwest Native societies for upwards of 3,500 years started to unravel. In just a few decades a newly developed resource extractive industry—

[363] Fischhoff, B., Hope, C., Watson, S.R., in *Readings in Risk*, 1990, pp. 31, 40.

[364] Otway, H., in *Social Theories of Risk*, 1992, p. 226.

[365] Rappaport, R.A., in *Annals of the American Academy of Political and Social Science, Challenges in Risk Assessment and Risk Management*, 1996, pp. 69, 71.

[366] Rappaport, R.A., in *Annals of the American Academy of Political and Social Science, Challenges in Risk Assessment and Risk Management*, 1996, p. 66.

[367] Renn, O., in *Social Theories of Risk*, 1992, p. 78.

the commercial salmon fisheries—severely weakened the Pacific salmon (*Oncorhynchus* spp.) that had flourished in the region for millennia.

Colonizing estuaries, streams, rivers and lakes, the migratory salmon was an immense biological phenomenon that might have provided food for many future human generations, Native and non-Native alike, who called the Pacific Northwest their home. Instead, the story the salmon describes how the resource briefly became a global food, before fading away. It is largely a cautionary story of how new technologies drove rapid change leading to adverse outcomes: how the industry fell apart and the social and economic systems that had depended upon the salmon disintegrated. It is, in the end, a story about failure—how society failed to manage the risk of environmental collapse.

Looking back across many decades to this place and time, questions can be asked. Did the region understand the consequences of losing a great resource? Did its leaders recognize the long-term and collective economic advantages of maintaining a healthy fishery? By what means could the downfall have been avoided? Had the calamity been unavoidable? All told, how had this society tried to save its salmon?

The early settler James Swan was living on the north Olympic Peninsula when the commercial fisheries arrived, and he may have had a premonition about its grim future. While Swan always had been quick to promote the region's economic development, he also seemed to understand the dangers of unrestrained growth. The frustration of observing a people and place over many years, he penned in his 1878 diary, was when things changed for the worse. Swan had arrived in western Washington in 1852, first visited the Makah Natives at Neah Bay in 1859 and published a 55,000-word

ethnological study of the Makah in 1865.[368] Back then, a three-day canoe journey was the fastest route to this remote corner of the peninsula. Now a steamer made the trip once per week.[369] For Swan, this was convenient. But by the late 1870s he was troubled by industry's presence at Neah Bay.

What bothered Swan was his belief that an expanding industrial marine fur trade economy had eroded the Natives' traditional way of life. In the early spring of 1880 he reported that since January the Makah had helped five commercial schooners harvest 1,474 seal skins. This was a tremendous amount of work that kept them from other pursuits. "They neglect all other avocations during the sealing season, from January to June," he wrote. "I think the business as now conducted is a positive detriment to these Indians." The industry was using Neah Bay's protected waters as a base and capitalizing on Native know-how and labor to catch fur seals (*Callorhinus ursinus)*. Their seasonal migration made it possible for crews to follow the herds along the Pacific Coast from San Francisco to the Bering Sea. Nearly a century after the sea otter peltry had brought Euro-American sea crews and change to this region, a new trade was happening to satisfy continuing human demand for fashionable insulation.[370]

The emerging activity Swan witnessed accelerated over the next few decades as a boom industry turned its attention to the commercial salmon fisheries. By 1912 Neah Bay had become a salmon canning outpost. Even in the storms and fog, the 18th century navigators such as Captains Cook and Meares might not have missed the entrance to the

[368] Doig, I., 1980, pp. 30, 36, 59, 114-115.

[369] Doig, I., 1980, pp. 30, 36, 59.

[370] Doig, I., 1980, p. 172, quote on p. 166; Dorsey, K., 1998, pp. 115, 112.

Strait of Juan de Fuca had they been exploring that summer. "The sight is said to be most impressive at night when most of the vessels are in harbor," the trade journal *Pacific Fisherman* reported in August. "Their thousands of lights make the little port look like a large city." The bay had become a "floating city" of 6,000 persons devoted to catching and processing salmon: two canneries, three curing plants, 115 purse seine boats, 350 gasoline trollers, and 600 sail and rowboats.[371]

The bust came soon after—by the 1920s the salmon canneries of Washington were shuttering. The commercial fisheries had already exhausted many of California and Oregon's coastal rivers before reaching Puget Sound and Alaska. The fleet stationed at Neah Bay to intercept salmon runs migrating back to their inland waters disappeared. Nearly a century after Swan had complained of the fur seal trade, the writer Ivan Doig spent a winter reading pioneer Swan's life diaries and retracing his western Washington footsteps. "I have clambered up all the great capes of this Northwest coast," Doig wrote. "But none of those, none, proffers the pinnacle-loneliness of this tip of Cape Flattery."[372] This remote corner, home to the Makah, once again felt far away.

Swan had indeed witnessed the industry's birth. And the final death spasms of the Puget Sound commercial fisheries took place long before Doig followed his trail. Three factors contributed to the ruin: the fisheries industry could not rein in its voracious appetite for fish; other industries destroyed salmon habitat and natal waters; and the state regulatory system could not manage the region's growth in any sensible way. First, an emerging industry used new techniques to catch, process and export massive quantities of

[371] *Pacific Fisherman* 10,8(August 1912), p. 12.

[372] Doig, I., 1980, p. 240, quote on pp. 73-74.

fish to distant markets—exploiting a resource beyond its limits. Gas-powered boats, synthetic nets, mechanized food processing and other advances made it easier to catch and sell fish. But in the end these technologies helped to bring about the ruin of the commercial fisheries for want of fish.

Second, engineering advances propelled the swift development of large-scale dam building—but without means to mitigate impacts to migratory fish. The construction of hydroelectric facilities and reservoirs across numerous rivers and streams powered growing cities and manufacturing, and created large-scale agriculture. Dams needed to pool water and divert rivers through penstocks to generate electricity; fish needed unobstructed downstream and upstream passage to migrate. Hence, what was good for one industry could threaten another's existence.

Finally, the regulators were caught in the middle. They were charged to manage a natural resource on behalf of a society that was expanding its economy at breakneck speed. Problems they could not solve hinged on questions they could not answer: How to ensure the survival of an industry whose raw material, fish, interfered with other economic needs? How to protect natural resources subject to intense exploitation? How to compel responsible short-term behavior to protect long-term social interests?

Oregon and Washington officials turned to technology. They embraced the newly applied science of aquaculture—mistakenly believing that large-scale artificial fish production could compensate for overfishing and dam building. By augmenting natural reproduction they hoped they could make up for whatever damages humans wrought. But the strategy failed. It actually undermined the region's ability to protect its natural resources and safeguard industry. It encouraged the acceleration of habitat destruction,

promoted overfishing and diminished the capacity of the fisheries to reproduce. At the same time, it weakened the intent and ability of regulators to guide the responsible use of natural resources. Moreover, it distanced society from understanding the needs and limits of natural ecosystems. It further separated the people from the environment upon which they depended.

If there had been a beginning, an event that triggered the industrial fisheries in the Pacific Northwest, it was the introduction of fish canning techniques in 1864. Until that time fish consumption had been local and eaten fresh, sometimes smoked or salted. Because fish is so perishable entrepreneurs iced their catch and transported it to markets within a day or two's journey, but not much farther. Hapgood, Hume and Company, based in California, solved this problem by applying traditional food canning techniques to salmon. Preserved in a tin can, the fish could be shipped any distance, ready to eat. Within a decade the company had secured markets both in the mainland United States and internationally. The region was now in a position to export its salmon. Canned salmon from the Pacific Northwest became a common staple, a cheap source of protein and readily available—shipped worldwide by the case in bundles of 48 one-pound cans.[373]

There seemed to be an endless supply of fish. Unlike their Atlantic cousins, species of the genus *Salmo,* Pacific salmon inhabited waters between Monterey Bay, California and the arctic coast of Alaska. The seven species possessed distinct attributes,

[373] Daniel B. DeLoach, *The Salmon Canning Industry* (Corvallis, OR: Oregon State College, 1939), pp. 11-12. See also, for example: James A. Lichatowich, *Salmon Without Rivers, A History of the Pacific Salmon Crisis* (Washington, D.C.: Island Press, 1999), pp. 84-94; David R. Montgomery, *King of Fish. The Thousand-Year Run of Salmon* (Westview Press, 2003), pp. 123-139; Dianne Newell, editor, *The Development of the Pacific Salmon-Canning Industry. A Grown Man's Game* (Montreal: McGill-Queen's University Press, 1989); Courtland L. Smith, *Salmon Fishers of the Columbia* (Corvallis: Oregon State University Press, 1979).

characteristics and names (Table 16.1). But the most prized species was the Chinook salmon. David Starr Jordan, later president of Stanford University, spent considerable time wrestling with its common and taxonomic nomenclature. The Chinook range encompassed a distance of thousands of miles, and each locale greeted it differently. In Alaska and Kamtchatka, it was known as the "King Salmon" and to the Russians as "Choweecha" or "Tchawytcha." In Canada's Fraser River it was called "Sah-Kwey" and in Puget Sound the "Columbia River Salmon" or "Tyee." On the Columbia River, it was known as the "Chinnook Salmon" and south of the Columbia it was called "Salmon." Regardless of its differing common names, wherever the Chinook lived humans found its flesh tastier than the other salmon species.[374]

The first major epicenter of industrial activity in the Pacific Northwest was on the Columbia River. The target species was the spring run of Chinook salmon. William Hume built a cannery on the river in 1866 and produced 4,000 cases. In the first four years his case pack increased seven-fold.[375] Soon after, industry swarmed the Columbia's lower reaches near the mouth, a funnel point for millions of salmon moving to upriver spawning streams in a basin that provided over 163,000 square-miles of accessible waters reaching into most of Washington, Oregon and Idaho, as well as portions of Canada.[376]

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[374] Goode, G.B., *The Fisheries and Fishery Industries of the United States*, George Brown Goode, editor, United States Fisheries Commission (U.S. Congress, Senate Miscellaneous Document 124, Section I, 1884), p. 479.

[375] John N. Cobb, "Pacific Salmon Fisheries," *United States Bureau of Fisheries*, Document No. 902, Appendix I to Report (1921), p. 30.

[376] National Research Council, *Upstream, Salmon and Society in the Pacific Northwest* (Washington, D.C.: National Academy Press, prepublication copy, 1995), pp. 63, 66.

Table 16.1 Seven species of anadromous salmon in the Pacific Northwest

Scientific name and primary common name	Common names	Size at maturity	Distribution
Oncorhynchus tshawytscha Chinook salmon	Tyee, spring, king, Quinnat, blackmouth	10-50 pounds, up to 126 pounds	Ventura River, California to Point Hope, Alaska
O. keta Chum salmon	Dog	3-18 pounds, up to 45 pounds	Sacramento River, California to Bering Strait and east to MacKenzie River, Canada
O. kisutch Coho salmon	Silver salmon	8-12 pounds, up to 31 pounds	Monterey Bay, California to Point Hope, Alaska
O. gorbuscha Pink salmon	Humpback, humpy	3-5 pounds, up to 14 pounds	Sacramento River, California to Bering Strait and east to Mackenzie River, Canada
O. clarki Sea-run cutthroat trout	Cutthroat trout, red-throated trout	1.5-4 pounds, up to 17 pounds	Eel River, California to Seward, southeastern Alaska
O. nerka Sockeye salmon	Red, blueback	5-7 pounds, up to 16 pounds	Klamath River, California to Point Hope, Alaska
O. mykiss Steelhead trout	Rainbow trout, Kamloops trout	8-9 pounds, up to 36 pounds	Northwestern Mexico to the Kuskokwim River, Alaska

Source: Lichatowich, J.A., 1999, pp. 233-235; National Research Council, *Upstream, Salmon and Society in the Pacific Northwest* (Washington, D.C.: National Academy Press, 1996b), p. 22.

By 1880 the lower river supplied raw material to 29 canneries. Thousands of persons—Natives, European settlers and Asian immigrants—were employed fishing and working in the processing facilities, respectively. Astoria, Oregon boomed as a port city. “Everything was done in a very crude manner,” a guest writer for the *Pacific Fisherman's* 1920 Year Book reminisced about working for the Hume brothers. “Salmon were plentiful and cheap those days: fishermen with their own gear got 20 cents apiece for Chinook salmon, and when on shares received 4 cents for each man and board. As they

caught from 10,000 to 14,000 fish per boat in a season they did very well."[377]

But all was not well. Federal fisheries scientists and other officials looked upon the scene with a mixture of awe and dread. "From 1876 to 1880 the river has become a perfect web of nets," one observer wrote, noting that as fishing intensity had increased the average catch of fish per boat had decreased. "There is hardly room on the river for so many to fish at once. A hundred salmon boats may be counted at almost any time in sight at Astoria."[378] In 1883 and 1884, huge runs returned to the Columbia. The canneries worked nonstop packing almost 1.5 million cases, or nearly 70 million pounds of fish. The fishermen kept bringing more and more salmon to the docks. They threw countless tons overboard for want of processing capacity.[379]

Competition among the fishermen to supply the shore-side canneries was so intense that in 1887 the U.S. Senate instructed the U.S. Army Corps of Engineers to report on whether any fisheries appliances obstructed the navigation and commerce of the river. The engineers found startling evidence that human activities were influencing the river's flow. The Columbia was a 1,200-mile-long river with the largest discharge into the Pacific Ocean from North America. And yet, bar-nets in the vicinity of Astoria actually slowed its current during flood stages and increased shoaling. Fish traps acting like "permeable dikes" checked its current and created a fill "obstructive to passing

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[377] Goode, G.B., "The salmon fisheries of the lower Columbia," in *The Fisheries and Fishery Industries of the United States*, George Brown Goode, editor, United States Commission of Fish and Fisheries (United States Congress, Senate Miscellaneous Document 124, Section V, 1887), pp. 753, 748; John N. Cobb, "The Salmon Fisheries of the Pacific Coast," *United States Bureau of Fisheries*, Document No. 751 (1911); Barker, W.H., "Reminiscences of the Salmon Industry," *Pacific Fisherman Year Book*, January 1920.

[378] Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1887, pp. 749-750, quote on p. 746.

[379] Cobb, J.N., 1921, p. 30; Cobb, J.N., 1911, p. 14; John N. Cobb, "Pacific Salmon Fisheries," *United States Bureau of Fisheries*, Document No. 839, Appendix III to Report, (1916), p. 156.

vessels." The Corps concluded that the cessation of net fishing near and on the infamously dangerous Columbia bar, at the river's mouth, could prevent the deaths of 20 to 60 fishermen a year.[380]

As the boom unfolded certain patterns of behavior emerged. There was an intense build-up when many companies rushed in to participate. Cannery after cannery arrived; the fishermen followed. They caught as much salmon as possible; the canneries attempted to pack as many cases as they could. There was no effort to control either the fishermen or the processers. "The profits to the fishermen out on the salmon banks are in direct ratio to the ability to get fish to the canneries without cessation or let-up when the run is on," the *Pacific Fisherman* observed. "The same statement holds true of the cannerymen operating their own sources of supply."[381] Pressure on a finite resource soared. The more fish that left the region packed into cases, the more money everyone believed they could make.

By the late 1880s the Columbia River fisheries showed signs of distress. Government officials were concerned. "Fisheries were established, canneries on a large scale erected, and the work of destruction began," A.M. Spangler summarized in the 1893 annual bulletin of the U.S. Fisheries Commission.[382] Predicting a crash in the river's

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[380] Charles Francis Powell and William A. Jones, "Letter from the Secretary of War, transmitting in response to Senate resolution of January 27, 1887, report on the salmon fisheries of the Columbia River," United States, 50th Congress, 1st Session, Senate, no. 123, pp. 2-5. For an analysis of the competition among lower Columbia fishers, as well as the rapid acceleration of cannery activity, see: Joseph E. Taylor III, *Making Salmon. An Environmental History of the Northwest Fisheries Crisis* (Seattle: University of Washington Press, 1999), pp. 137-151.

[381] *Pacific Fisherman* 6,1(January 1908), p. 74.

[382] Spangler, A.M., "The decrease of food-fishes in American waters and some of the causes," in *Bulletin of the United States Fish Commission, Volume 13, for 1893* (Washington, D.C.: Government Printing Office, 1894), p. 31.

salmon numbers, in 1894 Commissioner Marshall McDonald scolded "this is the penalty that must be paid for the improvidence and total disregard of the conditions necessary to maintain supply which has characterized the operations of the salmon fishermen on the Columbia River."[383] The industry was reckless. If left unchecked, it would destroy the resource and then terminate itself.

Rather than change their destructive behavior, the canneries expended the fishing areas—one watershed at a time—and then moved elsewhere. As historian Arthur McEvoy observed, "the commercial fishery left a trail of devastated resources in its wake." [384] Another historical account summed up the canning activity in California, Oregon and Washington waters in terms of the salmon life cycle: "In less than fifty years (twelve chinook salmon generations)," author and fisheries biologist Jim Lichatowich wrote, "nature's warehouse had been looted; its free wealth—the natural productivity of the Pacific salmon—had been devoured in the insatiable cannery lines."[385]

California's first cannery started on the Sacramento River in 1864. Washington's last cannery was constructed on the Hoh River in 1917.[386] Between 1880 and 1915 Pacific salmon cannery packs on major rivers and coastal areas in California, Oregon and Washington reached their peak annual levels (Table 16.2). The time it took to reach peak packs ranged from a minimum duration of three years to a maximum of 36 years. The

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[383] McDonald, M., "The salmon fisheries of the Columbia River Basin," in *Bulletin of the United States Fish Commission, Volume XIV, 1894*, (1895), pp. 163-164.

[384] Arthur F. McEvoy, *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980* (New York: Cambridge University Press, 1986), p. 73.

[385] Lichatowich, J.A., 1999, p. 90.

[386] Lichatowich, J.A., 1999, p. 89.

Columbia River canneries, for example, started in 1866 and peaked 29 years later with nearly 635,000 cases in 1895. They contributed the largest cumulative pack, through 1919, of over 21 million cases. The industry started and peaked in California first. Its last production peaks happened in the northern waters of Washington State, whose cumulative packs eventually rivaled those of the Columbia River.[387]

Table 16.2 Start year and peak year cannery packs of Pacific salmon in California, Oregon and Washington

Area	Start year	Peak year	Peak year cases	Cumulative pack from start to 1919
Sacramento River, California	1864	1882	200,000	1,419,534
Klamath River, California	1888	1912	18,000	122,221
Smith River, California	1877	1880	~7,500	51,281
Coastal streams of Oregon	1877	1911	138,146	2,750,999
Columbia River	1866	1895	634,696	21,376,293
Coastal streams of Washington	1911	1915	31,735	152,438
Willapa Harbor, Washington	1886	1902	39,492	572,950
Grays Harbor, Washington	1878	1911	75,941	893,257
Puget Sound, Washington	1877	1913	2,583,463	22,192,871

Source: Cobb, J.N., 1921, pp. 152-153 (See also: Lichatowich, J.A., 1999, p. 90).

In the quiet inland waters of Puget Sound and at ports along the Strait of Juan de Fuca, there was little industrial activity before the 1890s. But many persons knew it was only a matter of time before the canners would arrive. In 1880 the Fish Commission had

[387] Cobb, J.N., 1921, pp. 152-153; Lichatowich, J.A., 1999, pp. 87-90.

assessed the region, calling it "very abundantly supplied" but little developed.[388] Aside from the oceanic fur seal trade Swan described using Neah Bay, there was minimal commercial activity. And yet the Fish Commission found great potential: In the boundary waters of northern Puget Sound, "innumerable quantities of salmon … passed almost unmolested along the shores of Whatcom County." In nearby Skagit County, only the ranchers "occasionally fished for their own use." Among the group of islands comprising San Juan County, "this valuable fishing-ground up to 1894 was almost entirely neglected."[389]

Along the Straits, some residents were growing impatient. A local Port Angeles paper described a harbor teaming with fish. "As soon as we can have a colony of Eastern fishermen who understand handling this fish and preparing it for market…." the *Model Commonwealth* wrote in 1888, "they will find a ready market through all the interior town[s] and the East."[390] That same year, from Port Townsend, James Swan estimated that within two years "a colony of several hundred … fisherman will be here to develop the wealth now dormant and hidden in our waters."[391]

Swan's prediction came true in the following decade. In 1893, a federal report listed Clallam County as a fishery "of great and growing importance" with chief fishing

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[388] Goode, G.B., "The fisheries of the Pacific Coast," in *The Fisheries and Fishery Industries of the United States*, George Brown Goode, editor, United States Commission of Fish and Fisheries (U.S. Congress, Senate Miscellaneous Document 124, Section II, 1887), p. 626.

[389] William A. Wilcox, "Notes on the fisheries of the Pacific Coast in 1895," in *Report of the Commissioner for the year ending June 30, 1896* (United States Commission of Fish and Fisheries, Part XXII, 1898), pp. 592, 595-596, 603-604.

[390] Kathleen Coventon, *History of the Puget Sound Cooperative Colony*, December 30, 1939; *Model Commonwealth*, September 7, 1888.

[391] 1888 letter from Swan, Port Townsend, Wash, to Senator Dolph, in *Puget Sound Argus* (Beinecke Rare Book and Manuscript Library, Yale University, New Haven, CT).

centers at Port Angeles, Dungeness and Neah Bay.[392] "Fish of numerous varieties are fairly abundant at most seasons of the year, and the port has one of the best harbors in this region," the Fish Commission wrote of Port Angeles. During 1891 and 1892, fishermen of the town "and the immediate vicinity, including some Indian fishermen of Elwha Creek" had taken 140,000 pounds of salmon, halibut, and rockfish at a value of $6,180.[393] Norman Smith, mayor in 1892, later described how Native fishermen "paddle their canoes around the bay, catching salmon by trolling around the point of the spit that formed the harbor, or catching halibut on the halibut grounds off Morse Creek, or spearing the great hard-shelled crabs that swarmed all over the bottom of the bay."[394] Dungeness harbor, as recorded by the Fish Commission, was "noted for its abundance of crabs, which are fished for by 20 men, the catch being made by long-handled rakes from boats." Over 112,000 pounds were harvested and shipped to Seattle in 1895. As Klallam Jacob Hall later recalled, "the boats were taking crabs to Seattle every day and one day's shipment would be as high as 125 crab." Hall's father established a crab business in 1892, eventually employing eight others.[395]

The north Olympic Peninsula saw steady activity in its harbors, lower rivers and bays. Between 1889 and 1895 the number of persons employed in fisheries work in Clallam County increased from 315 to 530, of which 92 percent were Native persons in

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[392] *Report of the Commissioner for the year ending June 30, 1893* (United States Commission of Fish and Fisheries, 1895), p. 288.

[393] *Report of the Commissioner for the year ending June 30, 1893* (United States Commission of Fish and Fisheries, 1895), pp. 257-291.

[394] John McCallum and Lorraine Wilcox Ross, *Port Angeles, U.S.A.* (Seattle, WA: Wood and Reber, Inc., 1961), quote on p. 44 (Norman Smith, son of Victor Smith).

[395] Wilcox, W.A., in *Report of the Commissioner for the year ending June 30, 1896* (1898), p. 600; *Port Angeles Evening News*, May 14, 1957.

1892. Near-shore fishing boats rose from 174 to 202, along with the addition of one transport and ten fishing vessels. Total investment in apparatus and capital employed—ranging from gill nets and seines to shore and accessory property—jumped from $12,000 to $84,474. Species yield more than tripled, from 663,000 pounds to 2.06 million pounds including cultus-cod; halibut; herring; rockfish and dog, humpback, and silver salmon.[396] By 1899 the county's salmon and halibut value had increased by 50 percent, even though its catch remained close to1895 levels.[397] Investment increased almost 60 percent to $142,763, persons employed in the fisheries decreased about 25 percent to 395, and 35 fewer transport vessels and boats were employed. These figures suggest the county's overall operations more efficiently harvested resources and in so doing further gained from an increase in product values during that five-year period.[398]

J.W. Hume was one of the earliest to start commercial fishing in the area. In 1892 he purchased a cannery built in Port Angeles a year earlier. With a $10,000 investment he created a fishing and canning business named the National Packing Company. Using two small vessels and several boats with line and gill-nets to catch cultus-cod, halibut, and salmon, the company sold fish to local markets in Port Townsend and Seattle.[399] Unable

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[396] *Report of the Commissioner for the year ending June 30, 1893* (United States Commission of Fish and Fisheries, 1895), pp. 257-291; Wilcox, W.A., in *Report of the Commissioner for the year ending June 30, 1896* (1898), pp. 605-607.

[397] William A. Wilcox, "Statistics of the fisheries of Washington," in *Report of the Commissioner of Fisheries, 1901* (United States Commission of Fish and Fisheries, 1902), pp. 530-531.

[398] Wilcox, W.A., in *Report of the Commissioner of Fisheries, 1901* (1902), pp. 514-522; Wilcox, W.A., in *Report of the Commissioner for the year ending June 30, 1896* (1898), pp. 605-607.

[399] *Report of the Commissioner for the year ending June 30, 1893* (United States Commission of Fish and Fisheries, 1895), p. 291; Martin, P.J., 1983, p. 61; Howard Farmer, "The canning company," in *Jimmy Come Lately: History of Clallam County*, Jervis Russell, editor (Port Angeles, WA: Clallam County Historical Society, 1971), pp. 243-245.

to can salmon until 1895, it kept busy during the winters processing clams and clam nectar that Dungeness settlers gathered with horse-drawn plows over several square miles of tidal harbor bottom, packing 150 cases in 1893.[400] In 1895, Hume packed 1.46 million pounds or 22,100 cases of salmon at Port Angeles harbor. The fish were taken "mainly in the vicinity of that place," as well as from King, Skagit and Mason counties. Hume employed a variety of methods to maximize the catch—mostly humpback and silver—and was the first to try purse seines in the Strait of Juan de Fuca. That year he used 12 seines in waters near the Port Angeles cannery.[401] In 1899 the company used 2.04 million pounds of salmon and 4,370 bushels of clams to pack 29,124 and 2,000 cases.[402]

The National Packing Company's operations illustrate how the fisheries industry adapted successfully to conditions north of the Columbia, and in so doing developed a commercial hub. Canneries and trap sites proliferated, buoyed by access to an expansive, untapped fishing ground and by growing markets. The numerous inlets, coves and estuaries on the Strait and throughout the inland sea of the Sound served as a natural funnel for migrating fish as well as localized habitat for many marine species. In addition

[400] Wilcox, W.A., in *Report of the Commissioner for the year ending June 30, 1896* (1898), pp. 599-600; Lauridsen, G.M. and Smith, A.A., 1937, p. 148; *Port Angeles Evening News*, November 28, 1953.

[401] Wilcox, W.A., in *Report of the Commissioner for the year ending June 30, 1896* (1898), pp. 599-600; Richard Rathbun, "Review of the fisheries in the contiguous waters of the State of Washington and British Columbia," in *Report of the Commissioner of Fisheries, 1899* (United States Commission of Fish and Fisheries, 1900), pp. 311-313. Purse seining is a method of fishing that surrounds a school of salmon with a long drawstring net then hauled to the craft.

[402] Wilcox, W.A., in *Report of the Commissioner of Fisheries, 1901* (1902), p. 531.

to the international and North American canned salmon trade, the rapid growth of Washington State also provided demand for fresh fish and seafood.[403]

This combination of opportunities ensured that nearly any location that had access to fish was used. "In some places only two or three small nets may be employed to supply the local wants, while in others the advantages for shipping or canning interests may stimulate a considerable activity," the Fish Commission observed. "Even in such small rivers as the Elwha and Dungeness … having only 2 or 3 miles of level course, several nets may be in use, and such fish as are not required at home find their way to the Seattle market."[404] By the turn of the century, industry had laid full claim to the waters of western Washington. In the previous five years capital investments had tripled; cannery capacity more than doubled; producer product value doubled; and employee number had increased from about 6,000 to 10,000 persons.[405] Industry had indeed found a new bonanza.

The commercial fishery had begun developing new fishing grounds in Alaska, British Columbia and Puget Sound even before it had left the Columbia. The industry knew its survival required a constant supply of raw material to feed the canneries. And so it expanded into new untapped areas in advance, anticipating its exit from fished out waters. Between 1881 and 1889 southeastern, central and western Alaska's development was meteoric: one cannery was joined by 36 more. Starting in 1888 the upward trend of

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[403] *Report of the Commissioner for the year ending June 30, 1893* (United States Commission of Fish and Fisheries, 1895), p. 288; Wilcox, W.A., in *Report of the Commissioner for the year ending June 30, 1896* (1898), p. 600.

[404] Rathbun, R., in *Report of the Commissioner of Fisheries, 1899* (1900), p. 310.

[405] Wilcox, W.A., in *Report of the Commissioner of Fisheries, 1901* (1902), pp. 503, 512.

Alaska's salmon pack corresponded with the downward trend of the Columbia River as declining catches forced canneries to more remote waters. Between 1889 and 1899, the number of canneries in British Columbia increased from 28 to 68, and in Puget Sound from 2 to 19. In 1899, 17 remaining canneries on the Columbia packed about 330,000 cases compared to about 765,000 cases in British Columbia; 900,000 cases in Puget Sound; and 1.08 million cases in Alaska.[406]

The rapid growth of canning north of the Columbia River could only have occurred through rebranding, or the use of lower grades of salmon that, conveniently, were abundant in Alaska and the boundary waters of Washington and British Columbia.[407] From the early days of canning the chinook had been used exclusively—perhaps because the reddish color of its flesh resembled the Atlantic salmon, or because it frequented California and Oregon rivers.[408] As catches lessened the industry was forced to market other species. At first sockeye was substituted, although for a while the trade did not label its cans as such.[409] By 1889, 14 percent of the Columbia River pack was sockeye and steelhead. Puget Sound and British Columbia operators were canning with chinook, silver, chum, pink and sockeye salmon species.[410] The Spanish-American War

[406] Cobb, J.N., 1916, pp. 157-173; DeLoach, D.B., 1939, pp. 42, 45-46.

[407] DeLoach, D.B., 1939, pp. 33, 40-43.

[408] Cobb, J.N., 1916, p.157; *Pacific Fisherman* 6,1(January 1908), p. 21.

[409] John N. Cobb, "Pacific Salmon Fisheries," *United States Bureau of Fisheries*, Document No. 1092, Appendix XIII to Report (1930), p. 424. First to label fish as sockeyes was a British Columbia company, in 1894-1895. Marketing was not immediately successful.

[410] DeLoach, D.B., 1939, pp. 20, 41-42; James A. Crutchfield and Giulio Pontecorvo, *The Pacific Salmon Fisheries: A Study of Irrational Conservation* (Baltimore, MD: The Johns Hopkins Press, 1969), pp. 75-76.

in 1898 enabled marketers to sell any kind of salmon, although at less cost.[411] In 1900, sockeye comprised 68 percent of North America's canned-salmon pack compared to only 11 percent chinook.[412]

In addition to a variety of species found in the northern waters, another advantage industry enjoyed was ready access to Native skill and expertise in catching fish.[413] On Vancouver Island, for example, Nootkan groups first participated in the pelagic sealing during the 1870s. When the salmon industry became established on the Fraser River in the following decade, Natives left their villages to work for the canneries, with men catching and women preparing the fish for processing.[414] In 1880, the Fish Commission reported that the majority of Puget Sound fishermen were Natives who fished for their own consumption, supplied town markets and worked for fish processors. In Seattle, "Indians in the neighborhood bring in, almost daily, boat-loads of salmon-trout (*Salvelinus*), young salmon, and the various flounders &c."[415] The Fish Commission reported in 1892 that Neah Bay Indians "bring in considerable quantities of halibut, cultus-cod, and red rockfish" and in 1899 Clallam County Indians were selling silver

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[411] *Pacific Fisherman* (January 1908), p. 21; Cobb, J.N., 1930, p. 424; DeLoach, D.B., 1939, p.15. The paleness of chum, pink, and silver salmon flesh did not compromise the nutritive content of the fish or the practical value of canned food (even chinook, depending on the locale, sometimes had pale or grey flesh).

[412] DeLoach, D.B., 1939, pp. 20, 41-42; Crutchfield J.A. and Pontecorvo, G., 1969, pp. 75-76. Within ten years pink and chum harvesting would equal sockeye catches, later dominating the market by World War I.

[413] Fisher, R., in *The Cambridge History of the Native Peoples of the Americas, Volume 1: North America Part 2*, 1996, p. 163; See also: Boxberger, D.L., in *Ethnohistory*, 1988, pp. 161-190; J.E. Michael Kew, "History of coastal British Columbia since 1846," in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, pp. 162-164.

[414] Eugene Arima and John Dewhirst, "Nootkans of Vancouver Island," in *Handbook of North American Indians, Volume 7: Northwest Coast,* 1990, p. 409.

[415] Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1887, pp. 626-627.

salmon to local canneries, using "canoes and paddles in all their fisheries, and also in pursuing whales."[416] By the turn of the century, the Makah owned their own seal-hunting ships and hired white fisherman. In 1909 the county's salmon fisheries employed more Natives than any county in the State.[417]

During its expansion into new fishing grounds, industry also streamlined and innovated with new technologies. Companies and ownership centralized administration in San Francisco and Seattle, forming corporations such as the Alaska Packers' Association, the Columbia River Packers Association, and the British Columbia Packers Association. The consortiums built larger canneries, increasingly relied on contractors to import labor and added more hand tools and machines, notably a salmon-butchering device called the "Iron Chink"—so named because it replaced a niche filled by Asian laborers.[418] As explained by an industry trade journal "automatic work in the canneries means automatic feed to the canneries."[419]

By 1905 fishing boats with internal-combustion engines and power winches were operating, facilitating the use of purse seines, strong nets that could encircle and corral fish over large areas. Soon after, the first sea-going vessel was developed, equipped with

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[416] Richard Rathbun, "Summary of the fishery investigations conducted in the North Pacific Ocean and Bering Sea from July 1, 1888, to July 1, 1892, by the U.S. Fish Commission Steamer Albatross," in *Bulletin of the United States Fish Commission, Volume XII, for 1892*, (1894), p. 162; Wilcox, W.A., in *Report of the Commissioner of Fisheries, 1901* (1902), p. 530.

[417] Ruby, R.H. and Brown, J.A., 1992, p. 126; Cobb, J.N., 1911, pp. 75-81. The total number was 327 persons, of which 176 were Indians.

[418] DeLoach, D.B., 1939, pp.16, 111-114.; *Pacific Fisherman* (January 1908), pp. 19-21; Jefferson F. Moser, "The salmon and salmon fisheries of Alaska," in *Bulletin of the United States Fish Commission, Volume XVIII, 1898* (1899), pp. 18-21.

[419] *Pacific Fisherman* 6,1(January 1908), p. 74.

a full deck and living quarters.[420] This technology was revolutionary and, in the words of the *Pacific Fisherman*, would "become universal with the spread of the industry."[421]

Thanks to gas-powered craft, fishermen could now pursue salmon in open waters. They no longer needed to depend solely on fixed net and trap sites along the coast and at river mouths further inland. This innovation could not have come at a better time. "The demand for Pacific Coast canned salmon is all of the time increasing, but to find grist for the canning mills grows a more perplexing problem every year," the *Pacific Fisherman* wrote in 1908.[422]

Industry could now intercept returning salmon runs on open waters well before they reached their entry points at estuaries and inlets. By 1915 some 300 power seiners were operating on the waters of Puget Sound, the Strait of Juan de Fuca, and the Pacific Ocean using nets as long as 300 fathoms (or 1,800 feet). The efficiency and scale of pursuing salmon had increased tremendously.[423]

The mobility of fishing operations shifted industrial activity westward. Port Angeles took on increasing importance as a supply facility and headquarters for fleets that caught and transported fish to eastern Puget Sound canneries. Its harbor became a strategic departure point from which to meet incoming fish.[424] A perpetual traffic connected the feeding banks outside and along the Strait to inland processing centers.

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[420] Lloyd Spencer, editor-in-chief, *A History of the State of Washington, Volume II* (New York: The American Historical Society, Inc., 1937), pp. 87-94.

[421] *Pacific Fisherman* 6,1(January 1908), p. 74.

[422] *Pacific Fisherman* 6,1(January 1908), p. 74.

[423] Spencer, L., 1937, pp. 87-94.

[424] *Pacific Fisherman* 10,2(February 1912), p. 40; *Port Angeles Olympic*, April 1, 1913.

"You can count every skiff of the salmon fishing fleet off Ediz Hook," a hiking club reported from Mount Angeles, above Port Angeles, in the summer of 1915. "Every ship on the strait is plainly visible."[425] Farther west, at Cape Flattery, the *Pacific Fisherman* reported in 1912 that "a colony has sprung up to cater to the wants of the big fishing fleet," including floating machine shops, a floating restaurant and bakeries, and fueling stations. "New boats are said to be arriving daily."[426]

While Olympic Peninsula's harbors had turned into support centers for the fishing fleets, the area accommodated several canneries and processing facilities, even though they were minor compared to the output of Blaine, Bellingham, Anacortes and Friday Harbor.[427] Along the Straits west of Port Angeles in the 1880s, Myron Eells reported that a cannery had started in the vicinity of Clallam Bay and Hoko River.[428] Along the Pacific coast, from 1912 to 1915 a cannery at the Sol Duc River packed 7,516 cases of salmon; 1917-1919 a cannery at the Hoh River packed 1,640 cases; 1912-1919 a cannery at the Queets River packed 22,783 cases; and from 1911 to 1919 two canneries at the Quinault River packed 120,449 cases. Although small, the packs on these streams were consistent and profitable for the Native groups that supplied much of the salmon. In 1915, for

[425] *Olympic Leader*, June 26, 1915; See also: Cobb, J.N., 1921, p. 20; Wilcox, W.A., in *Report of the Commissioner for the year ending June 30, 1896* (1898), p. 600; *Pacific Fisherman* 12, 1(January 1914), p. 40; *Pacific Fisherman* 13,7(July 1915), p. 35; *Pacific Fisherman* 1915 Yearbook, p. 39.

[426] *Pacific Fisherman* 10,8(August 1912), p. 12.

[427] *Pacific Fisherman* 10,2(February 1912), p. 40; *Port Angeles Olympic*, April 1, 1913; *Tribune-Times*, January 11, 1907.

[428] Smithsonian Institution, *Annual Report of the Board of Regents of the Smithsonian Institution. Part 1* (Washington, D.C.: Government Printing Office, 1889), p. 608; See also: Myron Eells, *The Twana, Chemakum, and Klallam Indians of Washington Territory* (Fairfield, WA: Ye Galleon Press, 1996[1887]).

example, Natives at Quinault caught 355,007 sockeye valued at $80,348.[429]

Newspapers and the *Pacific Fisherman* trade journal often reported on the doings of the local industry on the north Peninsula. The Hume cannery was renamed the Manhattan Packing Company in 1902, under Charles J. Farmer. In September 1904 the facility was packing a "continuous and steady" early run of silversides since August 6. "As many as 6,000 fish per day have been taken by the Indian trollers off the cape," at Neah Bay, with the cannery running full time and packing 5,000 cases by August 21.[430] The following year the Gorman Brothers, a large salmon packing and brokerage business, enlarged the facility. [431] In September 1909 the *Olympic-Leader* reported that local sport fishermen had caught 1,400 fish along Ediz Hook. "At the low estimate of ten pounds per fish (we saw one fisherman on the water front with a 40-pound Tyee), we have 14,000 pounds; fourteen cents each, the cannery price, gives a total of $196."[432] In 1911, the *Seattle Daily Times* reported the Manhattan Canning Company employed 100 people while in operation and packed salmon cases valuing $350,000 in addition to clams and clam nectar.[433] In 1919, the Union Fishermen's Fish & Packing Company, which ran an

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[429] Cobb, J.N., 1921, pp. 22-23, 155-157. By 1921 they would have sole control over their reservation's fishery laws, location and catch.

[430] *Pacific Fisherman* 2,9(September 1904), p. 9. The facility's name later changed to the Manhattan Canning Company.

[431] Farmer, H., in *Jimmy Come Lately: History of Clallam County*, 1971, pp. 243-245; Cobb, J.N., 1921, p. 20; *Pacific Fisherman* 8,7(July 1915), p. 35.

[432] Reprinted in *The Olympic-Leader*, "Lake Crescent Number," June 9, 1911.

[433] *Seattle Daily Times*, June 27, 1912. The *Pacific Fisherman's* last reported pack for the cannery was 1913: "The Manhattan Canning Company closed its plant at Port Angeles after packing 37,000 cases, about 25,000 of which were Sockeyes. The company had expected to secure a pack of but 20,000 cases for the season." Soon after, Gorman & Company sold the cannery along with their extensive holdings that comprised four canneries in Anacortes, two at Neah Bay, and five in Alaska. *Pacific Fisherman* 11,10(October 1913), p. 12; *Pacific Fisherman* 8,7(July 1915), p. 35.

extensive fleet of fishing boats, built a cannery and cold storage plant on Ediz Hook to handle its share of the Cape Flattery catch, packing 21,065 cases.[434]

To the east, E.A. Sims, who owned some of the most valuable trap sites on Puget Sound, had set up a base of operations in Port Townsend where he operated a cannery that was remodeled in 1911.[435] The San Juan Fish Company operated nine traps between Clallam Bay and Port Townsend, and in Washington Harbor the Bugge Canning Company packed Sequim Bay clams. "The Indians at Sequim Bay often dig 500 bushels of clams in a single night. They have been digging for fifteen years, yet the number does not diminish," the *Pacific Fisherman* reported.[436] *The Olympic-Tribune* reported in 1919 that on Dungeness Spit at Sequim Bay a cannery had replaced an Indian village where, in former times, "it seemed that the string of canoes on the beach was fully a mile long."[437]

By 1915 Puget Sound's catch represented 87 percent of Washington's fisheries harvest, and the state generated the nation's greatest fish products output.[438] But the constant pressure on the resource had taken its toll. To supply the inexhaustible demand industry moved into remote waters, used more lethal technologies, caught formerly

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[434] *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921); *The Seattle Daily Times*, June 19, 1919; *Pacific Fisherman* Supplement (January 1920), p. 83; *Pacific Fisherman* Year Book (January 1921), p. 40; *Pacific Fisherman* Year Book (January 1922); *Pacific Fisherman* Year Book, (January 1923), p. 49; Farmer, H., in *Jimmy Come Lately: History of Clallam County*, 1971, pp. 243-245.

[435] *Pacific Fisherman* 8,3(March 1910); *Pacific Fisherman* 9,8(August 1911), p. 19.

[436] *Pacific Fisherman* 9,4(April 1911), p. 16.

[437] *The Olympic-Tribune*, June 13, 1919; Bridges, T. and Duncan, K., "Jamestown S'Klallam," in Olympic Peninsula Intertribal Cultural Advisory Committee, *Native Peoples of the Olympic Peninsula: Who We Are*, Jacilee Wray, editor (Norman: University of Oklahoma Press, 2002), p. 39.

[438] Darwin, L.H., *The Fisheries of the State of Washington*, Washington State Department of Fisheries and Game, Washington State Bureau of Statistics and Immigration, 1916, p. 3.

unwanted species and even took immature fish. The commercial fishermen hunted harder and longer and took whatever they could find. By 1910 practically all the Puget Sound halibut banks had been fished out, Willapa Harbor's famous oyster beds had severely declined, and salmon exploitation had become dangerously indiscriminate.[439] "The greed for fish is making cradle robbers of many of our fishermen," Leslie H. Darwin, Washington State Fish Commissioner, reported in his 1917-1919 annual report to the governor. Darwin blamed purse seining and power boats for "the near destruction of our Sockeye salmon run and the depletion of the other runs of our Puget Sound salmon."[440] During 1920-1921, the *Pacific Fisherman* reported more idle salmon canneries "than ever before in the history of the industry," with the smallest output since 1910.[441] In Port Angeles, the city's two packing companies were out of business by 1921.[442]

John Cobb, one of the country's leading fisheries scientists and director of the University of Washington's School of Fisheries, chronicled the demise of the state's fisheries. Each of his reports warned what would happen, but to no avail. "Man is undoubtedly the greatest present menace to the perpetuation of the great salmon fisheries of the Pacific coast," he wrote in 1917. "When the enormous number of fishermen

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[439] *Pacific Fisherman* 10,12(February 1912), p. 48; Spencer, L., 1937, p. 86; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), p. 99.

[440] *Twenty-Eighth and Twenty-Ninth Annual Reports of the State Fish Commissioner*, 1917-1919 (Washington State Fisheries Commission, 1920), pp. 10, 83.

[441] *Pacific Fisherman* Year Book (January 1922), pp. 35-36.

[442] Union Fishermen's Fish & Packing company opened in 1919 and lasted only to 1920, when it packed 2,512 cases. The Angeles Packing Company, Port Angeles' second cannery, packed 5,950 cases in 1919 and 3,750 in 1921, when the site was demolished. *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921); *The Seattle Daily Times*, June 19, 1919; *Pacific Fisherman* Supplement (January 1920), p. 83; *Pacific Fisherman* Year Book (January 1921), p. 40; *Pacific Fisherman* Year Book (January 1922); *Pacific Fisherman* Year Book (January 1923), p. 49; Farmer, H., in *Jimmy Come Lately: History of Clallam County*, 1971, pp. 243-245.

engaged and the immense quantity of gear employed are considered, one sometimes wonders how any of the fish, in certain streams at least, escape."[443] Describing the armadas of several thousand power boats working off the mouths of the Columbia and Strait of Juan de Fuca from five to eight months of the year, in 1921 he wrote: "It is quite plain that the salmon runs … can not long continue to exist under this terrific drain upon the immature and mature fish. In the latter section the sockeyes and humpbacks are rapidly being exterminated, and it is probable that the chinooks and cohos, the especial victims in this attack, will soon show signs of exhaustion."[444] In 1930 Cobb noted that 41 canneries had operated in 1915, 45 in 1917, 23 in 1921, and 14 in 1928.[445]

Those who observed first-hand the work of the fishermen and canneries provided stark assessments of a self-destructive industry. "The number of salmon actually caught in Karluk Bay, near the river mouth and in the lower portion of the river, is so large as to make a true statement concerning them seem incredible," a Fish Commission field investigator reported from Alaska in 1889. "In my opinion this river will soon cease to show such a state of productiveness, if indeed it has not already done so." Another investigator's notes from a trip to Alaska in 1898 described a scene of frenzied activity exacerbated by ineffective laws and systemic greed. Fishermen had scoured every stream within 80 miles of some canneries, diverting entire runs into nets. He returned in 1901 to a grisly scene at Bristol Bay. "In front of every cannery in this district, and along the beaches for several miles, thousands of dead fish are seen…. windrows of decaying fish,

[443] Cobb, J.N., 1916, p. 91.

[444] Cobb, J.N., 1921, pp. 92, 94.

[445] Cobb, J.N., 1930, p. 425.

a hundred feet in width … testify to the enormous waste during a canning season." In Washington State, a Whatcom County attorney was so disturbed by the Bellingham salmon industry that he complained to the governor, describing an instance where fishermen dumped 65,000 salmon in one day "simply because they could not sell them."[446] The *Pacific Fishermen* compared the canners to small kids quarreling over candy. "What they want is immediate profits, [even] if the result is the utter annihilation of the industry."[447]

The Port Townsend cemetery where James Swan rests commands a view of the waters where the Strait of Juan de Fuca meets Puget Sound. From this vantage point in 1900, the year of his passing, the channels were likely pulsing with activity. Swan had been an eyewitness to the heady days of the commercial fisheries as it moved into the northern waters of Washington State—the busy harbors, the flotillas of craft, the feverish pace of the canneries. On the eve of his burial a group of Makah visited Port Townsend, having journeyed from Neah Bay to say farewell to their old friend.[448] In youth, likely none of these mourners could have imagined the magnitude and intensity of industrial operations that soon would locate on their shores and communities. Nor could they have envisioned the technologies that could catch and process fish at large scale, driven by

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[446] Tarleton H. Bean, "Report on the salmon and salmon rivers of Alaska, with notes on the conditions, methods, and needs of the salmon fisheries," in *Bulletin of the United States Fish Commission*, 1890, pp. 181-182; Rathbun, R., in *Report of the Commissioner of Fisheries, 1899* (1900), p. 321; Moser, J.F., in *Bulletin of the United States Fish Commission, Volume XVIII, 1898* (1899), pp. 26, 34-44; Jefferson F. Moser, "Salmon investigations of the Steamer Albatross in the summer of 1900," in *Bulletin of the United States Fish Commission, Volume XXI, 1901* (1902), pp. 187-188; G.V. Alexander to Governor J.R. Rogers, August 19, 1897 (Box 2C-1-4, "Governors' Records, Files of Governor John Rogers, FC 1897." Washington State Archives, Olympia, WA).

[447] *Pacific Fisherman* 5,10(October 1907), p. 15; *Pacific Fisherman* 8,7(July 1910), p. 19.

[448] Doig, I., 1980, pp. 242-243.

growing global demand for salmon.

When the cannery enterprise started, the Pacific Northwest had known a prolific fishery. Previously the resource had sustained generations of Native groups and amazed early Euro-American immigrants. And yet by 1930 much of the region's commercial fishing industry was gone. Dismantled facilities, rotted wharf pilings and memories of abundance were the only remaining evidence. Over time, the memories approached fable: tales of profusion and excess that were hard to believe, tempered by warnings of what went wrong. While much destruction did occur, the fisheries were not completely destroyed. On some streams and rivers the capacity of the resource to replenish itself remained. Even so, there was severe loss. And there was also a sense of violation. A sort of communal irresponsibility had taken hold of the region. It had lost control of itself.

Chapter 17 Cumulative Loss

The historian Anthony Netboy devoted much of his career to documenting the worldwide decline of salmon. Published in 1973, his 600-page text, *The Salmon, Their Fight for Survival*, presents a discouraging global assessment of human impact on the Atlantic and Pacific species. What stands out is the step-wise pattern of cumulative loss over time. Region after region, river by river lost its fisheries wherever population growth and industrialization occurred. "For at least 1,500 years the Thames provided sport for anglers," Netboy wrote. "The Thames, the longest river in England, is a notable but not unique example of the total destruction of a renowned salmon producer, a fate it has shared with the Seine, Rhine, Connecticut, and many other major waterways in Europe

and North America."[449]

As in much of Europe, salmon in the river basins of northeastern America and many of its western watersheds likewise came to exist only in memory. In each area, growing and industrializing societies seemed incapable of avoiding the hard mistakes of their predecessors. Lessons from the past could never successfully inform strategies for the future. There was a sort of enigma about the relationship between these societies and their fish. It was hard to explain how such a highly prized economic and cultural resource nevertheless vanished at the hands of those who valued it, time after time across different places.

One hundred years before Netboy published his history, the United States Fish Commission had published a report on the condition of southern New England's fisheries that included a condolence from Great Britain. "The Americans, like ourselves," it observed, "have begun to find that fisheries will die out if the fish are hindered from spawning, and are taken at all times and of all sizes."[450] The colonies had owed their existence largely to the fisheries trade. It was the mainstay of communities along New England's shores comprising one of the principal sources of wealth for early settlers.[451] But during the nineteenth century the species disappeared across the Northeast. By the Civil War most streams were barren, consigned to the memory of old timers. Dams and

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[449] Anthony Netboy, *The Salmon: Their Fight for Survival* (Boston: Houghton Mifflin Company, 1973), p. 68.

[450] Spencer Fullerton Baird, *Report on the Condition of the Sea Fisheries of the South Coast of New England in 1871 and 1872* (Washington, D.C.: Government Printing Office, 1873), p. 144 ("Extract from the London field").

[451] Raymond McFarland, *A History of the New England Fisheries* (New York: University of Pennsylvania, 1911), pp. 57-77; Idyll, C.P., "Coastal and marine waters," in *Origins of American Conservation*, Henry Clepper, editor (New York: The Ronald Press Company, 1966), pp. 74-75.

other artificial obstructions, saw and paper mills, gasworks, factories and fishermen were all responsible, and everywhere each state shared identical problems.[452]

On the Connecticut River—the largest river in New England—the fall of salmon was particularly hard. "Wonderful things are said about their abundance in colonial days," a Fish Commission historian wrote in 1884. As recounted in a popular tale the fish was once so plentiful that apprentices and paupers protested against eating it more than twice a week. But by the early 1800s salmon "began rapidly to diminish." The river had supplied the New York market, which instead turned to Maine's Kennebec River. In 1819 an observer noted that salmon "had scarcely been seen" in the river for 15 or 20 years. In 1872, when "a solitary Salmon made its appearance" at the foot of a dam 100 miles from the river's mouth the local fishermen did not know what the fish was. "The circumstances of their extermination in the Connecticut are well known," the Fish Commission wrote, "and the same story, names and date changed, serves equally well for other rivers."[453]

Managing the fate of fish and wildlife was largely the responsibility of state governments.[454] The colonies passed acts to safeguard their fisheries since the seventeenth century. Forward-thinking lawmakers imposed provisions restricting the

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[452] Dean Conrad Allard, Jr., *Spencer Fullerton Baird and the U.S. Fish Commission* (New York: Arno Press, 1978), p. 118; *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. xlvi, xlix.

[453] Goode, G.B., 1884, p. 469; Allard, Jr., D.C., 1978, p. 118; *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. xlvi, xlix.

[454] Only conservation activities incidental to national government functions expressly delegated by the constitution were superior, including the regulation of interstate and foreign commerce, treaty making and ownership of territories and other property. McEvoy, A.F., 1986, pp. 101, 109; Robert H. Connery, *Governmental Problems in Wild Life Conservation* (New York: Columbia University Press, 1935), pp. 32-34, 53, 178; Thomas A. Lund, *American Wildlife Law* (Berkeley and Los Angeles: University of California Press, 1980), pp. 46-47.

time, mode and extent of fishing—they banned baskets, hoop nets and explosives used to catch fish. Dams required fish passage. Laws also compelled the removal or abatement of obstructions, sewage, sawdust, gas works and tannery refuse, industrial drainage, mine pumping and diversions.[455] In spite of all the legislation the health of the waterways deteriorated and the eastern fishing industry declined.[456]

The state of Maine typified this experience. Between 1821 and 1880 it passed 433 acts relating to fisheries of which 161 dealt specifically with migratory fishes. Well before statehood Maine's colonial leaders had passed acts of similar intent. Of special concern was preventing the loss of fish to dams; such devices had helped to destroy many fisheries across Great Britain and Europe. Owners were required to construct and maintain fishways, "the limitation, being for the public benefit, is not extinguished by any neglect to compel compliance." As early as 1741 a general act provided for a court of justice to appoint committees to inspect dams to ensure compliance. For over 150 years, uniform legislation provided considerably for the enforcement of the rules and imposed a heavy penalty to a breach of the law. Nonetheless, its result as tallied by a Fish Commission report in 1887 was unequal to its intention.[457]

The publication devoted 27 pages to chronicle the decline, including the impact attributable to blocked or inadequate fish passage from hundreds of dams. On the Saint

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[455] Idyll, C.P., in *Origins of American Conservation*, 1966, pp. 74-77; *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. xlv-l; Connery, R.H., 1935, pp. 214-215; Spangler, A.M., in *Bulletin of the United States Fish Commission, Volume 13, for 1893*, 1894.

[456] Idyll, C.P., in *Origins of American Conservation*, 1966, pp. 74-77; *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. xlv-l; Connery, R.H., 1935, pp. 214-215.

[457] Atkins, C.G., "The river fisheries of Maine," in *The Fisheries and Fishery Industries of the United States, Section V, Volume 1,* George Brown Goode (Washington, D.C.: Government Printing Office, United States Commission of Fish and Fisheries, 1887), pp. 726-728.

Croix River, "the building of dams had reached such a stage as to seriously interfere with the ascent of fish, and they began rapidly to decline in numbers." On Denny's River, "[t]he effect of this was to nearly exterminate the alewives, and the salmon, though they continued to breed in the river below this dam, were reduced to very small numbers." On the Cobscook, "three insurmountable dams were built many years ago, utterly exterminating the salmon, and reducing the alewives so that the catch was barely a dozen a year." On the Machias, "[s]almon continued to breed and be caught in the river, until other and impassable dams were built, when they too disappeared along with the shad and alewives." On the Narraguagus, "great numbers of salmon, shad, and alewives were taken here, but the dams at Cherryfield long ago destroyed them." On the Kennebec, "there are dams at Augusta, Waterville, Fairfield, Somerset Mills, Skowhegan, and Madison. All of the tributaries are dammed at frequent intervals." On the Cobbosseecontee "there are 8 dams within 1 mile of its mouth." On the Sandy "there are 3 dams within the natural range of fish, the same number on the Carrabasset; on the Sebasticook and branches 15 or more…."[458]

Those who knew the history of the Northeast worried about the future of the Pacific Northwest. Richard Rathbun, a government fisheries scientist with the Fish Commission and Smithsonian Institution, was well familiar with the issue. He had studied the decline of boundary water fisheries on a joint Canadian-United States commission in the 1890s.[459] On the one hand, he wrote, the abundance of salmon in the

[458] Atkins, C.G., in *The Fisheries and Fishery Industries of the United States, Section V, Volume 1,* 1887, pp. 699-726.

[459] Kurkpatrick Dorsey, *The Dawn of Conservation Diplomacy: U.S.-Canadian Wildlife Protection Treaties in the Progressive Era* (Seattle: University of Washington Press, 1998), pp. 41-42.

region seemed limitless and was "so great as to challenge human ingenuity to affect it in any way." But in light of what happened to the northern Atlantic rivers, he warned, "we are led to recognize the omnipotence of man in this direction at least."[460] As Rathbun had feared, the harsh experience of the east coast replayed in California, Oregon and Washington. In 1911, John Cobb appraised the governing performance of the region and found large failures. He argued that "selfish interests which have no regard to the future" had thwarted the creation of needed laws, and the enforcement of existing laws "was and is yet difficult to secure."[461]

At least two causes had contributed to this outcome. First, the fisheries were not the region's sole economic activity. In the preexisting Northwest Coast economy fishing had been the fulcrum upon which everything rested.[462] But now competing interests had converged on the rivers, including mining, agriculture, timber, industry and manufacturing, transportation, hydroelectric and municipal. Because each of these interests held different priorities, there was little reason for them to support or obey legislation to protect fish habitat. Starting in the 1840s, as California, Oregon and Washington grew, multiple and simultaneous impacts damaged fish habitat and thereby weakened the spawning and survival capacity of the resource.

Livingston Stone witnessed part of the devastation. In 1872 the Fish Commission detailed him to find one of northern California's few remaining intact fisheries. Stone found it in a deeply remote territory under the protection of a Wintu Native group that

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[460] Goode, G.B., 1887, p. 79; Rathbun, R., in *Report of the Commissioner of Fisheries, 1899* (1900), pp. 331, 333.

[461] Cobb, J.N., 1911, pp. 41-45.

[462] Drucker, P. 1955, p. 24.

had retreated far up the McCloud River. Across much of the state miners, farmers and loggers had already forcibly scattered or killed nearly all of the Native groups. Evaluating the devastation, Stone wrote that "every contrivance employed that human ingenuity can devise" in tandem with "the slow but inexorable march of those destroying agencies of human progress" had caused the salmon to disappear, "as did the buffalo of the plains and the Indians of California."[463]

The final salmon holdout among the Wintu would vanish. Speaking before the American Fisheries Society in 1892, Stone concluded that between the "murderous greed of the fishermen" and "the white man's advancing civilization," there was no hope for salmon. "[T]here was no power in the world that could have prevented the mining on the Feather, the Yuba, the American Fork, or the other spawning streams of the salmon," he lamented. "Nothing could have stopped the building of the railroad up the Little Sacramento or the erection of the saw mills on the upper McCloud."[464] His assessment was bleak.

The other cause that contributed to the loss of Pacific Northwest fisheries was rooted in cultural and social factors. There were no strategies in place to shape attitudes and guide behavior. Absent was a set of beliefs, traditions and expectations that proscribed how humans should interact with nature for the benefit of both systems. To some extent this may have reflected the absence of a locally-dominant fisheries economy. While some groups clearly benefitted from the fishery, others did not. There was little need to compel everyone to protect the resource. Society's collective survival did not

[463] *Bulletin of the United States Fish Commission, Volume XII, 1892* (1894), pp. 14-19.

[464] *Bulletin of the United States Fish Commission, Volume XII, 1892* (1894), pp. 14-19.

require it. Because the economic priorities of the region were not entirely connected to the fisheries, so, too was the socio-cultural way of life disconnected from nature. The mentality toward exploitation was instead more akin to "anything goes." There was little urgency to compel society to manage the risk of a fisheries collapse. For the most part—economically, socially and culturally—it simply did not care about what lay on the horizon. For those who did see long-term value in protecting the fisheries, their efforts were largely futile.

Some observers attributed this attitude to a national psyche that believed resources were the property of everyone, destruction was inevitable and altogether it served the immediate common good. An historian of the American West described the nineteenth-century settlers of the Willamette Valley of central Oregon as invaders. Their "economic and biological system" was alien to the Native systems already in place. Their cultural conventions were wholly different. They prioritized personal gain and participation in wider economic markets. Such behavior ultimately led to a rift between themselves and the land of the Pacific Northwest.[465] As one fisheries expert argued in 1892, Americans were "eager to take advantage of any and every opportunity for increasing individual or national prosperity." While at the same time, "protective laws were infractions of popular rights and thus were entitled to no respect." Even among the regulators, "sworn duties are rarely performed and that infractions being thus winked at by the authorities, the laws are brought into contempt."[466] There was no unity within society as to why resources needed protection or how to ensure their protection. Nearly

[465] Boag, P.G., 1992, pp. 97-98.

[466] Spangler, A.M., in *Bulletin of the United States Fish Commission, Volume 13, for 1893,* 1894.

75 years later, in 1968 the biologist Garrett Hardin likewise argued that "a society that believes in the freedom of the commons" would effectively rationalize individual greed to the detriment of both natural resources and general society.[467]

And yet there were examples of traditional societies that had successfully managed commonly owned resources.[468] What was perceived to be common property often was subject to economic activities regulated by social relationships, common values and rules.[469] Some pre-capitalistic societies had developed informal institutions based on customs, taboos and kinship rather than legislation and juridical procedure. Economic resources were culturally managed and subject to highly regulated structure and function. Such societies had emphasized sharing among members rather than accumulating wealth, and conserving and allocating resources to the benefit of local communities rather than bending to the potentially excessive interests of outsiders.[470]

In the Pacific Northwest prior to the arrival of the newcomers, many Native groups had developed and implemented what essentially functioned as a cohesive cultural and social regulatory apparatus. First, they accorded spiritual standing to important species. Religious beliefs and customs in the form of ceremony, myth and taboo provided rules of engagement for the treatment and use of natural resources. As the ethnologist

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[467] Hardin, G., "The tragedy of the commons," *Science* 162(December 13, 1968):1243-1248, p. 1244.

[468] Clark, C.W., "The economics of overexploitation," *Science* 181(August 1973):630-634; See: McEvoy, A.F., 1986, pp. 10-16.

[469] Berkes, F., "Fisherman and 'The Tragedy of the Commons,'" *Environmental Conservation* 12,3(Autumn 1985):199-206, p. 204; Ciriacy-Wantrup, S.V. and Bishop, R.C., "'Common Property' as a concept in natural resources policy," *Natural Resources Journal* 15(October 1975):713-727, pp. 714-715, 721.

[470] Suttles, W., 1987, pp. 20-21; Ciriacy-Wantrup, S.V., "The economics of environmental policy," *Land Economics* 47(1971):37-45, p. 43; Gordon, H.S., "The economic theory of a common-property resource: the fishery," *Journal of Political Economy* 62(1954):124-142.

Pliny Earle Goddard described in the 1924 *Indians of the Northwest Coast*, Native peoples believed that animals had immortal souls, usually became reincarnated, were "practically our equals" in general intelligence and surpassed humans "in the particulars for which the animal in question is especially noted." Among the Haida of British Columbia, for example, animals were capable of taking on or even possessing a human form, with varying degrees of supernatural power.[471] As Elmendorf recorded among the Twana Natives along the Hood Canal, the ceremonial recognition of salmon was a serious matter. The first returning crooked-jawed salmon marked a special occasion in which children ate the fish, thanked him and invited him to come again. "They ate even the skin and the head, ate him all up. Every child in the village had to eat some of the fish. This was to bring the run the next year."[472]

Second, within communities there was nearly universal participation in the catch and processing of valuable fisheries. This ensured that the technologies and tools of exploitation were shared and integrated. There were clear boundaries and limits. Those who violated the rules were held accountable or ostracized. Among communities there was the expectation that fishing rights should be honored. According to Elmendorf's informants, for example, there was a "dislike of 'outsiders'" from distant areas "persistently intruding, for hunting" within Twana territory. "Such intruders were 'impolite,' they 'didn't know how to act,' 'they hadn't been brought up right.'" If persistent, they were told to leave.[473]

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[471] Pliny Earle Goddard, *Indians of the Northwest Coast* (New York: American Museum of Natural History, Handbook Series No. 10., 1924), quote on p. 113, p. 112.

[472] Elmendorf, W.W., 1993, p. 254.

[473] Elmendorf, W.W., in *Coast Salish and Western Washington Indians, Volume IV*, 1974, p. 309.

Finally, resources were often distributed equitably across social strata and in line with natural fluxes. Material wealth was dispersed more than it was concentrated. When seasonal returns of certain species were abundant, excess catch was processed and stored in anticipation of harder times. In these interconnected ways everyone understood that the survivability of their families and communities depended upon protecting the long-term health of the fisheries.[474]

In contrast the regulatory system of laws put into place by late nineteenth-century state governments on the West Coast was a failure. It suffered from a variety of systemic problems. Foremost was inadequate enforcement and prosecution of conservation laws. Partly this was because of lack of funds. In 1911, for example, a senate panel investigating the Washington State Fish Commission concluded that it was impossible for the commissioner to enforce closed season laws because "he is not furnished with sufficient boats, men and appliances necessary in order to enable him to patrol the fishing grounds."[475] The succeeding commissioner reported that his department had two field deputies responsible for covering an area of operation over 1,000 square miles.[476]

The problem was not new to the region. In 1899 the department explained to the governor that it was forced to avoid "anything like a systematic prosecution" of

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[474] As explicated in Part 2, Salmon Dwellers. See also: Ciriacy-Wantrup, S.V. and Bishop, R.C., *Natural Resources Journal*, 1975, pp. 713, 722; Ciriacy-Wantrup, S.V., 1971, pp. 43-45; Berkes, F., *Environmental Conservation*, 1985, pp. 199-205; Rathbun, R., in *Report of the Commissioner of Fisheries, 1899* (1900), pp. 329-335; Hewes, G.W., "Indian fisheries productivity in the pre-contact times in the Pacific Salmon area," *Northwest Anthropological Research Notes* 7,2(Fall 1973):133-155, p. 149.

[475] *Twenty-Second and Twenty-Third Annual Reports of the State Fish Commissioner,* 1911-1912 (Washington State Fisheries Commission, 1912), p. 28.

[476] *Tenth and Eleventh Annual Reports of the State Fish Commissioner,* 1899-1900 (Washington State Fisheries Commission, 1901), p. 18; *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner,* 1915-1917 (Washington State Fisheries Commission, 1917), p. 11.

violations of the law because "it was not right for us [to] dodge out and punish one man for the violation of the law when it was a fact well known to every one that a majority of the cases were to be allowed to pass without notice." Otherwise, the department's current "bluff" policy would have backfired if such a small group tried to enforce laws without adequate funds and assistance. "[I]f it is the intention of the Legislature that these laws should be enforced," the fish commissioner advised, "certainly they should provide sufficient appropriations to pay for the expenses of the same."[477] In Oregon similar problems beset the commission. "We have no power to appoint deputies," the state's 1891-1892 annual report stated, "and the three commissioners can travel over but a small portion of the fishing grounds of this state in one night. So about all the law does, as it now stands, is to compel the law-abiding citizen to stay ashore, while some, who are always ready to dare the law, will go and fish."[478]

When fisheries departments did manage to arrest violators, local attorneys and judges were not always sympathetic to the state. "From our past experience it has been clearly demonstrated to us that to make an arrest and turn the matter over to the average county authorities without appearing in person to prosecute the case, seldom results in any good," a Washington commission report stated in 1899.[479] Years later, in 1912, game wardens remained frustrated by local attorneys who repeatedly refused to prosecute dam owners despite continuing protests from the department. In Oregon, the master fish

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[477] *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1901), pp. 17-18.

[478] *Fifth and Sixth Annual Reports of the State Board of Fish Commissioners to the Governor of Oregon*, 1891-1892 (Oregon Fisheries Commission, 1893), p. 38.

[479] *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1901), p. 18.

warden wrote of fishways that "when I have produced evidence in substantiation of my contentions I have, in most cases, been overruled by the courts." Similarly, federal officials described a state trial of gill-net fishermen in California where strong evidence failed to compel a jury to convict. A local justice had successfully made the case that the law was ambiguous because "the words 'more than one-third across the width' of a river involve the distance between two remotely distant points on the opposite sides of the river!"[480] In Washington an official wrote to the governor that his department was afflicted by the wide-scale failure of courts. The problem was so acute that the commissioner L.H. Darwin recommended that the state attorney general assign someone to assist the department where counties were making a "farce" of the law.[481]

Political pressures similarly trivialized the normal course of justice. In 1897 affidavits from citizens across Washington found fault with state fish commissioner James Crawford, who was later removed from office because of misconduct. At Grays Harbor he knowingly failed to stop a packing company from repeatedly violating closed season laws; in Chehalis County he neglected to require several dams to construct fishways, allowed a shingle mill to dump its saw dust into the Chehalis River, and viewed a cannery catching fish illegally without taking legal action. As one legislator wrote: "There are in the county, and in fact all over the state, many notorious violations of the laws relating to the fishing industry, and just as notorious neglect of duty regarding the

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[480] *Twenty-Second and Twenty-Third Annual Reports of the State Fish Commissioner, 1911-1912* (Washington State Fisheries Commission, 1912), p. 121; *Biennial Report of the Department of Fisheries of the State of Oregon, 1911-1912* (Oregon Department of Fisheries, 1913), p. 96; Smith, H.M., "Notes on a reconnaissance of the fisheries of the Pacific Coast of the United States in 1894," in *Bulletin of the United States Fish Commission, Volume XIV, 1894*, (1894), p. 224.

[481] Leslie Darwin to Ernest Lister, September 12, 1914 (Box 2H-2-50, "1913-1916" file. Washington State Archives, Olympia, WA).

same by the present fish commissioner."[482]

Fifteen years later similar claims were leveled at fish commission personnel. "[T]he Fish Trust has practically controlled every legislature since 1899," a Whatcom County assessor charged in a letter to Governor Ernest Lister. "[T]he fish Interests have been the financial backing of every 'machine' we have had here in Whatcom county…. I wish to enter a vigorous protest against the appointment of any man as Fish Commissioner unless he has been 'fire tested.'"[483] A federal official summed up the problem in 1898, reporting on the difficulty of obtaining good laws, "while measures to legalize the employment of the most destructive devices for taking fish find numerous supporters and comparatively easy passage."[484]

There was also a sense of inequality—a belief that the system was unfair. A Washington commissioner described it as "the feeling that the big fellows have been getting the fish," sometimes illegally, "and that the little fellow ought not to be prosecuted when he gets a few illegally."[485] Critics thought that state officials too often sided with industry. "The state commissioners are political appointees whose tenure of

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[482] State of Washington Executive Department. E. R. Rogers, August 12, 1897 (Box 2C-1-4, "Files of Governor John Rogers, Fish Commission, Removal of James Crawford, 1897." Washington State Archives, Olympia, WA); Chas McManree, L.M. Rice, Frank Osborn to Rogers, affidavit, April 12, 1897; Frank Osborn to Rogers, affidavit, April 12, 1897; E.M. Hoover to Rogers, affidavit, April 13, 1897; W.H. Abel to Rogers, April 15, 1897; D.M. Harris to Rogers, July 23, 1897; John A. Gilkey to Rogers, May 6, 1897 (Box 2C-1-4, "Records of Governor John Rogers, Fish Commission, 1897." Washington State Archives, Olympia, WA).

[483] W.H. Kaufman to Ernest Lister, December 28, 1912 (Box 2H-2-50, "Fisheries Commission 1912, 1913-1916" file. Washington State Archives, Olympia, WA).

[484] Connery, R.H., 1935, pp. 203-206, 214-215, 225; Meehan, W.E., "The relations between state fish commissions and commercial fishermen," in *Bulletin of the United States Fish Commission, Volume XVII, 1897*, (1898), p. 345.

[485] Leslie Darwin to Ernest Lister, September 12, 1914 (Box 2H-2-50, "1913-1916" file. Washington State Archives, Olympia, WA).

office is limited to the length of time their party may be in power," the *Pacific Fisherman* wrote in 1907. The trade journal argued that fishing interests controlled state legislation and worked to defeat protective laws. Moreover, "the laws on our statute books are not enforced if they hamper to any extent the interests which have friends at 'headquarters.'"[486]

The impression of unfair policies extended into boundary waters. Commercial fisheries laws created serious disputes between states and between the United States and Canada. The animosity between Oregon and Washington over the Columbia River on behalf of the canneries so threatened the fisheries that President Roosevelt, in a message to Congress, recommended federal intervention. In 1908 the government superseded Washington in resolving international conflicts with Canada and Great Britain over the valuable Frasier River sockeye runs. Two years earlier Congress had enacted laws for the territory of Alaska, in part because of lack of effective regulations, and entrusted enforcement to the Bureau of Fisheries.[487]

In 1914, a citizen of Winlock, Washington, a small town midway between Olympia and the Columbia River, sent a letter to Governor Lister to complain about the inability of the state to protect the fisheries on a creek nearby his home. "I take Pleasure in Droping you a few Lines to Let you Know how things is here [sic]," R.C. Freeman wrote, describing a pattern of widespread industrial pollution, impassable fish obstructions, dishonest wardens, inattentive officials and partial enforcement.

I Notified the state Fish Commissioner the 24 of Sept of the Condition of the Fish

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[486] *Pacific Fisherman* 5,10(October 1907), p. 15.

[487] Cobb, J.N., 1911, pp. 41-45. In 1903 the United States Commission of Fish and Fisheries was abolished and replaced by the Bureau of Fisheries under the Department of Commerce and Labor.

> wayes was here and Also how the Creek was it is so full of Refuse that a Trout could not Git through unless they had Wings so they Could Fly up the creek and the water is Black as ink and smells so Bad that the Fish could not Live in such water and the saw Dust and Bark is so thick you cant see the water only in some Places. Below the Dam here in Town the creek is Plum Full fore a 1/4 of a mile and all kind of Refuse From the Logging going in the water all the time so now you are the third Governer I have Informed of the condition of this Creek here But I've Been unable to Git Enything Don Fore the Protection of the Fish. we have no Fish here now and will not have fore some time to come if this is not stopt now. I sent word to the Stat Commisioner he Notified Our County Gam Warden so he Wrighten me But Our Game wardens here Know Just the Shape Every thing is here as well as I Do. But they will not Force the Law on thes Big Companys. But if they find some one that Dos not Employ a Lot of men they will sinch them. the Deputy Fin[e]d a cuple of Boys the other Day $10.00 and cost Fore having 2 Trout under 6 in. in their Posesion. Now to stream I Refer to is the Olequa Creek in Lewis Co Wash. The Logging Co here By the Name of OConell Lumber Company has a Drg Saw on a float in the Dam to Cut up their Logs with and I also here that Veness Lumber Co Dos the same But I have not Been Down their to see But I will Tell you who I have Been after. I started with Gov Mead. and Riseland and then Governer Hay and Riseland and John sent Link Barten Here to Look after the Fish wayes and Just as well sent a 10 year Old Boy fore they bought him off so he would not Do Anything Or it Looked oful much Like it. now we want something Don so we can have some Fish here. fore I am Greaty Surprised at Mr. L.H. Darwin sending a notice to the warden here fore he has Been Notified a Good many times of how things is Down here so I will close as Ever Your Friend.[488]

Over the span of about ten years Freeman had argued to three governors that his government could not protect the fisheries. His assessment was correct. The surge in economic activity to develop natural resources had overwhelmed the regulatory system's ability to manage the risk of damaging the fisheries. Those who exploited the resource were not responsible for protecting it. Many were free to disobey or ignore laws. Community orientation around local fisheries was fragmented. Laws promulgated by distant and centralized state regulators fostered separation and disrespect for the legal system, even among those charged to uphold and enforce the laws. There was no real

[488] R.C. Freeman to Governor Lister, October 19, 1914 (Box 2H-2-50. Washington State Archives, Olympia, WA).

connection between communities and the fisheries—no comprehensive sense of consequences should the resource collapse. There was detachment and disengagement as the destructive tendencies of society went unchecked. Because the region was unable to deal with the adverse effects of this behavior, it was disconnected from considering and managing risk in any meaningful way.

Reports of tours and field investigations of the Pacific Northwest and Alaskan fisheries provided meticulous details of a dysfunctional system. Some federal officials came to believe there was a strong inverse relationship in the quality of resource protection between the disappearing Native societies and the expanding Euro-American society. "It may safely be said that wherever the white man plants his foot and the so-called civilization of a country is begun," Commissioner Spencer Baird wrote in 1878, "the inhabitants of the air, the land, and the water, begin to disappear."[489]

From California to Alaska officials reported similar stories. Among the Wintu on the McCloud River in California, Livingston Stone was so worried about the plight of the remaining Natives and salmon runs that he recommended military protection for the "superior and inoffensive race." In 1877 a garrison of soldiers arrived to protect the area, including the nation's first salmon hatchery that Stone had built.[490] In 1898 Commissioner Jefferson Moser described how Alaskan Natives sent delegations to his vessel to protest the methods of the non-Native fishermen. For centuries the Native families and clans had held rights to the streams. "They claim the white man is crowding

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[489] *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), p. xlv.

[490] *Report of the Commissioner for 1873-4 and 1874-5* (Washington, D.C.: Government Printing Office, United States Commission of Fish and Fisheries, Part III, 1876), pp. 408-410; McEvoy, A.F., 1986, p. 50 (quote).

them from their homes, robbing them of their ancestral rights, taking away their fish by shiploads," Moser wrote. They worried their fisheries would soon be destroyed, leaving their families with no supplies and the prospect of starvation. They did not understand "how those of a higher civilization" could fish on streams "not their own" without invitation.[491]

As Native management regimes disappeared, a wealth of tradition and accumulated experience also was lost. During his many years with the Natives in the Skokomish River area starting in 1874, Eells noted that the younger persons did not know the names of tools and implements whose use became obsolete soon after non-Natives arrived. "This shows how quickly the past is forgotten," he wrote.[492] In his interviews with older Quileutes in the 1950s, Singh had found that "the old Indians had a sense of conservation" and were upset by new methods employed by the commercial fisheries. They had warned the young Natives participating in the industry that it could not last. Singh reported that "the ancient life-way is not only gone, it is forgotten by most; only a few elders in each tribe remember it… Only a few recall old ways of hunting, fishing, and berry picking."[493]

Erna Gunther provided a stark assessment in 1940. Her ethnobotanical study of western Washington had hoped to illuminate the cultural and material interplays of various Native groups. But rapid environmental change and acculturation over the

[491] Moser, J.F., in *Bulletin of the United States Fish Commission, Volume XVIII, 1898* (1899), p. 43.

[492] Smithsonian Institution, 1889, p. 609; See also: Eells, M., 1996.

[493] Lichatowich, J., "Managing for sustainable fisheries: some social, economic, and ethical considerations," reprint from *Proceedings of a Symposium: Environmental Ethics and Future Management of Fishery Resources* (Oregon Chapter, American Fisheries Society, 1989), pp. 11-16; See: Darling, F.F., "The ecological approach to the social sciences," *American Scientist* 39,2(April 1951):244-256; Singh, R.R.P., 1966, quotes on p. 29, p. 8.

preceding decades had undermined her efforts. “Constant work with these people brings out again and again the dearth of knowledge of many phases of the older culture,” she wrote reflecting upon her research dating back to the 1920s. “It frequently happened that an informant said, ‘Where did you find this plant? I haven’t seen it in years,’ or ‘I know that plant, but I can't call it’—meaning that he had forgotten the name.” In the mid-1920s, Gunther had “talked with old men who knew that bows were made of yew wood but had never used one seriously.” She had learned that “many an old woman wished she could dig camas for a meal but instead she cooks navy beans or macaroni.” She had found that “people of middle age have heard their grandparents talk of cedar-bark clothing … but the cast-off clothing which white people trade for baskets, or clothing ordered from Sears-Roebuck has been the standard wearing apparel for them all their lives.” With the exception of some old medicinal usages, too much change had occurred from deforestation and non-native flora from farming for Gunther to test seriously her original hypotheses. “So instead of working only against the dying out of people who participated in some of the old culture,” she concluded in 1940, “here even the very materials on which the culture depended are disappearing and changing.”[494]

During the latter half of the nineteenth century the cycle of loss that had earlier visited northeastern America’s fisheries began to repeat itself in the Pacific Northwest. Notwithstanding warnings and efforts to prevent the outcome, economic pressures on the newly developing region were too powerful to harness. There was a spiraling loss of habitat and fish populations as each decade passed.

[494] Erna Gunther, *Ethnobotany of Western Washington. The Knowledge and Use of Indigenous Plants by Native Americans* (Seattle, WA: University of Washington, 1973), pp. 8-10, quotes on pp. 9-10.

Coincidentally, in the meantime New England legislatures were starting to evaluate how to reverse many decades of withering impacts to their fisheries. They formed fish commissions to investigate why conservation laws had not worked and whether other solutions existed. In a report on Vermont's fish resources submitted in 1857, George Perkins Marsh concluded that lack of enforcement and interstate coordination had left many laws ineffective. In 1865 New Hampshire and Vermont appointed fish commissions to handle the matter of dams blocking the passage of fish in downriver states. Massachusetts, Connecticut, Rhode Island and Maine established commissions to evaluate existing laws. The 1870s were a turning point for fisheries conservation in the United States. During their course of investigation the New England commissions came to view the work of private fish culturists as a potential means of replenishing the nation's waters, of stopping the cumulative loss. They convinced the U.S. Congress to fund federal research into the possibility of using aquaculture to solve the country's problems.[495]

Chapter 18 The Golden Hammer

When Livingston Stone reached the upper reaches of the McCloud River in the early 1870s, he had located an extraordinary place—one of the only remaining intact salmon fisheries in California that gold mining had not destroyed.[496] Stone's assignment for the U.S. Fisheries Commission was to find a source of fish eggs that could be used to rebuild depleted salmon runs on the East Coast. Fish breeders held the California salmon in high

[495] Allard, Jr., D.C., 1978, pp. 114-121.

[496] Stone, L., "The artificial propagation of salmon on the Pacific Coast of the United States," in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), pp. 216-218, 221.

regard, believing it hardy and free from disease. Stone had found a good source protected deep in the High Cascades by a community of Wintu Natives. The fish "were so thick in the river …" he noted in his July 1875 journal, "that we counted a hundred salmon jumping out of the water in the space of a minute, making 6,000 to be actually seen in the air in an hour." His crew stripped nearly 9 million eggs from the spawning runs that summer.[497] By the turn of the century Fish Commission operations in California distributed over 50 million embryos to hatcheries throughout America, Europe and Australia.[498]

In 1871, East Coast fish commissioners and a new trade group called the American Fish Culturists' Association had asked Commissioner Spencer Baird to consider a national program to develop artificial fisheries propagation. Fish culture was based on techniques long used in Europe, gathering and distributing naturally or artificially impregnated eggs to transfer to distant waters. The practice was even older, dating back to antiquity.[499] New England states had attempted to develop hatcheries to rebuild Atlantic salmon runs but could not easily obtain spawn—few rivers had the fish left. They looked to suppliers using healthy Canadian streams but were rebuffed by costs

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[497] Goode, G.B., 1884, p. 485; Stone, L., in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), p. 212; *Report of the Commissioner of Fisheries, 1877* (United States Commission of Fish and Fisheries, Part V., 1879), p. 34.

[498] *Report of the Commissioner of Fisheries, 1877* (United States Commission of Fish and Fisheries, Part V., 1879), pp. 34-35; Stone, L., in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), p. 228; Goode, G.B., 1884, p. 485.

[499] Allard, Jr., D.C., 1978, pp. 117-130; United States Fisheries Commission, *A Manual of Fish-Culture, Based on the Methods of the United States Commission of Fish and Fisheries* (Washington, D.C.: Government Printing Office, 1897), p. 31; A. Hunter Dupree, *Science in the Federal Government* (Cambridge, MA: Belknap Press, 1957), p. 237; Goode, G.B., "The status of the U.S. Fish Commission in 1884," in *The Fisheries and Fishery Industries of the United States*, George Brown Goode, editor, United States Fisheries Commission (U.S. Congress, Senate Miscellaneous Document 124, 1884), p. 1155.

of $1,000 per gallon of eggs imposed by the country's government. State commissions thus appealed to federal resources to facilitate egg production from western streams and help individual states to coordinate hatchery production on large interstate rivers. [500]

Baird liked the idea. Congress had created the agency to advise the nation on what ailed the fisheries and recommend what could be done to correct the problems. The Fish Commission understood the insufficiency of prevailing theories of an "inexhaustible" nature, having witnessed the loss of part of North America's coastal fisheries. Baird saw aquaculture as a means to bring applied science to bear not only on the country's natural resource problems, but also to serve larger economic interests. Commission scientists saw their work as providing the country with valuable natural product, no different from mining, irrigation and forestry sectors. Its scientists even compared their work to crop and livestock management. "It is as if … we had in ten or fifteen years to bring the science of agriculture from nothingness up to where it could supply the wants of 50,000,000," one official wrote. [501]

Baird was a widely respected natural scientist who later served as secretary of the Smithsonian. His view of fish culture as carrying out economic interests prevailed for

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[500] *Report of the Commissioner of Fisheries, 1872 and 1873* (United States Commission of Fish and Fisheries, 1874), pp. 523-554; Stone, L., in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), p. 205; United States Fisheries Commission, *A Manual of Fish-Culture, Based on the Methods of the United States Commission of Fish and Fisheries*, 1897, p. 31; Stone, L., "Some brief reminiscences of the early days of fish-culture in the United States," in *Bulletin of the United States Fish Commission, Volume XVII, 1897* (1898), p. 338; Allard, Jr., D.C., 1978, pp. 123-125.

[501] Goode, G.B., "The relation of scientific research to economic problems," in *Bulletin of the United States Fish Commission, Volume XIII, 1893* (1894), pp. 53, 57, 55; Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, p. 1152; Connery, R.H., 1935, p. 15; Goode, G.B., in *Bulletin of the United States Fish Commission, Volume XIII, 1893* (1894), p. 52; Bumpus, H.C., "The importance of extended scientific investigation," in *Bulletin of the United States Fish Commission, Volume XVII, 1897* (1898), p. 178; Smiley, C.W., "What fish culture has first to accomplish," in *Bulletin of the United States Fish Commission, Volume 4, for 1884* (Washington, D.C.: Government Printing Office, 1884), p. 67 (quote).

decades, long after his passing in 1887. In 1893 George Brown Goode, a former Commissioner, echoed Baird by noting the "importance of securing the aid of science for the solution of economic problems."[502] These efforts—to foster the science of fish culture in order to promote the efficient use of economically valuable resources—were ahead of their time. Commission officials were forerunners of a national movement that sought to conserve and properly manage natural resources in the early twentieth century.[503]

Baird also believed that fish culture provided an opportunity for the commission to expand its scope and size. The commission was legally powerless to promulgate laws—even if it had wanted to—and reluctant to recommend unpopular legislation to Congress. He agreed with many Northeast officials that legal restrictions had been unable to prevent the ruin of the fisheries. In spite of the importance of enacting and enforcing legislation, such measures had not worked and held little promise. The pressures of the nation's economic development were too strong to withstand.[504] "Protection of fish by laws is what legislators have been trying to effect for many centuries," the commission stated in 1884, "and we are bound to admit that the success of their efforts has been very slight indeed."[505] While it recognized other methods such as preserving fish waters in

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[502] Goode, G.B., in *Bulletin of the United States Fish Commission, Volume XIII, 1893* (1894), pp. 53, 57, 55; Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, p. 1152.

[503] Gerald D. Nash, "The conflict between pure and applied science in nineteenth-century public policy: the California State Geological Survey, 1860-1874," in *Science in America since 1820*, Nathan Reingold, editor (New York: Science History Publications, 1976), pp. 174-185; Connery, R.H., 1935, pp. 5-15, 115-116; Dupree, A.H., 1957, pp. 232-240; Goode, G.B., in *Bulletin of the United States Fish Commission, Volume XIII, 1893* (1894), pp. 49-58; Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, p. 1155.

[504] Idyll, C.P., in *Origins of American Conservation*, 1966, p. 77; *Bulletin of the United States Fish Commission, Volume XII, 1892* (1894), pp. 14-19.

[505] Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, pp. 1148-1149, 1157.

their natural condition and preventing wasteful fishing, its focus was on hatcheries. Commission bulletins renounced many regulatory mechanisms and instead promoted fish culture as the means of improving the fisheries. "It is better to expend a small amount of public money in making fish so abundant that they can be caught without restriction…" Goode reasoned in 1884, "rather than to expend a much larger amount in preventing the people from catching the few that still remain after generations of improvidence."[506] The message to Congress was that the science of fish culture could substitute the need for unpopular laws. Congress agreed, and granted many appropriations.[507]

The Fish Commission quickly devoted itself to the "wholesale replenishment" of the nation's fisheries resource and blunting of "the enormous forces which are at work to produce their entire annihilation."[508] Progress was swift. Five years after Stone had set up the California hatchery on the McCloud River, the Commission was exporting salmon eggs for 50 cents per 1,000 rather than importing Canadian eggs for $40 per 1,000.[509] Between 1871 and 1883 upwards of 85 percent of funding went to artificial propagation. It supported 17 hatcheries that collected and distributed millions of eggs from whitefish, cod, shad, carp, brook trout, Atlantic and California salmon, oyster and several other varieties of food-fishes. The Commission encouraged state agencies to start their own hatchery programs in concert with federal assistance and leadership. It believed fish

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[506] Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, pp. 1141-1159, quotes on pp. 1148-1149, 1157.

[507] Allard, Jr., D.C., 1978, pp. 117-130; United States Fisheries Commission, *A Manual of Fish-Culture, Based on the Methods of the United States Commission of Fish and Fisheries*, 1897, p. 31; Dupree, A.H., 1957, p. 237; Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, p. 1155.

[508] Smiley, C.W., in *Bulletin of the United States Fish Commission, Volume 4, for 1884*, 1884, p. 65.

[509] Stone, L., in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), p. 212; Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, p. 1179.

culture was useful only as a large-scale and national endeavor. Within a few years the number of state fish commissions had more than doubled. State and even foreign applications for support flooded the Commission. Maine, Connecticut and Massachusetts helped to build a salmon propagating station on the Penobscot. Maryland aided with the development of a shad-hatching station on the Susquehanna. By 1882 state governments had spent over $1 million for fish propagation.[510]

Most people believed artificial propagation was an immediate success. They gave credit to applied science for having figured out how to get around the needs of rearing fish. The assumptions were straightforward. Fish culturists assumed that far more juvenile fish could be spawned from a garnered supply of ova and milt than could naturally reproduce in the wild. Only a small percentage of a female's thousands of eggs survived the natural ordeal of reproduction. Nearly all survived if the parent organisms were captured and their eggs placed into the pails and trays of hatcheries, it was thought. Fish culturists also assumed that by transporting species to uninhabited waters they could unleash the potential productivity of nature, a process that would in effect manufacture entirely new fisheries. In this manner the productivity of all waters could be restored or created with millions of artificially bred fry or by transplanting rapidly growing species.

Evidence of success came in the form of what was held to be empirical observation. When depleted waters revived with once abundant or new species, the plantings of artificially spawned eggs were marked as the cause. Fish Commission

[510] Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, pp. 1141-1159, 1161, 1178; Connery, R.H., 1935, pp. 119-121; Idyll, C.P., in *Origins of American Conservation*, 1966, p. 77; Goode, G.B., "The first decade of the United States Fish Commission: its plan of work and accomplished results, scientific and economical," in *Report of the Commissioner of Fisheries, 1880* (Washington, D.C.: Government Printing Office, United States Commission of Fish and Fisheries, 1883), p. 55; *Report of the Commissioner of Fisheries, 1877* (United States Commission of Fish and Fisheries, Part V., 1879), pp. 18-48.

reports provided the evidence with a steady stream of achievements at state and federal hatcheries along with reinforcing mentions of scientific awards won at international exhibitions.[511] Because of whitefish hatcheries in Michigan, for example, "[t]he fishermen of the Great Lakes admit that but for public fish culture half of them would be obliged to abandon their calling." Beginning in the 1870s shad and striped bass acclimatizing in "almost every accessible coast settlement" on the Pacific slope were touted as "an enduring testimony to the influence of man over fish production." In just one year during the following decade the Commission distributed carp to 10,000 applicants covering 30,000 separate bodies of water in every state and territory, having met "with success beyond doubt." In 1880 the Commission noted that the United States fisheries produced 48, 18 and 52 million pounds of alewives, shad and salmon, respectively, in addition to bass, sturgeon and smelt. It was "beyond the possibility of challenge…" a report stated, "that the great river fisheries" of the country "are entirely under the control of the fish culturist to sustain or destroy, and are capable of immense extension."[512]

State commissioners in the Northeast were enthralled by the outcomes, especially for salmon. Atlantic and Pacific salmon were planted into many of the region's rivers in the 1870s. In 1878, great numbers of juvenile western salmon floating about the rivers coincided with satisfactory returns of adult eastern salmon. The appearance of Atlantic salmon in many long-empty stretches of water convinced the public that fish culture

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[511] Stone, L., in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), p. 212; Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, p. 1179.

[512] Goode, G.B., in *The Fisheries and Fishery Industries of the United States,* 1884, p. 1161; *Report of the Commissioner of Fisheries, 1894* (United States Commission of Fish and Fisheries, 1896), pp.148-149; Smith, H.M., in *Bulletin of the United States Fish Commission*, 1894, p. 226.

could rejuvenate the rivers.[513] It was thought the Pacific cousin would easily thrive in eastern waters and even adapt to warmer southern rivers. On Maine's Medomac River "large salmon have been seen jumping in the basin, above the dam, where such a sight has not been witnessed before for forty years." On the Penobscot, there was "no doubt in the minds of the most incredulous that the work of restoration by planting and protection is an entire and unmistakable success."[514] New Hampshire and Rhode Island reported salmon returns, as well as New York. In Peekskill one correspondent reported "the capture of a salmon, a true *Salmo salar*" in the Hudson River. "Am I justified in supposing it to be one of the fry introduced into the upper part of our rivers a few years since?"[515] There was now more than hope of success, there was proof.

The "proof" was all but irrefutable because its standard of reliability was outwardly simple. Success and failure were measured by tallying the number of eggs planted and then verifying whether fish later appeared. Net and trap counts, observations from shore and deck—these were the measures used. There was little scientific understanding of larger forces at play—biological, ecological and environmental factors. Cause and effect was crudely manipulated but not easy to disprove. The state and federal commissions judged themselves by their own standards of perception rather than on scientific principles.

On the West Coast, the Fish Commission's hatchery work quickly expanded to

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[513] *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. 926-942.

[514] *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. 925-927.

[515] *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. 928-937.

support the salmon canning industry. The McCloud River hatchery proved to be so popular that both state and industry began to court federal assistance to build their own, first in California and then the Pacific Northwest.[516] The region's leaders embraced the argument that fish culture could save the commercial fisheries before development and overfishing left the region's rivers in a state similar to the Northeast. "Since we commenced putting young salmon into the Sacramento, Pitt, and McCloud Rivers," a participant wrote in 1882, "the number of canneries with money invested *has more than trebled*, and more persons are investing money in new canneries."[517] Common cause united industry and government conservation agencies. If the canneries were doing well, many believed that it was largely because of fish culture. "[T]he increase in yield to the canneries for ten years has been almost exactly proportionate to the increase in the deposition of fry."[518] What passed as empirical evidence of Commission success now included how productive the cannery packs were from year to year.

This formula for success also attracted the interest of Oregon and Washington salmon packers.[519] In 1876 a group of Columbia canners alarmed by deteriorating salmon runs in the Clackamas River followed California by appealing for Fish Commission help. With expenses paid by industry, Commissioner Baird detailed Stone to supervise

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[516] Smith, H.M., in *Bulletin of the United States Fish Commission*, 1894, p. 226; *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. 773-774.

[517] DeLoach, D.B., 1939, pp.11-12, 32-33, 40-42; Smiley, C.W., in *Bulletin of the United States Fish Commission, Volume 4, for 1884*, 1884, p. 202.

[518] Smiley, C.W., in *Bulletin of the United States Fish Commission, Volume 4, for 1884*, 1884, p. 68.

[519] DeLoach, D.B., 1939, p. 33.

construction of a hatchery which he completed the following year.[520] In 1877 R.D. Hume built a hatchery at the mouth of the Rogue River, at Ellensburgh, Oregon, in an effort to check a "visible decrease in the number of fish returning" needed to supply his newest cannery.[521] In 1882 Astoria's chamber of commerce, concerned about the city's 24 canneries and 10 more surrounding it on the lower Columbia, requested a federal hatchery. "So great an industry and consumption needs fostering," civic officials argued.[522]

Oregon and Washington's fish commissions also accepted fish culture, working together with industry to secure legislative appropriations for hatchery construction and maintenance. Reaching statehood and the arrival of the fisheries industry earlier than Washington, Oregon's commissioners were the first to educate state leaders of the benefits of artificial propagation. They filled their annual reports with Fish Commission material and regional hatchery highlights. The state's third report for 1889 opened and closed with fish culture literature and requests for additional funds, guiding readers through the merits of hatchery programs across the country.[523] In 1893 the legislature appropriated $2,000 for a hatchery on the Siuslaw River. The state commission also received support from Clackamas hatcheries operated by the Fish Commission and the Salmon Packers' Propagating Company. The commission's 1895-1896 report advised

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[520] See generally: Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1887 and at p. 752; *Report of the Commissioner of Fisheries, 1877* (United States Commission of Fish and Fisheries, Part V., 1879), pp. 20, 22, 31-32.

[521] *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. 773-774.

[522] Smiley, C.W., in *Bulletin of the United States Fish Commission, Volume 4, for 1884*, 1884, p. 304.

[523] *Third and Fourth Annual Reports of the State Board of Fish Commissioners to the Governor of Oregon*, 1889-1890 (Oregon Fisheries Commission, 1891), p. 4.

"that hatcheries could be built and operated on every prominent coast stream, an undertaking which would result within a few years of doubling the output of the canneries in that part of the state."[524]

Washington State's Fish Commissioner Crawford followed Oregon's lead. In 1890 the commission's first report recognized the important "enforcement of strict laws" but explained: "To foster and replenish the streams of our state with salmon and trout, the establishment of a hatchery is a positive necessity … as has been demonstrated in the older states, without the aid of artificial propagation the stock of fish will eventually become exhausted." Including testimonial letters from British Columbia's fisheries inspector and R.D. Hume as well as Fish Commission material, Crawford concluded his appeal for state funds by warning that without hatcheries the state's fish industry would become "sadly impoverished."[525] Soon after, with the help of state congressmen the commissioner secured two federal tank cars containing black bass, spotted catfish and sun fish" along with a $15,000 appropriation for the construction of a salmon hatchery.[526]

Washington appropriations rapidly outpaced Oregon's hatchery development, allocating funds to establish a comprehensive fish culture program to keep pace with industry. With four hatcheries in operation by 1898, successor Commissioner A.C. Little called on the legislature to fund a massive building campaign to sustain all commercial fishery districts. For the Columbia he recommended at least three times the present

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[524] *State of Oregon. Third and Fourth Annual Reports of the State Fish and Game Protector of the State of Oregon, 1895-1896 (Salem, OR: Oregon, Fish and Game Protector, 1896)*, pp. 32-35.

[525] *First Report of the State Fish Commissioner*, 1890 (Washington State Fisheries Commission, 1890), pp. 22-25.

[526] *Third Annual Report of the State Fish Commissioner*, 1892 (Washington State Fisheries Commission, 1892), pp. 15-16.

hatchery output. Logging operations and overfishing at Willapa Harbor and Grays Harbor necessitated an immediate hatchery program "to keep up the supply of fish." On Puget Sound "in every instance … has come the complaint of remarkable decrease in the run of salmon." The district's only hatchery, built on Skagit River's Baker Lake to spawn sockeye, was inadequate and required the assistance of hatcheries on "every prominent stream."[527] The legislature of 1899 responded to what Little called "the only salvation of the salmon industry" with appropriations totaling almost $92,000 for the building and maintenance of 16 hatcheries.[528]

In the space of about two decades, the Fish Commission's efforts to promote fish culture had developed into a mania for hatcheries, especially in the Pacific Northwest. During the 1880s a California commissioner went so far as to tell state legislators that with sufficient appropriations he could fill a river "so full of salmon that it would be difficult for a steamboat to pass through them."[529] By the turn of the century, Oregon and Washington officials argued that hatcheries had stabilized the Columbia River commercial fisheries. "The permanency of the fishing industry…" Washington State Commissioner T.R. Kershaw concluded in 1902, "is assured for all time to come."[530] In Puget Sound and Alaska, officials considered hatcheries to be preventative rather than

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[527] *Ninth Annual Report of the State Fish Commissioner*, 1898 (Washington State Fisheries Commission, 1898), pp. 33, 38-40, 41.

[528] *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1901), pp. 24, 104.

[529] Smiley, C.W., in *Bulletin of the United States Fish Commission, Volume 4, for 1884*, 1884, p. 202.

[530] *Fourteenth and Fifteenth Annual Report of the State Fish Commissioner*, 1903-1904 (Washington State Department of Fisheries and Game, 1904), p.6; *Thirteenth Annual Report of the State Fish Commissioner*, 1902 (Washington State Department of Fisheries and Game, 1902), pp. 7-8.

restorative courses of action. They built them in anticipation of development.[531] The belief in fish culture—and the scientific and economic evidence used to support and justify its success—was so compelling that it indelibly guided the future of the country's fisheries resource management.

But problems soon surfaced. First, the Fish Commission realized that fish culture was vulnerable to the same threats that affected the natural fisheries. Finding healthy streams that could provide sources of spawn became increasingly challenging on the West Coast. Second, the biologists and mechanical engineers who developed hatchery technologies had an incomplete knowledge of the behavior of fish and requirements of aquatic ecosystems. They were trying to replicate something that was complex and which they did not understand. Efforts by the Commission to address these twin problems proved daunting. Neither the legislature nor industry was interested in the alternatives. They did not support prohibitive regulations to protect stream habitat. Nor did they wish to allocate funds for scientific research to study the life history and needs of fish populations. The Commission could not undo what it had started: fostering the simplistic belief that hatcheries could function apart from other measures needed to address overfishing and habitat damage.

The paradox of hatcheries was that they had the same requirements as natural systems. Damaged salmon rivers could not be replenished unless healthy rivers existed somewhere else to supply the salmon. The scheme was, in effect, taking something from one source to use toward another. Ultimately, a source was needed—there was no way to avoid this fundamental requirement. Such difficulties beset the Commission's hatchery

[531] *Bulletin of the United States Fish Commission, Volume IX, 1889* (1891), p. 170.

on the McCloud River in 1884. Railroad construction blasting eight miles downstream of the facility blocked fish migration to the upper river. For the next four years salmon could not ascend. The Commission had to stop its operations—the installation was worthless.[532]

The problem continued. In 1896 the Commission shut down the Clackamas River hatchery that Livingston Stone had built. Mills, dams and logging destroyed the salmon fisheries and therefore the hatchery. "[I]t was too near civilization to prosper…." Stone explained, "it was given up."[533] That same decade, the Commission also concluded it should not build additional hatcheries on the Columbia River until Oregon and Washington rewrote the regulation of times, methods and apparatus of the lower river fishing grounds. Because salmon were not permitted to reach their spawning grounds, federal hatcheries could not secure an adequate supply of eggs. "Propagation on an adequate scale to compensate for the waste of the fisheries is no longer possible under existing conditions," he argued. "All efforts will be disappointing, unprofitable, and nugatory."[534]

Protective laws, in fact, were necessary to prohibit conditions that harmed the fisheries if hatcheries were to succeed. As one observer noted in a Commission bulletin in 1897, the idea that artificial propagation could eliminate the need for such laws, "does not and can not work."[535] Baird had early on acknowledged that legislation to protect the

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[532] Stone, L., in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), pp. 216-218, 221.

[533] Stone, L., in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), pp. 216-218, 221.

[534] McDonald, M., in *Bulletin of the United States Fish Commission, Volume XIV, 1894,* (1895), pp. 154, 168.

[535] Meehan, W.E., in *Bulletin of the United States Fish Commission, Volume XVII, 1897,* (1898), p. 347.

fisheries was important and even necessary in conjunction with fish culture. But this aspect of his thinking was disregarded. Commission policy under his and subsequent leadership instead emphasized the failures of regulations and the need to foster fish culture as a substitute solution, not a complementary one.[536]

Another piece of Baird's vision that went unfulfilled was the need for "careful scientific research" to learn the "history and habits of the fish." This was critical to determine "what should really be done," he argued to a Congressman in 1871, "…. before intelligent legislation can be initiated."[537] In addition to the introduction and multiplication of useful food-fishes throughout the country, Baird emphasized the need to investigate the apparatus and methods of fisheries production and commerce, and to study human influence on the habitat and abundance of fish. He had argued that limiting Commission work to food-fishes was of little value unless its conclusions rested "upon a broad foundation of investigations purely scientific in character." These should be drawn from a thorough analysis of the life histories of all animals and plants "from beginning to end" relating to their migration, reproduction and growth. Ultimately, he believed that such work enabled fisheries managers to better explain the forces of exploitation and the human behaviors underlying them, as well to understand the biological and ecological requirements of fisheries resources. Only then could the Commission provide sound assessments and capable recommendations.[538]

But the Commission never properly investigated and studied the resource. The

[536] Connery, R.H., 1935, pp. 119-122.

[537] Connery, R.H., 1935, pp. 116-117.

[538] Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, pp. 1141-1142.

positive response to artificial propagation so overwhelmed federal fisheries officials they in turn shirked other obligations deemed less practical but which, nonetheless, Baird had believed were fundamental to the Commission's duties. During its first 12 years of operation under Baird the total budget for scientific inquiry was $47,000, compared to more than $800,000 spent on fish propagation. Even the Commission's flagship laboratory at Woods Hole, created by Baird, remained almost entirely a summer operation used by independent researchers. "[T]he propagation of fish is at present by far the most extensive branch of the work of the Commission," a review of the previous decade noted in 1880, admitting that "activity in this direction may be regarded in the light of applied rather than pure scientific work."[539] In 1884 Commission personnel admitted that they really did not know what they were doing. There was a "serious question of scientific knowledge" around fish culture and "an enormous deal to be learned." They did not know "many of the needed facts with reference to the embryonic life of fishes, suitable temperatures of water, how to secure proper forms and kinds of food, &c." Such questions, the report concluded, could only be solved by "careful and continued study."[540]

The questions remained unanswered. Stocking waters and building hatcheries was the priority, even more so after Baird's death in 1887. The research inquiries into life-histories and ecology of fish that he had managed to undertake were further curtailed. In an 1893 bulletin, George Brown Goode paid homage to Baird's "high ideals" while

[539] McHugh, pp. 27-28, 46; Dupree, A.H., 1957, p. 237; Connery, R.H., 1935, p. 120; Goode, G.B., in *Report of the Commissioner of Fisheries, 1880*, 1883, p. 55; Idyll, C.P., in *Origins of American Conservation*, 1966, p. 78.

[540] Smiley, C.W., in *Bulletin of the United States Fish Commission, Volume 4, for 1884*, 1884, p. 67.

acknowledging the continuing "uncertain and often seemingly mysterious" qualities of biota used by fishermen and fish culture.[541] Another scientist appealed for public donations to establish a new biological laboratory or endow the Woods Hole hatching station to engage in pure research. "The scientific investigation of the interrelations of the members of the aquatic world of life," he wrote, was what the Commission had "undertaken to do with the all too meager means at its command."[542] Although federal scientists believed the interests of fish culture were better served by sustained research, they failed to undertake it. State fish commissions were similarly powerless to convince their legislatures of the need to support protective laws and research. Washington State, for example, vainly sought funds to hire biologists, recognizing the need to understand the habits of salmon, if only to understand better how to make hatcheries work.[543]

Unsurprisingly, the Commission was hamstrung by fisheries problems for want of facts and comprehension of the resource it was managing—the kind of information Baird knew was essential to the overall success of fisheries management. As the nineteenth century came to a close, the nation's leading fisheries scientists were forced to admit how little they actually knew after nearly 30 years of work. In 1896, Livingston Stone could only wonder what had happened to the millions of Pacific salmon fry the Commission had planted in hundreds of East Coast rivers. "What became of them? Where did they go?

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[541] Goode, G.B., in *Bulletin of the United States Fish Commission, Volume XIII, 1893* (1894), pp. 56-57.

[542] Ryder, J.A., "Biological research in relation to the fisheries," in *Bulletin of the United States Fish Commission, Volume 13, for 1893* (Washington, D.C.: Government Printing Office,1894), pp. 62-63.

[543] *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1901), pp. 22-23; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), p. 14; *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917), p. 31.

Are any of them still alive anywhere in the boundless ocean? Or are they all dead?" he asked. "And if they are dead, what killed them?" To everyone's "stupendous surprise and disappointment," the attempt to create a new commercial fisheries industry on the eastern seaboard had failed. Neither Stone nor anyone else understood why.[544] Officials on the Pacific Coast likewise were perplexed. In 1899 Richard Rathbun reported an urgent need to investigate the biology and commerce of the region's fisheries, concluding that without such information any regulations were insufficient.[545]

In many ways it was too late. Hatcheries had become the centerpiece of Pacific Northwest fisheries management. The Commission's increasing concerns about fish culture went unheard. There was little federal officials could do to moderate the region's support for aquaculture and loathing of regulations. On the Columbia River in 1894, "the practical unanimity of opinion is remarkable," an observer reported. "The reliance placed in fish-culture is practically unanimous."[546] In Puget Sound, another official found that faith in fish culture had led to the belief that there was no need for any regulations whatsoever. The expectation was that government hatcheries would supply a constant source of fish to support unrestricted fishing. Industry leaders were effective in both soliciting hatchery funding and blocking any prohibitory legislation.[547] "Taken as a whole," an economist later concluded in a period monograph, "the salmon industry should be severely condemned." There was no interest in supporting conservation

[544] Stone, L., in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), p. 219.

[545] Rathbun, R., in *Report of the Commissioner of Fisheries, 1899* (1900), pp. 345, 329.

[546] Smith, H.M., in *Bulletin of the United States Fish Commission*, 1894, p. 241.

[547] Rathbun, R., in *Report of the Commissioner of Fisheries, 1899* (1900), p. 349.

measures or scientific enquiry into how to manage the resource. Fisheries management policy had become, in essence, tantamount to a massive government subsidy to propagate fish artificially. There was no room to consider alternative methods of resource management.[548]

As the twentieth century opened, the use of fish culture in the Pacific Northwest intensified. In spite of the uncertainties and flaws of artificial propagation, it was difficult for officials to conceive of another method of fisheries management that society would support. Like it or not, they had to use hatcheries to address the many threats to the fisheries, no matter how unsuitable the tool. In this way the technology was used as a golden hammer. Because the hammer was the only tool they could use, they treated every problem as if it were a nail. The hatchery was a familiar device viewed as a universal remedy: a cure-all technology for whatever challenge they faced.[549]

The new century brought with it new problems for the commercial fisheries in the region. Across its heavily watered and mountainous western slopes, the rapid development of hydroelectric power would further challenge fisheries managers. Early twentieth century conservation advocates saw hydroelectric power as a cleaner and more infinite source of energy than coal or wood. The power industry was positioned to initiate an economic transformation. Its engineers knew where each of the region's major rivers

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[548] DeLoach, D.B., 1939, pp. 39-40; Connery, R.H., 1935, pp. 115-121; Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, pp. 1139-1145; McHugh, J.L., "Trends in fishery research," in *A Century of Fisheries in North America*, Norman G. Benson, editor (American Fisheries Society Special Publication No. 7, 1970), pp. 26-28, 46-48; Idyll, C.P., in *Origins of American Conservation*, 1966, pp. 76-78.

[549] For assessments of the history, role and challenges of fisheries hatcheries in the Pacific Northwest, see for example: Philip Johnson, *Historic Assessment of Elwha River Fisheries* (Port Angeles, WA: Olympic National Park, 1997), pp. 63-67, 90-94, 107-111; Lichatowich, J.A., 1999, pp. 111-150; Montgomery, D.R., 2003, pp. 149-176; Taylor III, J.E., 1999, pp. 68-132.

should be dammed, understood how many cubic feet the reservoirs would hold and how much horsepower could be generated. They accurately predicted that the industrial growth of the Pacific Coast was linked directly to its ability to produce large quantities of inexpensive electricity. They argued that water power above all was the west's greatest asset—not a case of canned salmon.[550] Perhaps unsurprisingly, hatcheries would play a pivotal role in helping the fisheries establishment respond to the problem of how to mitigate the widespread construction of dams that were impassable to fish.

Part 6. For the Regulator, a Most Unpleasant Portion

Chapter 19 A Sad Failure

In 1912, Leslie Darwin of the *Seattle Times* published an article on the natural wealth of Clallam County, reporting on the Olympic Power Company's dam construction on the Elwha River. Darwin was a well-known newspaper man in Washington who served as general manager of two Bellingham papers and as a legislative reporter for the *Times*. The dam was "the first great step in the direction of development of the natural resources of Clallam County," he wrote. "It would be a reckless prophet who would attempt to foretell the great future of that territory … with its immense resources upon which hardly a scratch mark has as yet been made."[551] The following year, Darwin arrived in Olympia to serve the newly formed Lister administration as director of the state fisheries

[550] See for example: *Journal of Electricity, Power and Gas* 24,2(January 8, 1910), pp. 36-37; *Journal of Electricity, Power and Gas* 32,13(March 28, 1914), pp. 263-266; *Journal of Electricity* 44,10(May 15, 1920), pp. 463-465; *Journal of Electricity* 56(January 1, 1926), p. 8; *Journal of Electricity* 52,3(February 1, 1924), p. 95.

[551] *The Seattle Daily Times*, June 27, 1912; *Pacific Fisherman* 11,4(April 1913), p. 12; Roth, L.R., 1926, pp. 582, 586-587.

commission. He inherited several difficult issues from the outgoing commissioner, including what to do about passing fish over high dams such as the Elwha River dam.

Darwin took his cues from the governor, a progressive who sought to give voice to conservation and fair play, if not action. "It is our duty as citizens to preserve and protect what we do not use for those who will follow after us," Lister said to the legislature in his inaugural. His election platform called for economizing every area of government, making departments self-sufficient, passing accountable legislation and utilizing natural resources responsibly. He promoted the preservation and upkeep of timber and fisheries resources, the reclamation of logged off areas and barren regions to agriculture, and the development of flood control and hydroelectric power.[552]

Lister believed that the stewardship of state waters should not be borne entirely by the public. He saw the fisheries as one of Washington's chief industries and set out to overhaul how the commission managed it. He called on the legislature to rewrite existing laws to better protect the interests of the state, arguing that licenses and fees collected were insufficient to meet the commission's operating expenses. "The fish belong to the state," he reasoned. "It operates the hatcheries and furnishes the necessary protection for the industry." He also advised that taxes should pay for fisheries department operations, that "beneficiaries of the fishing industry" should bear "their proportionate part of the general expenses." At a national Salmon Day banquet in Seattle, Lister urged a crowd of cannery men and state and federal officials to care for future as well as present needs, and to build more hatcheries. "We must provide for these, as well as for more rearing ponds

[552] Herman August Sleizer, *Governor Ernest Lister: Chapters of a Political Career* (MA thesis submission, University of Washington, 1941. Washington Public Documents, 1891-1915), pp. 15-16, 21-24, 66; *Inaugural Message of Governor Ernest Lister to the 13th Legislature,* Washington Public Documents, 1911-1912, Volume 1 (Olympia, WA: 1913), p. 5.

and a greater efficiency in the prop[a]gation of our fish," he cautioned, "so that we of the West will be able to say to our neighbors in the East that we have achieved where they failed, and show them what true conservation means."[553]

Lister ordered Darwin to make the commission work: to reduce inefficiencies, eliminate corruption, enforce laws and revamp the state's hatchery program. Darwin's administrative style was meticulous and no-nonsense. His first annual report summarized two years of broad overhaul and adjustment. He introduced accounting and bookkeeping procedures to record all phases of departmental work. Monies collected jumped 50 percent as the department became nearly self-sufficient. Hatchery costs of salmon eggs decreased from 89 to 43 cents per thousand. More salmon were hatched than ever before in the department's history. Existing hatchery capacities increased 25 percent. Five hatcheries were built and five others restored; four new boats were commissioned. Darwin even remedied the substandard living conditions of hatchery employees and their families.[554]

The report also introduced the commission's new fisheries code, established in 1915. It extended legal protections to food fishes including smelt, herring, shad, sturgeon and shell fish. It addressed the public health threat from dumping of unused fish at large canning centers near cities. It stopped the roundabout use of subsidiary corporations to

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[553] *Senate Journal of the 14th Legislature*, Washington Public Documents, 1913-1914, Volume 1 (Olympia, WA: 1915), pp. 103-104; *Inaugural Message of Governor Ernest Lister to the 13th Legislature*, Washington Public Documents, 1911-1912, Volume 1 (Olympia, WA: 1913), pp. 22-23; *Seattle Post-Intelligencer*, March 13, 1915.

[554] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 5, 31, 40, 44, 97-99; *Typewritten report for fiscal year commencing April 1, 1915, and ending December 1, 1915, Twenty-sixth fiscal year* (Washington State Fisheries Commission, December 1, 1915), p. 2 (Box 2H-2-51, "1913-1916" file. Washington State Archives, Olympia, WA).

avoid existing fish taxes. It guaranteed the commission a revenue surplus to assist maintaining other state departments required to expend funds on behalf of fisheries interests. In addition, the code revamped laws regulating fish passage over stream obstructions, such as dams.[555]

The revised code was long overdue, and it was to Lister and Darwin's credit that changes were finally made. Few members of Washington's 1893 legislature could have foreseen how outdated almost every fisheries law would become by 1915. Technical advances in the commercial fisheries such as motor boats, power seines, automated canneries and refrigerated transportation did not exist in the early 1890s. How and where fish were caught, as well as the methods of processing fish, had changed. Moreover, competing industries that vied for the use of the rivers and water, population growth and development also intensified and similarly employed new technologies. Likely the biggest challenge Darwin faced was how to square these rival interests with his duties. His responsibilities to promote the conservation and growth of the fisheries industry were checked by Lister's need to accommodate many other interests that benefited the state.

This problem was not new to the commission. Darwin's predecessors had grappled with it constantly. The political directive was to encourage economic expansion. Former Governor Marion Hay had signaled to the Legislature of 1911 that the state was "destined in time to become a thickly populated manufacturing, commercial and maritime commonwealth." He pointed to "easily and cheaply developed" hydroelectric power,

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[555] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 5, 31, 40, 44, 97-99; *Typewritten report for fiscal year commencing April 1, 1915, and ending December 1, 1915, Twenty-sixth fiscal year* (Washington State Fisheries Commission, December 1, 1915), p. 2 (Box 2H-2-51, "1913-1916" file. Washington State Archives, Olympia, WA).

"great quantities of cheap raw material," "cheap transportation" and ample coast line for harbors as the ingredients to use.[556] The message was clear. Do whatever it took to convert this natural abundance into a vibrant and diversified economy so that the state could prosper.

The side effects of this conversion were severe for the fisheries. A commissioner who served under Hay, John Riseland, listed in 1907 the "principle destructive agencies" of the fisheries industry. The list included economic interests viewed by state leaders as critical to the region's growth and prosperity, including logging; sawdust, refuse and oils dumped into streams; irrigating projects; sewage from cities; and dams.[557] Commission reports told of the destruction. Hundreds of timber outfits stripped forests from miles of drainages and impounded streams using seasonal splash dams to float logs and bolts (a short round section of a log) downriver. Lumber mills clogged rivers with tons of refuse. Wood pulp factories dumped thick sludge into the waters. Farmers channeled rivers into ditches and canals, frequently diverting more water and fish than were left to flow to sea. Growing towns and cities pumped in fresh waters from rivers and returned the water filled with sewage. Private companies and the federal government erected dams to generate hydroelectric power, reclaim arid lands and control floods and navigation. Fisheries officials had no choice but to acknowledge the circumstances and respond as best they could. They recognized the importance of the competing activities and tried to limit the damages where possible. As one commissioner stated in a 1905 report, all

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[556] *Second Message of Governor M.E. Hay to the Legislature of 1911,* Washington Public Documents, 1909-1910, Volume 1 (Olympia, WA: 1910), p. 23.

[557] *Eighteenth and Nineteenth Annual Reports of the State Fish Commissioner*, 1907-1908 (Washington State Fisheries Commission, 1909), p. 5.

economic activities were "very essential to the great future of our state and must not be hampered or held back for the salmon industry."[558] To say otherwise was politically unsound.

In front of all these challenges there was one problem that had been impossible to solve: how to pass fish over dams. The predicament was likely as old as their use. Nearly everyone believed that dam builders should be held accountable for helping migratory fish get around the structures. Attempts to enable fish to ascend dams resorted to artificial fish passage devices commonly called fishways, fish-passes, or fish ladders. They were mostly wood or concrete replications of a stream bed's natural gradient and flow. The hope was to imitate the hydrologic and organic mechanisms of water and fish with carpentry, masonry and rule of thumb. At face value it seemed like a sensible idea. But no one could figure out how to design a device that could move fish reliably. The dilemma only worsened as dams became larger and more permanent. Even the most conscientious regulators and legislatures struggled to find a solution. When Darwin took office he inherited a problem that federal and state officials had been trying to clean up for over 40 years.

In the Pacific Northwest the early loggers were the first to build dams, either to generate mechanical power to mill timber or to flood streams to collect and move logs down to ports. Dam construction was so frequent that officials were often unaware of it until someone complained—there were simply too many to monitor. By the early 1890s, the problem was obvious to everyone. Much of the region was overrun with operating and derelict dams built over the past 30 years. Some of the dams had fishways, but as the

[558] *Sixteenth and Seventeenth Annual Reports of the State Fish Commissioner*, 1905-1906 (Washington State Fisheries Commission, 1906), p. 16.

state's first fisheries commissioner discovered, they did not work. They were "crude affairs, called by courtesy 'fish ladders.'" And yet only fish "of considerable acrobatic accomplishments" could get over them.[559]

Recognizing the severity of the threat, Washington State's first legislature tried to deal with problem directly by enacting a fish passage provision in 1890. Additionally, the governor called on Commissioner Crawford to regulate the establishment of a standard fishway—a multiuse design that could work on every dam. The solution seemed simple enough: pass a law requiring fish passage on every dam and make sure the apparatus worked.[560] In 1892, using several plans drawn up by state, federal and Canadian officials, Crawford designed a fishway he hoped would work on Washington's dams. He also called for the revision of the state's 1890 statue. The legislature amended it in 1893 to ensure that fishways were "determined and approved by the fish commissioner" and "suitable to enable the fish to pass over, through or by said obstruction, upon construction thereof."[561] The burden now fell squarely on the government to ensure that fishways actually worked.

Even with the new law the problems continued. Throughout the 1890s the commission pointed to logging dams as a leading cause of habitat loss to the fisheries. In the Willapa and Grays Harbor districts Commissioner Little pointed to the destruction of large tributaries by a combination of dams lacking proper fishways and their artificial

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[559] *First Report of the State Fish Commissioner*, 1890 (Washington State Fisheries Commission, 1890), pp. 26-27, 29.

[560] State of Washington, *Message of Governor E.P. Ferry to the Legislature, extraordinary session, September 3, 1890*, Washington Public Documents (Olympia, WA: 1891), p. 19.

[561] *First Report of the State Fish Commissioner*, 1890 (Washington State Fisheries Commission, 1890), pp. 29-30; *Third Annual Report of the State Fish Commissioner*, 1892 (Washington State Fisheries Commission, 1892), p. 20.

flooding. “The constant use of these dams on certain streams has driven the salmon entirely out of them,” he reported in 1900. The torrent of flood waters and logs both scoured spawning beds down to rock or suffocated them with layers of sediment and gravel.[562] Moreover, the dams interfered with state hatchery operations that, ironically, used dams to trap fish to collect spawn. Because of troubles on at least three hatchery streams, Little asked the legislature to enact a law to protect fish culture operations from timber dams.[563]

His successor, Riseland, likewise wrestled with the dams. In 1906 a logging company actually blew up part of a state hatchery rack because it blocked the flow of logs. At the Willapa Hatchery an upriver washout demolished the station and temporarily flooded the superintendent and family's dwelling. On Puget Sound’s Stillaguamish River “thousands of cords of shingle bolts were floated down the creek and caused a great deal of damage to our racks and a heavy loss of breeding fish.” Difficulties also were reported at the Kalama River hatchery and in Grays Harbor.[564]

As timber operations burgeoned across the state, officials were overwhelmed. First, the process of enforcing the law was laborious. It required locating hundreds of dams, checking compliance of fish ladders, finding the owners to secure agreement or taking them to court and then confronting local attorneys and judges who often did not

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[562] *Ninth Annual Report of the State Fish Commissioner*, 1898 (Washington State Fisheries Commission, 1898), p. 39; *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1901), pp. 16-17.

[563] *Ninth Annual Report of the State Fish Commissioner*, 1898 (Washington State Fisheries Commission, 1898), p. 39; *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1901), pp. 16-17.

[564] State of Washington, *Report of the Attorney General. For the Period of Two Years Ending November 1, 1906* (Olympia, WA: 1906), pp. 359-361; *Twentieth and Twenty-First Annual Reports of the State Fish Commissioner*, 1909-1910 (Washington State Fisheries Commission, 1910), pp. 12-13, 19, 24.

uphold fish passage laws. Second, dam enforcement was a small part of their regulatory obligations and they had limited resources. In 1900 the commission admitted its awareness of frequent infractions and poor response. But without enough deputies "it was impossible for us to even attempt anything like a systematic prosecution of these violations of the law."[565] Finally, there was no guarantee the devices even worked once installed. The fishways simply did not perform well.

In Oregon, for example, events on the Clackamas River in the mid-1890s illustrated the challenges confronting regulatory officials. A dam near Gladstone blocked fish migration to an upriver hatchery operated by the U.S. Fisheries Commission. The structure was "generally recognized as one of the greatest evils now affecting the fisheries of the Columbia River basin," the commission wrote, strenuously advising the Oregon commission to fix the menace.[566] Oregon had created a fish passage law in 1878. Many dam owners complied—they built fish ladders. But time after time the fishways failed to work. In response the commission rebuilt the devices; but they, too, fell short. The state commissioner believed his latest design would work. So, too, did California's commission, which had adopted the plan for statewide use. But the fishway failed. All the commissioner could do was to recommend that the legislature amend the law to require dam owners to maintain fishways "to the satisfaction of and in accordance with the instruction of the person whose duty it is to enforce the laws for the protection of fish."[567]

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[565] *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1901), p. 18.

[566] *Fifth and Sixth Annual Reports of the State Board of Fish Commissioners to the Governor of Oregon*, 1891-1892 (Oregon Fisheries Commission, 1893), p. 31; Smith, H.M., in *Bulletin of the United States Fish Commission*, 1894, p. 244.

[567] *State of Oregon. Third and Fourth Annual Reports of the State Fish and Game Protector of the State of Oregon, 1895-1896 (Salem, OR: Oregon, Fish and Game Protector, 1896)*, pp. 8, 12-13, 52-53.

The commissioner wanted the burden to fall back onto the dam owners to find a suitable design.

The Pacific Northwest was discovering what other regions had already learned. In Europe, Britain and the northeastern United States rivers and streams were overrun with dams dating back to earliest settlement. They were also filled with unworkable fish passage devices. In 1872, Charles Atkins of the newly formed U.S. Fisheries Commission had formally investigated the problem. He concluded that in spite of many attempts to get it right, there were "so many diverse circumstances" that it made the construction of fish ladders a difficult undertaking.[568]

Atkins had defined the problem as one of countervailing forces. First, the fish had needs that competed with the requirements of dams. "The fish demand that it be accessible, attractive, and easy of ascent," he wrote. But fish ladders threatened the strength of a dam, usurped precious water and added to construction and maintenance costs. "The parties at whose expense it is built demand that it be durable and reasonably cheap," he also noted. "The owners of the water-power demand that it be not wasteful of water." Second, fish ladder designs varied according to the differing circumstances of each dam and stream; there was no all-purpose model that solved every problem. The complexity of each situation could not be generalized. "To meet these various desiderata requires a careful consideration of the questions of location, capacity—form, material, and mode of construction."[569] These considerations alone handicapped the reasonable implementation and enforcement of fish passage provisions.

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[568] Atkins, C.G., "On fish-ways," in *Report of the Commissioner of Fisheries, 1872 and 1873* (United States Commission of Fish and Fisheries, Part II, 1874), pp. 598, 594.

[569] Atkins, C.G., in *Report of the Commissioner of Fisheries, 1872 and 1873* (1874), pp. 598, 594.

Ten years after the Atkins report the Fish Commission again addressed the issue of building fish ladders. Marshal McDonald all but reiterated the problems outlined in the previous study, adding that Atkins' "improved" fishway had not met expectations. McDonald, in turn, introduced a "new system" of building fishways. But it, too, proved unworkable.[570]

As the nineteenth century closed, most fisheries experts reached consensus that the success of fish passage was compromised by the very presence of dams, universal fishways did not work, and efforts to design fish passage unique to specific dams were largely a flop. If a fish ladder were truly efficient, one report stated, "we would practically destroy the obstruction, and would establish for the migratory species a passage up to their spawning-grounds as free and unrestrained as if no obstruction existed." Repeated failures to invent a workable universal fishway had convinced many officials that, in the words of one writer, "it was futile" for legislatures to require dam owners to build fish ladders using state plans if no plans were suitable for use. In Great Britain, experts found that state of the science technologies were inadequate for tailored apparatus. "Even the carefully planned and scientifically constructed fish way…which theoretically appears to overcome all the most serious obstacles to success," one inspector argued, "is only moderately effective, and may indeed be a failure." Getting a fish ladder to function at all, even under ideal circumstances, was an elusive goal.[571]

Industrial societies continued to build ever larger and more complex networks of

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[570] McDonald, M., "A new system of fishway-building," in *Report of the Commissioner of Fisheries, 1882* (United States Commission of Fish and Fisheries, Part X, 1884), pp. 43, 46, 44, 45.

[571] Prince, E.E., "The fish-way problem," *Thirty-fifth Annual Report of the Department of Marine and Fisheries, 1902* (Sessional Paper No. 22, Ottawa, 1903), pp. lxi, lxi-lxvi, lxxx.

dams into the twentieth century. In the Pacific Northwest and across the country the growing use of concrete dams built by power companies, irrigation interests and municipalities made matters worse. They were conspicuous objects, hundreds of feet wide and spanning large chasms. No one was sure what to do about them.

In 1912-1913, coincidentally during the time that the Olympic Power Company was building its hydroelectric dam on the Elwha River, fisheries officials were especially busy trying to cope with the threat of big dams. During a meeting of commissioners from several states in 1912 there was little optimism. An official from Pennsylvania called his state's law to provide dams with fishways a nightmare. The department's prescribed fish ladder on a 65 foot high power dam had failed and upriver residents were angry, claiming the dam had "taken away their inherent rights."[572] An American Fisheries Society report on fishways also had little positive to say. "The fishes still hold the same veto power which they have been exercising at their own sweet wills in regard to all previous plans."[573]

In 1913, federal Fisheries Bureau officials critiqued state legislative efforts to require fish passage. "It is much easier to proclaim the desirability of a fishway," they concluded, "than to say what sort of a fishway and what location for it would be practically effective." If one could not design a workable device, then it was "useless to waste relatively large sums for the name of 'fishway.'"[574] That same year Canadian fish

[572] Buck, W.O., "Fishways for the rank and file," *Transactions of the American Fisheries Society* 42,1(1913), pp. 109-112.

[573] Buck, W.O., 1913, pp. 101, 105, 102.

[574] Coker, R.E., "Water-power development in relation to fishes and mussels of the Mississippi," in *Report of the Commissioner of Fisheries for 1913, Appendix VIII* (Washington, D.C.: Government Printing Office, 1914), p. 21.

commissioner E.E. Prince, a leading international authority on fish passage, said in frustration that "I am really prepared to admit that one fish would prove a successful fishway. One clearly proved case of a fish ascending and finding its way to the waters above the fish pass would, to my mind, silence criticism." Prince summed up 50 years of private and public fishway work worldwide as "in general, a sad failure."[575]

By the time the Elwha River dam was nearing completion most experts in the Pacific Northwest believed that the existing framework of fish passage laws was of little practical value. Officials had come to realize that there was no solution to the vexing problem of how to make fish passage work. And until the technology could work, laws requiring fish passage were to some extent pointless and certainly unrealistic. These circumstances forced them into uncharted regulatory territory, a place where crafting any policy solutions required using unconventional methods.

Chapter 20 The Elwha River Problem

In late 1910, construction workers converged at the precipice of a remote and undisturbed canyon on the Elwha River about five miles south of the Strait of Juan de Fuca. They removed trees, shaved away hills and contoured embankments. In the valley above the site they cut away forest for a reservoir. Camp buildings appeared; heavy machinery arrived. Pilings were driven to make a temporary dam to divert water. They jammed massive timbers into holes to support a trestle and flume. By March 1911, over 100 men were at the site. They positioned logs for the cofferdam, a structure that temporarily dewatered the bed of the river. The *Olympic Leader* reported the Elwha waters "will be

[575] Prince, E.E., "A perfect fish pass," *Transactions of the American Fisheries Society* 43 (1913), pp. 49-50.

flowing thru the flume by the first of the month," in April.[576] The operation was running on schedule. These were the early stages of the Elwha Dam construction.

For four years the workers occupied Aldwell Canyon. The paper called it "the busiest place in the county."[577] They would build a dam, power house, spillways and penstocks. Much of the work was surgical and dangerous, requiring close contact with the canyon itself. They scoured its walls and floor, removing countless generations of growth and clog. First they blew out an immense log jam. Engineers harnessed in "bos'ns chairs" then lowered themselves into the narrow gap of rock to inspect crevices and faults, using their hands to mark boring spots. Small crews of "powder men" followed to blast holes with black powder. They descended on the "aeroplane"—a platform-like box that swung up and down in suspension over the water. They next dredged the stream bed, peeling off layers of compacted material. Compressed air was used to dry out the coffer dam so that concrete could take to the canyon's bottom. Finally the foundation work started. Bucket after bucket the masonry rose, filling the chasm.

There were delays. Canyons can be perilous places in the absence of caution, especially during high flow conditions. When heavy rains and freshets came, "the force of the current was something enormous, four and six foot [wide] trees coming down from upriver shooting thru the canyon like matches," one reporter observed. Several men drowned during the construction. At one moment they were busy working on planks inches above the rapid waters. Seconds later they were hundreds of feet down river. The crew scurried along the bank, tossing in dynamite sticks, vainly trying to retrieve the

[576] *Olympic Leader*, December 16, 1910.

[577] *Olympic Leader*, February 24, 1911; March 3, 1911.

body.[578] The dam blew out in 1912. When the reconstruction was finally complete the temporary flume was dismantled. The river now ran from the reservoir into the powerhouse, by way of penstocks, to spin turbine blades. It was no longer free-flowing.

The workers departed. They were only temporary residents. But Grant Humes, an early homesteader, was among the first non-Native arrivals to the upper Elwha foothills, in 1897. He lived in Geyser Valley for nearly 30 years, several miles upstream of the Elwha Dam. Humes' cabin was located between two rugged canyons, Rica and Grand. He was something of a legend. His penchant for risk-taking was well known. Not only had he killed off most of the valley's cougars, but he also ran the river at night—to hunt. "To handle your light, gun and boat all at once and not make a blunder at the all-important moment required some little skill," he wrote his brother, calling these floats "fascinating."[579]

Humes also witnessed the river's taming. "It was at once evident that the Old Elwha is in tethers," he penned in a 1927 letter. The second Elwha dam, built at Glines Canyon, was close to his realm. He stood above the rising waters behind the newly completed dam, reminiscing. The features and landmarks he had known were drowning—"soon to disappear from view, forever." These included old homestead sites, cabins and the mouth of Boulder Creek.[580] During the early phase of the dam's construction he had written that his life of "delightful isolation" was ending. "Verily,

[578] *Olympic Leader*, December 16, 1910.

[579] *The Olympic Tribune*, February 20/27, 1925 and August 11, 1911 [date uncertain]; Grant Humes to Will, May 12, 1926 (Humes File, Olympic National Park, Port Angeles, WA).

[580] Grant Humes to Will Humes, April 19, 1927 (Humes File, Olympic National Park, Port Angeles, WA).

thought I, the new era of things is upon us."[581] The power company in Port Angeles had planned to build a third dam at Rica Canyon. It would have submerged all of Geyser Valley south to the Lillian River tributary including his ranch. But the project never happened.[582]

The Humes brothers had seen the big salmon runs move through their stretch of the Elwha valley. In late 1897, Martin described the first arrivals of the hookbill (a mature coho salmon) migration, "just come from salt water." At times the runs were so thick, "all I had to do was to reach over them, hook the hook in there back and pull them out [sic]." But his cousin was not as lucky, with club in hand vainly chasing a large fish up a tributary creek, "striking at every jump."[583] Seven years earlier the mountaineer and explorer James Christie was among the first non-Natives known to see Geyser Valley. He was astonished by the ease with which he caught his meal of trout, describing "as fine fishing as any I ever enjoyed on the thousand streams I have had the pleasure of fishing in."[584]

But in late August 1911 the salmon never made it to Geyser Valley. Many hundreds had advanced as far upstream as the Elwha dam where they could go no farther. Swirling in the pool below the canyon, they "packed in together like a school of herring, or sardines in a box," the *Olympic Leader* wrote. By this time the power company had

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[581] Grant Humes to Will Humes, May 12, 1926 (Humes File, Olympic National Park, Port Angeles, WA); *The Olympic Tribune*, October 31, 1924.

[582] Grant Humes to Will Humes, February 2, 1928; Grant Humes Will Humes, July 9, 1928 (Humes File, Olympic National Park, Port Angeles, WA).

[583] Martin Humes to Brother and Sister, November 9, 1897 (Humes File, Olympic National Park, Port Angeles, WA).

[584] Robert L. Wood, *Across the Olympic Mountains: The Press Expedition, 1889-90* (Seattle: The Mountaineers and the University of Washington Press, 1976), pp. 93, 118, 105-106.

rerouted the Elwha's waters through a wooden flume. The coffer dam was barricading the river. Salmon jumped and smashed their way into the structures. The jet coming out of the flume was so powerful that it threw fish "fifty feet the moment their noses touched the water." The commercial trade journal, the *Pacific Fisherman*, took note. "The company has dammed the stream and was allowing the water to rush with terrific force through a small flume," it reported, "up which the fish found it impossible to go."[585] There were no more fish moving upriver south of the Elwha Dam. They could no longer reach 70 miles of habitat. Altogether, over 90 percent of the river basin's spawning and rearing areas was blocked.[586]

T.J. Gorman, a prominent salmon packer and broker, complained. He had an important stake in the Elwha River. His company operated canneries in Port Angeles and Anacortes and was readying to build another at Neah Bay. He knew that Elwha salmon were necessary for his businesses to thrive. Gorman was also a ranking consultant in state legislation and international fisheries disputes. He was president of the Puget Sound Salmon Canners' Association.[587] Gorman represented the commercial fisheries—he could not be ignored. The Clallam County sheriff and game warden visited the canyon to confirm that, indeed, thousands of silver salmon could not pass. "If they do not get to their spawning grounds," Game Warden J.W. Pike wrote state commissioner Riseland, "it

[585] *Olympic Leader*, September 1, 1911; *Pacific Fisherman* 9,11(November 1911), p.16.

[586] Johnson, P., 1997, pp. 3, 68; National Park Service, *Elwha River Ecosystem Implementation: Final Supplement to the Final Environmental Impact Statement* (Port Angeles, WA: U.S. Department of the Interior, Olympic National Park, 2005).

[587] On Gorman, see generally: *Pacific Fisherman* (1910-1912); *Olympic Leader*, September 1, 1911.

will mean a very serious drawback to the fish industry of this County."[588]

The Olympic Power Company had a new problem: salmon were massing in Aldwell Canyon with nowhere to go and the industrial fishery establishment was upset. State and federal experts rapidly converged at the power dam. They quickly realized the problem had no simple fix. Commissioner Riseland's fishway expert concluded that until the dam was completed there was no point in even discussing fishway construction. It was impossible to attempt for technical reasons. Moreover, no one knew how to build a fishway in so narrow a canyon over such a high structure. There was no guarantee that such a device worked. They concluded that they would wait until the dam was completed before they could think further about fish passage options. Power company officials predicted completion by February 1912.[589]

Gorman was unsatisfied and increased the pressure. He understood that as each run of salmon could not spawn for want of passage around the dam, his profits shrank. It was likely that fish passage had been blocked as early as spring 1911. In October, he gathered ranking officials at the canyon. It was, essentially, a crisis response summit. Pike, W.A. Dinsmore of the federal Bureau, and state legislators E.E. Fisher of Clallam County and E.A. Sims of neighboring Jefferson County attended. Sims owned some of the best sockeye trap locations in Puget Sound and was an influential advocate of artificial propagation. Even the *Olympic Leader* was there. While "fish were jumping at a lively rate at the canyon" the men talked. Sims and Gorman wanted a fish hatchery for

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[588] J.W. Pike to J.L. Riseland, September 12, 1911 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[589] State Fish Commissioner to J.W. Pike, September 25, 1911; John Crawford to John Riseland, October 23, 1911 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA); *Olympic Leader*, October 20, 1911.

Clallam County. All agreed to a solution using a temporary hatchery or eyeing station (where the embryo is fertilized and develops) above the dam. A company derrick would net and haul the fish into a holding pen. Their eggs would be stripped and sent to nearby hatcheries. At a later date, once the dam was completed, the federal Bureau would build a permanent hatchery that generated fish planting product for dispersing into area rivers. The proposed site was upriver from the dam—presumably to take advantage of useful water conditions—perhaps at the Little River and Indian Creek confluences three miles from the reservoir.[590]

Progress was swift. By the close of 1911 the Bureau's "auxiliary hatchery" had collected about 400,000 silver salmon eggs until high water destroyed the trap. In early January 1912, power company and regulatory officials negotiated final details in Seattle. Everyone understood that a fishway, even on much smaller dams, was unreliable and of limited practical value. Riseland instead called on the Olympic Power Company to build a trap and elevator to haul fish over the dam according to state and federal specifications. The company had to donate one or two sites for federal hatcheries on the Elwha River, above the dam. Hatchery construction would begin immediately after the dam was finished. This seemed imminent because the structure was already over 100 feet high. Heavy machinery for the power house was being staged on-site. The commission believed this approach, if successful, "would be fully as satisfactory to the fishing industry, and to the people of the State as a whole."[591]

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[590] *Olympic Leader,* September 1, 1911; Cobb, J.N., "Preliminary report of fishway work," *Transactions of the American Fisheries Society* 57(1927), p. 200; *Pacific Fisherman* 9,11(November 1911), p. 21; *Olympic Leader*, October 13, 1911; On Sims, see generally: *Pacific Fisherman* (1910-1914, 1921).

[591] *Pacific Fisherman* 10,2(February 1912), p. 45; *Pacific Fisherman* 11,1(January 1913), p. 86; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner,* 1913-1915 (Washington State

In February the plan was fully formed and became public. The *Olympic Leader* and *Pacific Fisherman* reported that state and federal officials expected to build a permanent Elwha hatchery about one mile from the mouth of the Little River tributary. The Bureau would supervise the facility. The dam provided a ready-made capture area to pool and collect the fish. Machinery would lift the fish into containers for direct disposal into the hatchery. The Olympic Power Company would install an electric elevator to lift fish into crates for transport. "All kinds of trout and salmon will be handled. Work on the plant will be commenced soon, with the hope of having the hatchery ready by early summer," the paper wrote. Construction was to begin just as soon as the dam was operating in April. It appeared the Elwha River problem would be settled soon.[592]

The decision by Riseland and Dinsmore to give the go-ahead for the plan was based on precedents and experience with earlier dams and hatcheries. A formative case took place in 1905 on the Stillaguamish River. The Washington State Board of Fish Commissioners sought authorization from the legislature to sell a state hatchery on nearby Jim Creek and use the proceeds to build another hatchery at the foot of a power dam on the mainstem river about six miles upstream. The 1891 legislature had given the board charge of the state's hatcheries affairs. The board now had to wrestle with the fact that there was simply no way to build a viable fish ladder over the dam that was 60 feet high. By the turn of the century technological and legal circumstances had made it

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Fisheries Commission, 1915), pp. 83, 87, 89; Darwin to Aldwell, March 21, 1914; Darwin to Aldwell, April 6, 1914 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA); *Olympic Leader*, December 15, 1911; Riseland to Aldwell, January 11, 1912 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[592] *Olympic Leader*, February 23, 1912; Riseland to Aldwell, January 11, 1912 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA); *Pacific Fisherman* 10,2(February 1912), p. 44; *Olympic Leader*, March 15, 1912; *Pacific Fisherman* 10,4(April 1912), p. 23.

difficult for the state to enforce its outdated 1890 law requiring construction of fish passage devices over obstructions. The hatchery on Jim Creek had been failing, and the Jim Creek Water, Light & Power Company hoped to avoid the expense of an unworkable ladder by offering to sell the hatchery for the state. The proceeds went to the commission to rebuild the structure at the foot of the dam. The company provided free water and electricity. The plan seemed like a sensible solution to two problems. It seemed like a good idea to swap an inoperable hatchery for a new one to compensate for a fish ladder that could not have worked. The board, comprised of the State Governor, Treasurer and Fish Commissioner, approved it. The new hatchery was in operation the following year. The board now had a policy whereby it could augment the state's hatchery system when construction of viable fish ladders was judged to be impossible.[593]

The use of stream obstructions for hatchery work actually dated back to early federal Fish Commission techniques to secure good water supply and spawn sources. Hatcheries required a constant source of water flow through egg troughs and they needed an efficient means to collect the adult fish. In 1878, Livingston Stone built a 50 by 80 foot rack at the McCloud River station. The wooden structure was designed to block fish from swimming upriver. When the salmon runs arrived the rack held back "a vast number of salmon continually striking the bridge with sledge-hammer blows" that "kept up the attack at one point or another for three days." To provide steady water an 1878 Commission report recommended that personnel "throw a dam across the stream and locate the hatching-house close to it." The procedure continued to at least 1897, when the

[593] *Sixteenth and Seventeenth Annual Reports of the State Fish Commissioner*, 1905-1906 (Washington State Fisheries Commission, 1906), pp. 24, 35-39; *Eighteenth and Nineteenth Annual Reports of the State Fish Commissioner*, 1907-1908 (Washington State Fisheries Commission, 1909), pp. 19-20.

Commission published identical instructions in its fish culture manual.[594]

Washington State laws also provided for the use of dam and rack building at hatchery sites. By 1902 the state had established the bulk of its stations—starting in 1897, 15 additional hatcheries were added to the original four—several of which required dams, including the Samish, Willapa and Stillaguamish Rivers. The hatchery dam on the Willapa was so effective that angry upriver residents partially destroyed it using dynamite in 1915. If dams washed out, the commission rebuilt them the following season. The commission also assembled racks across most hatchery streams. The increasing use of rearing ponds at hatcheries accelerated the use of dams, including facilities at White River, Kalama, Startup, Snohomish and Nisqually.[595]

The development of rearing pond technology renewed the region's faith in hatcheries at a time when fisheries managers were starting to question whether aquaculture was working. Over the years they had released millions of salmon fry, but only a much smaller number returned. The credit for renewal goes to Riseland's predecessor, Commissioner Little, who after some persistence managed to obtain a small appropriation from the state legislature to develop an experiment station to conduct scientific investigation into fish culture. "Our lack of knowledge concerning many

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[594] Stone, L., in *Bulletin of the United States Fish Commission, Volume XVI, 1896* (1897), p. 213; Atkins, C.G., "Cheap fixtures for the hatching of salmon," in *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), p. 949; United States Fisheries Commission, *A Manual of Fish-Culture, Based on the Methods of the United States Commission of Fish and Fisheries*, 1897, p. 37.

[595] *Thirteenth Annual Report of the State Fish Commissioner*, 1902 (Washington State Fisheries Commission, 1902), pp. 31-33; *Sixteenth and Seventeenth Annual Reports of the State Fish Commissioner*, 1905-1906 (Washington State Fisheries Commission, 1906), pp. 19-22; *Eighteenth and Nineteenth Annual Reports of the State Fish Commissioner*, 1907-1908 (Washington State Fisheries Commission, 1909), pp. 8-11, 18-19; Darwin to W.V. Tanner, November 29, 1915 (Box 2H-2-51, "Fish Commission" file. Washington State Archives, Olympia, WA).

important points in the life history of the salmon is deplorable," the station's superintendent reported in 1902, noting how little pure research had been performed over the past three decades of fish culture.[596]

In 1897, Little had begun experimenting with the release timing of hatchery salmon fry, hypothesizing that many were lost to natural predators. By delaying their release in "rearing ponds" until the fry were larger, he believed their survival rate increased. In spite of federal commission concerns that the retention of fry compromised their natural instincts to escape enemies, the commission concluded that the practice worked. By 1908 Little had fitted several Columbia River hatcheries with rearing ponds. A booming canning pack in 1911 and 1912 led state and industry leaders to attribute the large catch to the development of the ponds. Thereafter, state and federal hatcheries on the Columbia were fitted with rearing ponds capable of raising salmon fry to a size of 3.5 inches. "It has proved beyond any question of a doubt … that the rearing pond is the proper method of increasing the supply of salmon," Riseland concluded in 1912.[597]

Riseland enlarged the production capacity of several hatcheries and secured funds to construct and maintain rearing ponds across the state. Hatching troughs, more efficient flume and water systems and loads of concrete were necessary, as well as a method of feeding the fry. To silence critics who believed the costs of feeding retained fish

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[596] *Thirteenth Annual Report of the State Fish Commissioner*, 1902 (Washington State Fisheries Commission, 1902), pp. 37, 41-42, 38-49; *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1900), pp. 68-70.

[597] *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1900), pp. 98-99; *Thirteenth Annual Report of the State Fish Commissioner*, 1902 (Washington State Fisheries Commission, 1902), pp. 45-48; United States Fisheries Commission, *A Manual of Fish-Culture, Based on the Methods of the United States Commission of Fish and Fisheries*, 1897, p. 22; *Pacific Fisherman* 11,1(January 1913), pp. 47-48; *Pacific Fisherman* 9,11(November 1911), p.11; *Twenty-Second and Twenty-Third Annual Reports of the State Fish Commissioner*, 1911-1912 (Washington State Fisheries Commission, 1912), p. 83.

outweighed the benefits of protecting them, Riseland minimized expenses by taking whatever food he could get cheaply or for free. Parent fish used for spawn were pickled, ground, and cooked; smelt and liver "ground very fine" complemented the diet; and canned "do-overs," rejected product often sold cheap to poorer markets, were sometimes donated by the canneries. The production of fish had taken on new meaning. Hatcheries no longer simply incubated eggs, but also operated as nurseries.[598]

The revival in hatcheries could not have come at a better time. Constant fishing pressure, the proliferation of logging and irrigation dams, and the construction of large power dams had alarmed fisheries managers. More and more spawning streams had disappeared. Rearing ponds held out the promise that hatcheries could keep up with the continuing loss of habitat, even where impassable dams eliminated large river basins. "The hatchery system of this state is a big thing and cannot be overdone," the commission's superintendent of hatcheries declared in a 1913 issue of the *Pacific Fisherman*. He argued that rearing ponds could save the industry and recommended more ponds on the Columbia River, Grays Harbor and Willapa Harbor streams, and at Puget Sound. "All this talk of advancing civilization destroying the industry is rot, pure and simple," he asserted.[599]

The new policy developed by the state Board of Fish Commissioners at Jim Creek fit well within the region's long-standing efforts to use aquaculture to compensate habitat loss from competing uses of rivers. They did not see the point of forcing dam owners to

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[598] *Twenty-Second and Twenty-Third Annual Reports of the State Fish Commissioner*, 1911-1912 (Washington State Fisheries Commission, 1912), pp. 73-108.

[599] *Pacific Fisherman* 11,1(January 1913), p. 48; *Pacific Fisherman* 9,2(February 1911), p. 27; *Pacific Fisherman* 10,2(February 1912), p. 42.

build ineffective ladders that could never restore upriver fish passage. They would instead build a new hatchery to generate more fish. As state hatcheries already employed the practice of building dams and racks—albeit temporary or subject to the life of the facility—it seemed pragmatic that a power company's dam could serve that purpose.

Notwithstanding the solution at Jim Creek, the increasing use of large federal dams to develop agriculture in eastern Washington further challenged the state's decision makers. On the Yakima River, for example, fish, power and agricultural interests were fighting to determine the future of the river and, for that matter, the state. Large federal dams used to develop agriculture in eastern Washington and power dams were now vying for water. In 1909, Riseland had ordered the Prosser Light and Power Company to fix a fishway on its dam, a low, wide concrete impoundment. The company had installed a ladder using plans provided by Riseland's predecessor. But the fishway did not work. "I am very sure that no salmon or any other fish ever went through that ladder," the company's owner had written to the governor. As for the new set of plans the company was to use for a replacement ladder, "I really feel that it will be just as inefficient and useless as the previous ladder," he wrote. "It is not my fault that the Yakima river has been practically dried up by the U.S. Reclamation Service and private irrigation companies."[600]

In the meantime, federal engineers balked at requests by the commission to fit their Yakima dams with fishways. They reminded Riseland that Washington gave them the right to use the water, and "enabling the fish to ascend … would practically destroy

[600] E.F. Benson to Hay, October 15, 1909 (Fish Commission 1909-1912, 1909(1), Box 2G-2-14. Washington State Archives, Olympia, WA).

the very purpose for which these dams were built."[601] The state had welcomed the projects, after all. On the defensive, Riseland bowed to the larger economic and political dimensions. "This department has never shown a disposition to embarrass or hamper any industry," he wrote to the governor in 1909. Riseland understood the state's larger economy could not be hampered by the commercial fisheries. Although the state would generate the nation's largest amount of fish products output in the following decade, it ranked third to agriculture and lumber within Washington. He understood the need to "accord each one all rights and privileges due the same" in order to benefit "the greatest number of citizens in our state."[602]

In consultation with the district's senators and the governor, Riseland successfully modified current laws to give his commission "more discretionary power" capable of adaptive solutions. The state attorney general reached a similar conclusion in early 1910. He acknowledged the federal government was not exempt from the construction of fish ladders because the state authorized the Reclamation Service to create reservoirs and appropriate water. But he argued that "it can be clearly implied" that the legislature did not intend to interfere with or embarrass the projects. Therefore, it should be Riseland's discretionary power to determine whether a fishway was practical. If conditions warranted successful fish passage—such as a dam of no great height and an adequate supply of water—he should order its construction. "But the legislature can expressly or by clear implication make exceptions to the general rule," the attorney general concluded.

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[601] Riseland to Hay, November 19, 1909 (Fish Commission 1909-1912, 1909(1), Box 2G-2-14. Washington State Archives, Olympia, WA).

[602] E.F. Benson to Hay, October 15, 1909 (Fish Commission 1909-1912, 1909(1), Box 2G-2-14. Washington State Archives, Olympia, WA); Spencer, L., 1937, pp. 92-93; Darwin, L.H., 1916, p. 3.

"The law is certainly broad enough to permit the government to store and use all of the water in any stream, and if the government is using all of the water, there could possibly be no use for fish ladders."[603]

Throughout 1910 more Reclamation Service dams caused further complications. "[I]t must be patent to every person with some judgement, [sic]" Riseland told the governor, "that it is very difficult, if not impossible, to erect a fishway in a dam of this kind that would be of any practical use at all." Even if fishway construction were possible at large obstructions east of the Cascades, Riseland doubted it would benefit fish because of downriver fry losses in irrigating ditches. Although state leaders including legislators and the attorney general agreed that answers to the problems lay outside the purview of current laws, Riseland realized not everyone was of the same opinion. "[I]t is very embarrassing to this department, owing to the fact that it gives some people an opportunity to criticize" he explained, adding "it affords them an opportunity to say that this department is not enforcing the law." Leaving the ultimate decision to Governor Hay, Riseland concluded the matter: "if you believe it wise to force the Reclamation service (if it can be done) to erect fishways in these dams I shall be glad to carry out your wishes."[604]

With the change in state governors Riseland departed as commissioner in March 1913, leaving a network of hatcheries, and the matter of the Elwha Dam, to his successor, Leslie Darwin. From one station in 1896, by 1913 the Washington Fisheries Commission

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[603] Riseland to Hay, November 19, 1909 (Fish Commission 1909-1912, 1909(1), Box 2G-2-14. Washington State Archives, Olympia, WA); *Washington Report of the Attorney General, W.P. Bell, Attorney General*, Washington Public Documents, 1909-1910, Volume 1 (Olympia, WA: 1910), pp. 143-144.

[604] Riseland to Hay, August 23, 1910 (Fish Commission 1909-1912, 1909(1), Box 2G-2-14. Washington State Archives, Olympia, WA).

had 20 salmon and 10 trout hatcheries, with the hope of building more.[605] But there was still no permanent hatchery on the Elwha River. There could be no hatchery until the company had completed the dam. Things had seemed in good shape in early 1912 at Aldwell Canyon until leakage was discovered at the downstream toe of the dam. Four workers drowned in February and March, with others injured in accidents. The caisson was opened, revealing sand and gravel rather than concrete. Consulting engineers recommended construction cease until the foundation was rebuilt. Aldwell fired his original contractor in August. His new engineers excavated deeper into the river bed to try to reach bedrock, driving steel piling across the canyon to stabilize the structure. As summer slipped away, expenses mounted. On the evening of October 30, for unknown reasons dam operators raised the head or water level behind the dam. Ominous bubbles and increased pressure were noticed below the dam. Three hours later, water found its way underneath and through the base of the structure. The foundation blew out and 12,000 acre-feet of water drained from the reservoir in 90 minutes, crashing its way down the valley.[606]

The Elwha River dam must have been near the top of Darwin's list of problems to address. He had started his duties on April 16, 1913. By early summer, Sims and Darwin had already visited Port Angeles to discuss the prospects of establishing hatcheries on Lake Crescent and the Elwha. In July the *Pacific Fisherman* was reporting that a state hatchery for trout was planned at Barnes Creek near Lake Crescent, west of Port Angeles,

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[605] *Twenty-Second and Twenty-Third Annual Reports of the State Fish Commissioner*, 1911-1912 (Washington State Fisheries Commission, 1912), pp. 108, 118.

[606] *Journal of Electricity, Power and Gas* 35,16(October 16, 1915), pp. 297-298; *Electrical World* 60(November 30, 1912), p. 1129; *Engineering Record* 69,13(March 28, 1914), p. 372.

and a salmon hatchery would "probably be located on the Elwha river just below the dam."[607]

Over a two-week period in August, Darwin and Aldwell negotiated. Their correspondence—a flurry of letters and telegrams—focused mostly on the hatchery location.[608] Periodically the discussion was tense; sometimes it was hindered and confused by overlapping communications, misplaced correspondence and Aldwell's travels. At times Darwin's manner was impatient and threatening.[609] Nonetheless, Aldwell acted in good faith: he was committed to fulfilling the terms he and Riseland had agreed to just as soon as the dam was completed. But he could not commit to anything sooner, even though run after run of salmon continued to perish. He reminded Darwin that everyone had earlier agreed that "it was utterly impracticable for the fish to successfully get over a Damn 100 feet high." He restated that under Riseland the state believed that there was nothing to gain by "insisting on us putting in some work which would be absolutely useless…" Rather, Riseland would "allow us to assist them in a method which all thought would be practical." He emphasized that he was "ready to donate any site for a fish hatchery which may be required on any property owned by our Company on the Elwha River."[610]

Darwin wanted new terms. He intended to refine Riseland's plan so that the

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[607] *Pacific Fisherman* 11,7(July 1913), p. 26.

[608] Darwin to Aldwell, telegram August 8, 1913; Darwin to Aldwell, August 8, 1913; Darwin to Aldwell, August 17, 1913; Aldwell to Darwin, telegram August 21, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[609] Darwin to Aldwell, telegram, August 8, 1913; Darwin to Aldwell, August 8, 1913; Aldwell to Darwin, August 18, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[610] Aldwell to Darwin, August 15, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

hatchery was placed below the dam, not above it. Although Riseland and the federal Bureau had chosen to erect a hatchery some distance above the dam, Darwin believed the plan was complicated by unproven schemes that attempted to shuttle fish from the base of the dam to a hatchery three miles away. He wished to simplify matters by constructing a concrete retaining basin at the foot of the dam to hold salmon until they were ready to spawn, at which point the hatchery could then use the fish. This improvement required that the state's hatchery be located nearby the power plant. "It was something like this that Mr. Riseland must have contemplated," Darwin explained to Aldwell, "save that he was going to put it up above your dam…."[611]

Two things remained unchanged. First, everyone understood that a fish ladder could not successfully pass fish over the dam. Second, that the hatchery's purpose was not to liberate fish to the upper Elwha, but rather to produce fish for the region by using the river's spawn. With respect to the outdated 1890 fish passage law, Darwin explained that while neither he nor Riseland could "waive one of the state's statutory requirements," precedent had been established by the board and attorney general to guide the commission on situations where fish passage was impossible. Moreover, if a hatchery were constructed at the foot of a dam the state could consider the dam its own obstruction for the purpose of taking fish for spawn. "The law gives to the State permission to obstruct streams for this purpose," he wrote. "[T]he State has a right to stop fish anywhere and make use of them for artificial propagation purposes."[612]

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[611] Darwin to Aldwell, August 17, 1913; Darwin to Aldwell, August 20, 1913; Darwin to Aldwell, August 21, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[612] Darwin to Aldwell, August 17, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

In addition to changing the hatchery's location, Darwin wanted the Olympic Power Company to pay for the hatchery, superintendent's residence and rearing pond, as well as to provide water and electricity. "I may say," he pressed, "that several of the big companies of the State to whom we have breached this proposition, have gladly consented."[613] With the Olympic Power Company suffering serious financial problems from having to rebuild the dam's foundation, and needing his engineers to approve the costs, Aldwell asked for estimates. "[J]ust looking at it right off the reel," he said, "it would appear that you were making a very heavy demand on us."[614] Darwin disagreed, and tried to appeal to Aldwell's business acumen by comparing plans. Riseland's idea, he argued, actually cost more because the power company paid for the operation of an "electric elevator" and "quite a little undoubtedly for repairs."[615] Moreover, Darwin, added in a follow-up communication, later fish commissioners "might find serious fault" with Riseland's plan because the fishway "would of necessity be a cumbersome affair." In contrast, he concluded, "my plan forever eliminates bother in the future."[616]

Darwin also appealed to Aldwell to support commission efforts to build a hatchery at Lake Crescent. The lake was famous for its game fish. Darwin wanted to capture spawn from its celebrated Beardslee trout in addition to steelhead spawn from the Elwha River to stock other streams and rivers. But acquisition of a Lake Crescent site on

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[613] Darwin to Aldwell, August 17, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[614] Aldwell to Darwin, August 18, 1913; Aldwell to Darwin, telegram, August 18, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[615] Darwin to Aldwell, August 20, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[616] Darwin to Aldwell, August 21, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

Barnes Creek had been frustrated by owners asking an exorbitant price. Aldwell agreed to donate "quite a plot of ground" adjoining national forest land provided by the government. He also let the state use "any timber or material" on his premises, and he paid a portion of the cost of 1,100 feet of piping connecting a planned dam on Barnes Creek to the hatchery. In return, the commission allowed Aldwell use of the water main, located near his as yet undeveloped Lake Crescent Villa Sites.[617]

Before Aldwell received Darwin's follow-up letter on the Elwha dam situation, he had already sent an August 21st telegram agreeing to the commission's plan with the caveat that he could not guarantee when construction would be complete. He made it clear the dam could not be finished before November 1913. Continued blasting prohibited any construction of "fish work at present" but that "we will now agree" to donate a suitable site, pay $2,500 to the commission for construction costs and supply electricity.[618] It seemed the Elwha River problem was now settled.

By spring 1914 Darwin had started negotiations with other companies with problematic dams. These included the Humptulips Driving Company on the Humptulips River; the Wishkah Driving Company on the Wishkah River; the Washington Water Power Company whose fish ladder had not worked on the Spokane River; and the Northwest Electric Company whose fish ladder had proved a failure owing to the height

[617] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 63-64; Darwin to Aldwell, August 17, 1913; Aldwell to Darwin, August 16, 1913; Darwin to Aldwell, August 17, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[618] Aldwell to Darwin, telegram, August 21, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

of the Little White Salmon River dam.[619] In each case he had been forced to find workable solutions to complexities that current laws did not address.

As a model example of success, Darwin pointed to the Tacoma City Headworks on the Green River. Tacoma's municipal dam was one of four problematic city dams built during the previous governor's administration. The mayor of Tacoma argued that fish passage into the reservoir would contaminate the drinking water of more than 100,000 people with decaying fish.[620] In consultation with Governor Lister Darwin had instructed his superintendent of hatcheries to figure out how to build a device that could collect spawn without compromising water sanitation.[621] The commission designed and built a concrete trap on a wing of the dam that enabled the hatchery to hold fish whenever it desired until the fish were ready to spawn. The plan solved "the problem of taking salmon at the foot of large dams and obstructions placed in the streams of this state."[622] Although the state attorney general did not think that the commission could exempt all municipal dams from a fishway requirement, the state did employ the method at power dams.[623]

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[619] Leslie Darwin to Ernest Lister, April 1, 1914; Esses to Leslie Darwin, October 24, 1913 (Box 2H-2-50, "Fisheries Commission 1913, 1913-1916" file. Washington State Archives, Olympia, WA); *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 28, 92, 110.

[620] Mayor to Darwin, October 28, 1913 (Box 2H-2-51. Washington State Archives, Olympia, WA).

[621] Mayor to Lister, October 28, 1913; Mayor to Darwin, October 28, 1913; Governor to W.W. Seymour, Mayor, October 29, 1913 (Box 2H-2-51. Washington State Archives, Olympia, WA).

[622] Darwin to Aldwell, August 21, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA); *Twenty-Second and Twenty-Third Annual Reports of the State Fish Commissioner*, 1911-1912 (Washington State Fisheries Commission, 1912), p. 103; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 27-28, 54.

[623] Darwin to W.V. Tanner, November 29, 1915; Scott Z. Henderson to Darwin, November 25, 1913; Darwin to Lister, December 1, 1913; Governor to W.W. Seymour, December 3, 1913 (Box 2H-2-51, "Fish

In his first report to the governor in 1913, Darwin laid out the problem and his solution succinctly. He explained that development of the state had brought with it "the mammoth dams" of the hydroelectric power companies. But "from the best information obtainable, a fishway over a very tall dam is practically valueless."[624] He instanced successful examples where the dam owners built viable hatcheries for the state at the base of the dams. As the hatchery required an obstruction to collect the fish, the dam served as that obstruction. It thus became the state's obstruction for the purpose of serving the state's hatchery. "The law should be changed so as to permit the Fish Commissioner to accept a fully equipped hatchery in lieu of a fishway where the spawn supply and other conditions justify."[625] The legislature approved of the policy. Effective March 31, 1915 the new Fisheries Code provided that the commissioner was authorized to allow the owner of a dam or obstruction too high for a practical fishway to construct and equip a hatchery for the fisheries department. The legislation now codified what had already been *de facto* state policy based on legal and technological precedents dating back to the work of current and previous administrations (Table 20.1).

As for the smaller logging dams blocking fish passage, Darwin aggressively pursued them. He was assisted by county game commissioners, who also had the legal authority to force fishway construction. These dams, he reported, "present no such

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Commission" file. Washington State Archives, Olympia, WA); *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917), p. 13; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), p. 28.

[624] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 27-28.

[625] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), p. 27.

problem, and the Department has busied itself in forcing the construction of fish-ways over them."[626] Riseland, when possible, had tried to arrange with timber companies to flood rivers after spawn-taking and to open hatchery weirs to pass floating timber. There could be flexibility because the dams were often smallish structures, constructed of wood

Table 20.1 Factors contributing to Washington State's decision not to enforce 1890 fish passage provisions at large dams, including the Elwha River dam, prior to 1915

Technological	
	In 1913 experts reconfirm earlier agreement that fish passage devices on large impoundment structures such as power dams rarely work; in general, all-purpose fishways have largely failed on all types of dams; and unique fishways have also failed. By 1912 rearing ponds in place on state and federal hatchery systems. Considered to revolutionize fish culture and revitalize faith in artificial propagation as a policy response to habitat degradation. By 1913 technology adapted to be used with concrete holding pens at base of large municipal and power dams. Federal and state hatcheries had been relying on the use of barriers such as dams and racks since early 1870s as means to capture fish to collect spawn.
Legal	
	In 1910 state executive and legislative branches, and attorney general sanction fish commissioner's use of "discretionary power" to enforce fishway laws at federal reclamation dams. By 1906, state governance concluded that fish passage laws were outdated and therefore impractical to enforce on large dams. State establishes the use of hatcheries at the foot of large dams as a viable alternative to fish passage requirements. Since early statehood, fish commission aware of and beholden to institutional sensitivities around statewide economic development. The expectation was that the fisheries industry should not be a barrier to other important economic pursuits.

or earth, rarely higher than 15 feet. Some naturally disappeared by rot or freshets. Others were destroyed. Splash and irrigation dams on the Elwha River met such fates. In 1914 the absent owner of a disused dam on Little River suggested the commission dynamite

[626] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 27-28.

the obstruction at his expense. Distance and pending bankruptcy prevented him from building a fishway as ordered. When the owner's powder failed to blow up the dam, Darwin recommended Game Warden Pike cover the cost.[627]

The Olympic Power Company was still coping with unforeseeable problems in Aldwell Canyon into winter 1913. Seepage beneath the impoundment repeatedly forced engineers to blast thousands of cubic yards of earth and rock below and above the dam. During spring 1914 the company redesigned the spillway and tainter gates. Darwin's impatience resurfaced in March. "I should like to know if you have gotten your dam closed yet so that the water is not passing under it…." he wrote Aldwell. "We could not afford to have another year's run of salmon waste as was the one this year." Darwin warned that unless the dam was in shape soon, he would force the company to build a fishway.[628] The threat was intended to expedite Aldwell's payment for a hatchery. The commission could not begin construction until it received a site and funds.

Both men were in similar predicaments, beholden to schedules and circumstances they could not control. Aldwell was bound by engineering and fiscal limitations. Darwin was pressured by Aldwell's constraints and the arrival of returning salmon with nowhere to go. "We are making all the haste which is possible to do" Aldwell later replied, "and all this waste of time and money was necessitated by the poor engineers we had at the commencement." He offered Darwin a house and assistance should the commission wish

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[627] See for example: *Thirty-Second and Thirty-Third Annual Reports of the State Fish Commissioner*, 1921-1923 (Washington State Fisheries Commission, 1923), p. 11; Pike to Darwin, January 25, 1914; Darwin to McBurney, January 27, 1914; Pike to Darwin, February 9, 1914; Darwin to Pike, February 19, 1914; Darwin to Pike, May 20, 1914; Pike to Darwin, May 21, 1914; Darwin to Pike, May 25, 1914 (Box 2H-2-50, "1913-1916" file. Washington State Archives, Olympia, WA).

[628] Aldwell to Darwin, April 4, 1914; Aldwell to Darwin, June 3, 1914; Darwin to Aldwell, March 21, 1914 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

to net fish in the interim. There was nothing more he could do because he was unable to guarantee suitable conditions for hatchery construction until his workers finished their job. Darwin replied that he could not collect fish because the dam remained unclosed. "One whole run of fish was lost," he complained, "and this has been the case for all the time the dam has been in the process of construction…." If Aldwell could not finish the dam promptly, Darwin added, "you pay the expense of our placing men at the foot of the dam to try and take the fish."[629] By this time, the original "auxiliary" federal Bureau hatchery was inoperable because construction conditions had made it impossible to catch and collect fish. The hatchery had produced 257,000 salmon fry in 1912, and between April 1913 and March 1914 only 70,000 eggs were collected, when it was abandoned.[630]

Things between the Olympic Power Company and the commission deteriorated as the summer continued. In June, Darwin warned Aldwell that the commission was about to order the company to erect a fishway. "It is out of the question for us to allow another fish run to beat its brains out against that dam."[631] Aldwell reminded him that everyone knew the dam was too high to pass fish successfully. Building a device that could not work "would be of no possible benefit to the State." He had done everything he could to help, including, he reminded Darwin, helping the commission to secure an additional

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[629] Darwin to Aldwell, April 3, 1914; Aldwell to Darwin, April 4, 1914; Darwin to Aldwell, April 6, 1914 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[630] *Pacific Fisherman* 10,2(February 1912), p. 45; *Pacific Fisherman* 11,1(January 1913), p. 86; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 83, 87, 89; Darwin to Aldwell, March 21, 1914; Darwin to Aldwell, April 6, 1914 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[631] Darwin to Aldwell, June 2, 1914 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

hatchery site in the county at Lake Crescent.[632]

There seemed to be a stalemate between the two parties. In response, Aldwell would do one more thing: he requested James A. Kerr to take up the matter with Darwin directly. Kerr's law firm represented the Olympic Power Company and he was also on the company's board. There was probably no better person in the region to use. Kerr had served on the executive committee of the Puget Sound Salmon Association, which included industry leaders such as Sims. He also had served former state governors by representing Washington interests in sockeye negotiations with Canada. His firm had earlier defended Lummi treaty fishing rights threatened by Alaska Packers Association traps. He was considered well versed in fisheries issues.[633]

By July 1914 building arrangements were underway for the Elwha hatchery. Darwin and Kerr had only to reassure each other that both parties understood what was to be. "While there is no specific statute giving us the right to accept a donation of this kind in lieu of a fishway," Darwin reaffirmed, "we have in several instances agreed with the owners of dams or obstructions, over which a successful fishway could not possibly be constructed, to accept a hatchery in lieu of their constructing a fishway." The arrangement was clear to everyone; Darwin assured Kerr that no future problems would arise. "I think you can appreciate that this is a sensible thing to do, and that no man would ever challenge such action," he wrote. "As Fish Commissioner, I can simply write you a

[632] Aldwell to Darwin, June 3, 1914 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[633] Darwin to Aldwell, June 5, 1914 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA); *Pacific Fisherman* 2,7 (July 1904), p. 8; Dewitt Gilbert, *Fish for Tomorrow* (Seattle: University of Washington School of Fisheries, 1988), pp. 16-18; *Sixteenth and Seventeenth Annual Reports of the State Fish Commissioner*, 1905-1906 (Washington State Fisheries Commission, 1906), pp. 46-48; Daniel L. Boxberger, *To Fish In Common* (Lincoln, NE: University of Nebraska Press, 1989), p. 51; *Pacific Fisherman Year Book*, January 1917, p. 60.

letter, setting forth the agreement, which will undoubtedly be binding on the State as any contract that could be drawn, but, if you think it best to draw a contract, please do so and send it to me for signature." In response, Kerr agreed to additionally bind the agreement with a contract, and in recognition of the fact that Darwin did not have the power to waive the construction of a fishway, clarified:

> … the State of Washington will, in my judgment, never require us to build such fishway or ladder without reimbursing us in the amount of money at least which we may donate under this agreement toward the building of a State institution of that kind…. The Power Company is willing to rely upon the sense of justice of the Legislature for reimbursement should the State hereafter deem it necessary that a fish ladder be erected upon the dam.[634]

The problem on the Elwha River was finally resolved between the power company and the state.[635] By the close of 1914, the Elwha hatchery would join Washington State's fleet of fish culture stations started more than 15 years earlier. The Elwha facility seems to have been especially valuable to Darwin. By 1915 Puget Sound comprised 87 percent of the state's fisheries activity and yet did not have nearly enough aquaculture to feed its waters, in his view.[636] He was sensitive to the region's desire to have more hatcheries. In a letter to state Senator A.S. Smith and Representative C.B. Babcock of Port Angeles, Darwin wrote that while a fishway over the Elwha Dam would have served "no earthly use," his negotiations with the power company had led to "the

[634] Aldwell to Darwin, June 27, 1914; Darwin to Aldwell, July 1, 1914; Kerr to Darwin, July 13, 1914; Darwin to Kerr, July 14, 1914; Kerr to Darwin, August 11, 1914 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[635] For a detailed review of the correspondence between The Olympic Power Company and Leslie Darwin, see: Philip Johnson, *Draft. Historical Assessment of Elwha River Fisheries* (Port Angeles, WA: Olympic National Park, 1994), pp. 79-95, 103-107.

[636] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 98-102.

only two fish hatcheries in existence" in Clallam County. This was "the very best proof of what my intentions are regarding the maintenance of the fisheries supply in your streams."[637] As Darwin explained in the department's annual report to the governor, he predicted the Elwha hatchery would become "one of the best hatcheries" in the state because of the number of varieties of salmon that spawned in the river.[638]

Hatchery growth under Darwin was comparable to the state's first wave of development at the turn of the century, when 15 hatcheries were erected in three years. In his first annual report, he stated "it would seem hardly possible for the state to have too many." He had wanted to build fish culture stations on every major salmon stream in Washington.[639] Between 1913 and 1921 he constructed 14 salmon and 4 trout hatcheries. Total commission operations represented 31 salmon hatcheries, 6 trout hatcheries and numerous eyeing stations.[640]

As more and more large dams were built in the state, Darwin created

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[637] Darwin to Smith and Babcock, August 27, 1915 (Box 2H-2-51. Washington State Archives, Olympia, WA).

[638] Darwin to Aldwell, August 17, 1913 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA); *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), p. 112.

[639] *Thirtieth-Fourth and Thirty-Fifth Annual Reports of the State Fish Commissioner*, 1923-1925 (Washington State Fisheries Commission, 1925), pp. 17-18.

[640] *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921), pp. 3, 264; *Twenty-Second and Twenty-Third Annual Reports of the State Fish Commissioner*, 1911-1912 (Washington State Fisheries Commission, 1912), pp. 109-112; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 92, 110, 112, 166; *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917), pp. 11-14, 23, 80, 150; *Twenty-Eighth and Twenty-Ninth Annual Reports of the State Fish Commissioner*, 1917-1919 (Washington State Fisheries Commission, 1920), pp. 18-19, 102, 160; *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921), pp. 24, 298; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915).

opportunities to expand his fish culture work. In 1914 Washington hydroelectric interests had paid for two of the Commission's three new hatcheries. The Olympic Power Company was one of over 20 dam owners to resolve fishway problems through negotiation with the commission. The commission's annual reports listed 84 separate interests whose problematic dams led to 22 owners constructing or modernizing 12 hatcheries. Salmon hatcheries were built, rebuilt or upgraded in lieu of fish passage at Chambers Creek; on the Elwha, Pilchuk, Humtulips, Wind, Willapa, Nasel, Skykomish and Chinook Rivers; and in the Chehalis region. A trout hatchery was built in lieu of fish passage on the Spokane River. In some areas of the state multiple dams within one drainage resulted in a group of dam owners contributing toward a single hatchery. If the commission had already located a hatchery on rivers where new obstructions were built, owners contributed toward a hatchery elsewhere.[641]

Darwin's efforts reinforced Governor Lister's belief that government should be efficient and that industry should contribute to whatever programs the state implemented on its behalf. He attempted to build rearing ponds at every facility in order to maximize hatchery operations. He required stations to take spawn from all varieties of salmon regardless of grade to eliminate idle time and unfilled capacity. He doubled and tripled scheduling duties to accommodate surplus eggs transferred by motor vehicles from other

[641] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 106, 110; *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921), pp. 3, 264; *Twenty-Second and Twenty-Third Annual Reports of the State Fish Commissioner*, 1911-1912 (Washington State Fisheries Commission, 1912), pp. 109-112; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 92, 110, 112, 166; *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917), pp. 11-14, 23, 80, 150; *Twenty-Eighth and Twenty-Ninth Annual Reports of the State Fish Commissioner*, 1917-1919 (Washington State Fisheries Commission, 1920), pp. 18-19, 102, 160; *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921), pp. 24, 298.

districts when necessary. By 1917, the state's salmon hatchery output had nearly doubled from a 1910-1911 egg take of about 154 million to a 1915-1916 egg take of about 280 million.[642] The state had also gained $35,000 to $40,000 worth of new hatcheries or improvements for free.[643] "[T]his department has not been forced to pay a cent for a site for either a salmon or trout hatchery which it has erected within the last 3 1/2 years," Darwin reported, noting that the state had gained $65,000 worth of hatcheries but only appropriated $24,500 toward construction. Darwin increased state hatchery production while simultaneously meeting the business standards of Lister's rigorous program to economize government.[644]

By the close of 1914 two long-standing ambitions were finally realized on the north peninsula. The Olympic Power Company had finished its dam with electrical transmission lines serving cities as far east as Bremerton.[645] In addition, the Washington Fisheries Commission was producing salmon and trout fry at new hatcheries to supply Puget Sound waters.[646] "Snuggled safely against the sidehill in that beautiful canyon" as described in the Port Angeles *Tribune-Times*, from 1914 to 1922 the Elwha hatchery took over 23 million chinook, chum, coho, pink and steelhead eggs from the Elwha River.

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[642] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 98-102; *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917), pp. 8-10, 15, 23, 39.

[643] *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917), pp. 14-16, 38-40.

[644] *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917), pp. 15-16.

[645] *Journal of Electricity, Power and Gas* 35,15(October 9, 1915), p. 280; *Journal of Electricity, Power and Gas* 35,16(October 16, 1915), p. 301.

[646] *Pacific Fisherman* 11,7(July 1913), p. 26; *Pacific Fisherman* 12,8(August 1914), p. 21.

This represented approximately 4.5 percent of Puget Sound's total hatchery production.[647] Additional eggs were frequently shipped from other facilities when work schedules allowed, including spawn taken from eyeing stations established in 1917 on the nearby Lyre River and Morse Creek.[648] From 1914 to 1920 the Lake Crescent hatchery took about 1.7 million trout eggs comprising 1.5 percent of the state's total trout hatchery output. Almost 3.25 million trout fry were planted in Clallam County waters, including Lakes Crescent and Sutherland, Beaver Lake, Cut Lake, Mud Lake, Barnes Creek, Morse Creek and the Elwha River.[649]

While the Elwha Dam continued to operate for ten more decades, Darwin's hatchery on the river was short-lived. As early as 1915 he had explained to Governor Lister and state legislators the difficulties of operating the hatchery. It was closer to salt water than any other in the state, making it hard to take spawn from early salmon runs that could not be held long enough before they died. Also, the location of the hatchery beneath the dam was vulnerable to water releases that damaged equipment. The state

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[647] Compiled from hatchery tables in: *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915); *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917); *Twenty-Eighth and Twenty-Ninth Annual Reports of the State Fish Commissioner*, 1917-1919 (Washington State Fisheries Commission, 1920); *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921); *Thirty-Second and Thirty-Third Annual Reports of the State Fish Commissioner*, 1921-1923 (Washington State Fisheries Commission, 1923).

[648] *Tribune-Times*, November 26, 1915; *Twenty-Eighth and Twenty-Ninth Annual Reports of the State Fish Commissioner*, 1917-1919 (Washington State Fisheries Commission, 1920), p. 20; *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921), p. 17.

[649] See tabulations in: *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915); *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917); *Twenty-Eighth and Twenty-Ninth Annual Reports of the State Fish Commissioner*, 1917-1919 (Washington State Fisheries Commission, 1920); *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921).

even questioned whether it had ever actually secured a deed to the hatchery site. Commission reports summed up the unfortunate matter with brevity, noting that "after four years very few salmon ascended as far up the river as the dam, and operations were discontinued in 1922." Moreover, "detention by impounding in limited spaces has not proven satisfactory for reproduction purposes."[650] The application of hatchery technology to mitigate the risk of losing fisheries to the Elwha Dam impoundment had failed.

Darwin left public service in 1921 and returned to Bellingham to resume his career in newspaper publishing. His perspective on natural resource development had hardened during his term of office. "At the end of eight years, I realize what a thankless task it is to try to preserve a great natural resource for a country," he said in farewell. "To him who tries to stand between the greed of those to whose private interest it is to destroy a great natural resource and the state which owns that resource, there is reserved a most unpleasant portion." By 1919 he had concluded that "selfishly interested parties" had and would continue to make it impossible to preserve the fisheries through legislative enactments. He recommended termination of the commission, and with it his leadership. Short of such drastic change, no legislative attempts could remedy the state's conservation problems. What was needed was a regulatory body free of the current highly politicized system where supervisors were beholden to legislators and governors.[651] In

[650] Darwin to Lister, September 8, 1915; Darwin to Senator A.S. Smith and Representative C.B. Babcock, August 27, 1915 (Box 2H-2-51. Washington State Archives, Olympia, WA); Darwin to Washington Coast Utility Company, April 6, 1920; Darwin to Washington Coast Utilities, May 19, 1920; F.D. Nims to Darwin, May 25, 1920; Darwin to Northwestern Power and Mfg. Co., October 27, 1920 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA); *Thirtieth-Fourth and Thirty-Fifth Annual Reports of the State Fish Commissioner*, 1923-1925 (Washington State Fisheries Commission, 1925), p. 23; *Thirty-Sixth and Thirty-Seventh Annual Reports of the State Fish Commissioner*, 1925-1927 (Washington State Fisheries Commission, 1927), p. 40.

[651] Spencer, L., 1937, p. 104; Roth, L.R., 1926, p. 587; *Twenty-Eighth and Twenty-Ninth Annual Reports of the State Fish Commissioner*, 1917-1919 (Washington State Fisheries Commission, 1920), pp. 37-38;

1921 Washington State's legislature abolished the Fisheries Commission and created a Department of Fisheries and Game.[652]

Thirty years had passed from Washington State's enactment of fish passage laws in its first legislative sessions of 1890 to Darwin's retirement. During this span, the parallel trends of rapid economic growth and large-scale technological development had placed unattainable demands on those charged to protect the fisheries. There was simply no way to control the many competing forces demanding access to and use of the rivers. As the power companies began to build larger and higher dams, it seems the state did not consider fish migration problems until after the structures were in place. This raised thorny questions. Why, for example, did the Olympic Power Company start dam construction on the Elwha River without first demonstrating its plans for the salmon? Moreover, if prior experience and knowledge showed that fish passage was impossible to provide, how could such dams move beyond a planning phase? Soon after Darwin's departure, events on the Columbia River would raise such questions.

Chapter 21 The Columbia Sacrifice

Nearly 400 miles upriver from the mouth of the Columbia a concentration of rapids stretching nine miles once dropped over 70 feet.[653] The steep descent was called Priest Rapids. In 1924 the Washington Irrigation and Development Company proposed to build

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Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner, 1919-1921 (Washington State Fisheries Commission, 1921), pp. 7-9.

[652] *Pacific Fisherman* 19,2(February 1921), p. 21.

[653]"List of Rapids of the Columbia River." http://en.wikipedia.org/wiki/List_of_rapids_of_the_Columbia_River#cite_note-gulick-29 [viewed September 4, 2011].

a dam at the site. A subsidiary of General Electric, the company wanted to pioneer markets in the manufacture of aluminum, magnesium metal and fertilizer as well as provide irrigation for agriculture. The commercial fisheries industry pointed out the project was unnecessary—there were no existing markets for the electricity. Moreover, the dam would cut off salmon from two-thirds of the Columbia watershed. Half of the river's returning runs would be stopped. Because the river was considered to be navigable water the decision of whether to license the dam was up to the Federal Power Commission and the federal Bureau of Fisheries.[654]

News of the proposal was hard to ignore. No one had ever tried to harness the mainstem Columbia River. It was an ambitious idea—but not unforeseen. By 1922 hydroelectric power facilities were producing almost 85 percent of California, Oregon and Washington's electricity.[655] Soon after the earliest plants were built at Spokane Falls in 1885 and Willamette Falls in 1889, technical advances spurred many projects. By the turn of the century each year saw bigger projects serving more uses. Experts quickly anticipated the need for federal intervention. As one observer wrote in *Electrical World* in 1908, "the potential value of large water-powers to a manufacturing community" was so enormous that "the national government must control these water-powers and

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[654] *Pacific Fisherman* 22,2(February 1924), p. 5; Winn, D., Shoemaker, C.D., Seaborg, E., Cobb, J.N., Clark, E.D., Freeman, M., *Save the Columbia River salmon. Brief submitted to Federal Power Commission in opposition to application of Washington Irrigation and Development Company for a license to construct a dam across the Columbia River and Priest Rapids, Washington* (Olympia, WA: Frank Lamborn, Public Printer, 1924), pp. 1-26, 4; Washington (State), Fisheries and Game Department Fisheries Division, *Washington State Fisheries Board, Meeting of May 14, 1924,* Seattle, 1924 ("Hearing held at Seattle, Washington ... on May 14th, 1924," Auxiliary Stacks Folio, University of Washington Libraries, Seattle, WA), pp. 8-13.

[655] Craig, J.A. and Hacker, R.L., "The history and development of the fisheries of the Columbia River," in *Bulletin of the United States Bureau of Fisheries, Volume 49, 1938* (Washington, D.C.: Government Printing Office, United States Bureau of Fisheries, Bulletin 32, 1940), pp. 192-193; *Journal of Electricity* 53,4(August 15, 1924), p. 128.

supervise their administration."[656]

President Roosevelt's administration was of the same opinion. His use of and support for the Geological Survey, Bureau of Forestry and Reclamation Service coalesced into "multiple-purpose" conservation policies that viewed water as a single resource with many uses. Western economic growth, especially its use of water and need of reservoir construction, brought the federal government into a new era of property rights, one centered on the large-scale "reclamation" of land. Reservoirs for irrigation aligned with hydroelectric power interests, industrial use, transportation use and forestry. The idea was to maximize the use of resources across water basins. In order to accomplish this, the government devised ways to lease water power rights to private parties. Federal programs also granted states large tracts of property and orchestrated financing through sales of public lands.[657]

In the meantime, while the Columbia River still supported a fisheries industry, it could no longer maintain the resource at previously harvested levels. The cumulative effects of habitat loss and over fishing had hobbled the fishery. Many of the salmon canners had long ago moved into Puget Sound, Canadian and Alaskan waters. On the cusp of a permanent diminishment the remaining Columbia-based commercial fisheries fought to save itself. Should dams rise in the mainstem river, industry believed it would likely disappear.[658] The prospect forced an honest evaluation of two go-to mitigation strategies: hatcheries and fish passage devices. Over the next few years the region was

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[656] *Electrical World* 52,4(July 25, 1908), p. 167.

[657] Samuel P. Hays, *Conservation and the Gospel of Efficiency; the Progressive Conservation Movement, 1890-1920* (New York: Atheneum, 1959), pp. 100-101.

[658] Lichatowich, J.A., 1999, pp. 180-182.

absorbed in debate. What should be the ultimate function of Pacific Northwest rivers? Could its economy accommodate both the fisheries and the power industries? Would the promise of newer technologies remedy the problem? If not, should society allow a new industry to sacrifice an old one?[659]

Former fisheries commissioner Leslie Darwin must have been thankful he was no longer responsible for the welfare of Washington State's salmon. Many of the hatcheries he had built at the foot of power dams had failed and fish ladder engineering had yet to achieve adequate results at high structures. "At the present time there are but few of our streams on which a dam is not already in place or on which there is not pending a proposition for one," his successor Ernest A. Seaborg wrote in 1921, noting his concerns because of the rarity of successful fish passage and inadequate hatchery mitigation.[660] The commission's 1923-1925 report found that out of 35 hatcheries in its possession only nine had "proven completely successful." Eight others had "failed as a direct result of irrigation ditches and dams," one compromised by commercial fishing and another yet to be determined. Sixteen other hatcheries had "developed into complete failures" either because of their location or maintenance.[661]

Each river had a sad story to tell. At the Jim Creek Water, Light & Power Company's dam on the Stillaguamish River, as early as 1909 the company had dewatered the river or flooded it to drive bolts downriver. The commission's first attempt to install a

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[659] *Pacific Fisherman* 22,1(January 1924), pp. 13, 15, 26-27; *Pacific Fisherman* 23,2(February 1925), pp. 7-9, 16; *Pacific Fisherman* 23,10(October 1925), pp. 7-9, 28.

[660] *Thirty-Second and Thirty-Third Annual Reports of the State Fish Commissioner*, 1921-1923 (Washington State Fisheries Commission, 1923), pp. 11-12.

[661] *Thirtieth-Fourth and Thirty-Fifth Annual Reports of the State Fish Commissioner*, 1923-1925 (Washington State Fisheries Commission, 1925), p. 29.

hatchery in lieu of fish passage was on the river. In spite of his many attempts to get the company to address the problems, commissioner Riseland explained, "their interests seem to come first." By 1925 the department had concluded that the policy did not work. "This is a fair sample of what a power dam does to the salmon run in any stream." On the Green River, where Darwin's experiments with concrete ponds below the Tacoma water system intake dam led the commission to promote the new technology on the Elwha and other dams, the hatchery had difficulties securing spawn after only four years. In addition, the commission reported in 1925 that "Willapa No. 2 and North River hatcheries are located below dams and are complete failures." As well, logging and irrigation activity harmed hatcheries on the Skagit and Dungeness Rivers, respectively.[662]

With such a poor showing, fisheries officials were not inclined to install a hatchery below the proposed Priest River dam. One important lesson learned since Darwin's time was that green or unripe salmon making their way upriver to spawn could not simply be intercepted at an obstruction and corralled in a holding pen for hatcheries. Even on smaller rivers with comparatively minimal spawning areas holding fish captive had not proven successful. When abruptly stopped, salmon often killed themselves attempting to escape or surpass obstructions. Also, the maturation process of eggs and milt was suspended or ceased. The idea of intercepting hoards of salmon en route to tributaries as far away as British Columbia and Idaho seemed unworkable. In their appeal to the Federal Power Commission, experts advised against the idea, arguing that "past

[662] *Twentieth and Twenty-First Annual Reports of the State Fish Commissioner*, 1909-1910 (Washington State Fisheries Commission, 1910), pp. 19-20; *Thirtieth-Fourth and Thirty-Fifth Annual Reports of the State Fish Commissioner*, 1923-1925 (Washington State Fisheries Commission, 1925), pp. 22-23, 25, 28.

experience of fish culturists" has demonstrated "conclusively that this is not feasible."[663]

Nor did officials view dams as otherwise passive objects. They had grown wary of how power company and irrigation dams manipulated river flows. They had found that large dams did not guarantee a stable flow of water, leaving hatchery operations at the whim of engineers who had other priorities. As Washington's Supervisor of Fisheries explained in 1925, "experience proves that the hatcheries fail if not conducted under favorable conditions, and in no case have they succeeded when interfered with by dams or irrigation ditches."[664] By 1927 departmental policy had little tolerance left for hydroelectric dams. In a bitter fight the commission had lost its preexisting hatchery on the North Fork Skokomish River to the city of Tacoma's newly constructed Lake Cushman power project that was 200 feet high. "The building of any dam in a stream, whatever the height of same…" the commission wrote, altered stream conditions, dewatered spawning beds below the dam and flooded reproductive areas above.[665] At a 1928 American Fisheries Society conference, Seaborg concluded that "unless the power interests can provide means of perpetuating the salmon runs," there was little the fisheries experts could do.[666]

Even the *Pacific Fisherman* was calling into question whether fish culture

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[663] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), p. 102; Winn, D., Shoemaker, C.D., Seaborg, E., Cobb, J.N., Clark, E.D., Freeman, M., 1924, pp. 23-24.

[664] *Thirtieth-Fourth and Thirty-Fifth Annual Reports of the State Fish Commissioner*, 1923-1925 (Washington State Fisheries Commission, 1925), p. 30.

[665] *Thirty-Sixth and Thirty-Seventh Annual Reports of the State Fish Commissioner*, 1925-1927 (Washington State Fisheries Commission, 1927), pp. 39-40.

[666] Calderwood, W.J., "Hydro-Electricity and salmon fisheries," *Transactions of the American Fisheries Society* 58(1928), p. 160.

technologies were worth pursuing. "It is an open question whether hatchery work as now conducted is a paying investment," the trade journal wrote in 1925.[667] In the face of new threats on the Columbia River, the profession took pause to consider how effective its strategies were. After nearly 50 years of work by federal and state scientists, "actual knowledge of the movements and habits of the fish is lamentably small, and the widest divergence of opinion still exists on a great many questions." Efforts to preserve the fisheries, the journal concluded were "largely groping in the dark" and, moving forward, needed "basis of fact, proven beyond dispute."[668]

The weighty questions that had vexed experts at the turn of the century were resurfacing. Where was the proof that all of the investments in artificial propagation had actually done any good? How could scientists know so little about the life habits and histories of the resource? Why was the fisheries resource in such poor shape in spite of decades of management? In sum, many people wondered why the hatchery strategy had not delivered on its promises. And, finally, many people were starting to listen to what some critics had been saying all along.[669]

The crisis stemming from the Priest Rapids proposal had one inadvertent consequence. It prompted many in the establishment to devote long overdue attention to those scientists who had been asking the questions. In 1913, for example, while Darwin

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[667] *Pacific Fisherman* 23,2(February 1925), p. 8.

[668] *Pacific Fisherman* 23,2(February 1925), p. 8.

[669] *Pacific Fisherman* 23,2(February 1925), p. 8; Idyll, C.P., in *Origins of American Conservation*, 1966, pp. 76-83; McHugh, J.L., in *A Century of Fisheries in North America*, 1970, pp. 26-28, 46; Larkin, P.A., "Maybe you can't get there from here: a foreshortened history of research in relation to management of Pacific Salmon," *Journal of the Fisheries Resources Board of Canada* 36(1979):98-106, p. 101; Larkin, P.A., "Play it again Sam—an essay on salmon enhancement," *Journal of the Fisheries Resources Board of Canada* 31,8(1974):1433-1459, p. 1437; National Research Council, 1995, p. 44.

was promoting the solution to build hatcheries at the base of dams, Canadian fisheries commissioner Prince published a paper for the American Fisheries Society. He titled his work "A Perfect Fish Pass," and he concluded that fishways and hatcheries "have in no instance brought back the fish to their pristine plenitude." Moreover, Prince argued, "it is plain that no hatcheries can really benefit a river to the fullest extent if the fish are cut off from access to the upper waters."[670]

John Cobb at the University of Washington had also challenged several tenets of current scientific thought in his 1917 *Pacific Salmon Fisheries*. He asked his colleagues to provide real proof of success. He believed that the "almost idolatrous faith in the efficacy of artificial culture of fish" was unsupported and untested. Cobb did not think anyone had actually proven that fish culture had been effective. He had offered an alternative perspective. "[T]he best way in which to conserve the fisheries of the coast," he suggested, "is by enacting and enforcing laws under which a certain proportion of the runs will be enabled to reach the spawning beds." Otherwise, if unrestricted fishing continued to depend on hatcheries alone, the stations would close "from sheer lack of material upon which to work," Cobb predicted.[671]

Needless to say, the work of Prince and Cobb was soundly ignored or dismissed by the majority. The Commissioner of Fisheries, Hugh M. Smith, in his response to Cobb, stated in the *Pacific Fisherman* that "salmon culture rests on a broader and sounder foundation than is here conceded." Not even Cobb, Smith asserted, could deny the "stupendous improvement over nature" that state and federal fish hatcheries had

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[670] *Thirtieth-Fourth and Thirty-Fifth Annual Reports of the State Fish Commissioner*, 1923-1925 (Washington State Fisheries Commission, 1925), p. 28; Prince, E.E., 1913, p. 48.

[671] Cobb, J.N., 1916, pp. 94-95.

achieved.[672] Cobb's colleague at the University of Washington, E. Victor Smith, who authored the state's 1919 manual of fish culture methods, likewise wrote that natural reproduction was "extremely wasteful." In other words, they argued, Cobb was wrong.[673]

But the evidence mounted. In 1920, Barton Warren Evermann, director of the California Academy of Sciences, reinforced Cobb's assertions. His study of the Alaskan fisheries concluded that the region's hatchery output of nearly three billion eggs had minimal results on fisheries production. In addition, some localities without hatcheries had been well maintained despite intensive fishing.[674] In 1931, R.E. Foerster, began to challenge the claims that hatcheries were more efficient at propagating fish than natural systems by comparing both methods in the first of several Cultus Lake studies in British Columbia. He had begun the investigation in 1925 and concluded that fish culture for sockeye salmon was not superior to natural production. "It is quite safe to say," he wrote, "that were similar records taken at many of the salmon hatcheries of the Pacific coast which are pointed to with enthusiasm and acclaim as glittering examples of Man's prowess over Nature, many exuberant hearts would be broken."[675]

As for the question as to why scientists still did not understand the behavior and pattern of the fisheries, the answer was because very few of them had studied it. Notwithstanding the long-held intention of early leaders of the Fisheries Commission to

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[672] *Pacific Fisherman Year Book*, January 1917, p. 59.

[673] Smith, E.V., "Fish culture methods in the hatcheries of the State of Washington" (Washington State Fisheries Commission, 1919), p. 6.

[674] *Pacific Fisherman* 18,7(July 1920), p. 23.

[675] Foerster, R.E., "A comparison of the natural and artificial propagation of salmon," *Transactions of the American Fisheries Society* 61(1931), pp. 121-130, 121, 124.

support basic biological research and years of lip-service, the establishment had made little progress. At a 1925 international conference, fisheries officials admitted that existing knowledge was inadequate. "If we tried to conduct agriculture on the basis of such ignorance," one person remarked, "anyone would think we were daft."[676]

Within four years of Darwin's retirement, management philosophy had begun to shift in Washington State. There was a sense that hatchery technologies were no longer the answer. In his concluding report to the governor, Darwin had argued that the only way to maintain salmon runs was to "constantly" build new hatcheries. But by 1925 the commission was at a loss to know how to proceed with its management responsibility. After years of "expending a large amount of money, time and energy," the department's report summarized, salmon runs had continued to deteriorate and now "approached the danger point."[677] Faced with the question of how to mitigate a large dam blocking the Columbia River, officials were now unwilling to turn to fish culture as the answer.

Efforts to build a fish ladder were also met with skepticism. The law required the U.S. Bureau of Fisheries to approve the design of fish passage devices over the proposed dam. But a proven fishway did not exist and the Bureau had neither the funds nor personnel for developing such equipment. The fisheries establishment did not want to shoulder the responsibility of finding a technological solution to a problem, it believed, for which there was no technology. Most experts, therefore, saw no possible way that salmon could coexist with dams on the Columbia River.

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[676] Bumpus, H.C., in *Bulletin of the United States Fish Commission, Volume XVII, 1897* (1898), pp. 177-180; *Pacific Fisherman* 12,7(July 1914), p. 13; *Pacific Fisherman* 23,4(April 1925), p. 3.

[677] *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921), p. 17; *Thirtieth-Fourth and Thirty-Fifth Annual Reports of the State Fish Commissioner*, 1923-1925 (Washington State Fisheries Commission, 1925), p. 4.

In May 1924 the Washington State Fisheries Board convened to discuss the matter of the Priest Rapids dam proposal. The meeting was chaired by E.A. Sims, who boiled the issued down to whether one industry should be sacrificed on behalf of another. "Now, the problem, as I understand it...." he said, "is whether this project can be constructed and not eliminate or entirely destroy another industry, which is the fish industry." Fundamentally, the question was should the country's greatest salmon river give way to the country's largest undeveloped source of electric power?[678] The way forward depended on whether a means of fish passage could be devised. Company president H.J. Pierce declared he was willing to install any kind of fish appliances necessary, "no matter what they cost as that is our part of our job." He assured the board that his engineers were perfectly willing to build a fishway over the 90 foot-high dam. But he needed the fisheries experts to instruct them on how to do it.[679]

Bureau Commissioner Henry O'Malley responded that it should be up to the company to help develop a proven fishway before the dam was built. Based on hard luck and failed experiences, the policy had changed. The responsibility of providing practicable fishways once again fell back onto the dam builders. Oregon and Washington officials had formerly asked legislators to rewrite fish passage laws so only fish commissions could design and sanction fishways. In the past, they had struggled with too many unworkable devices built by dam owners. But state experts could not develop plans that worked, either. O'Malley explained that no one could figure out how to design passage for dams over 40 feet high. Should the industry want to build a high dam on the

[678] Washington (State), Fisheries and Game Department Fisheries Division, 1924, p. 44.

[679] Washington (State), Fisheries and Game Department Fisheries Division, 1924, p. 13.

Columbia, it first needed to build a workable fishway.[680]

M.O. Leighton, head engineer for the company, asked O'Malley how could it be that the fisheries industry was "mighty skillful in catching these fish to put into cans," but unable to get "these fish to be raised up over a dam?" He, too, was unable to find any experts that could provide useful information on how to build fishways.[681] And he could not understand why. "The only difference between us," Leighton believed, "is you put them in the can and we will put them in the upper pool."[682]

Vigorous discussion followed. "[W]ho is competent to build a proper fishway, when nobody knows how to build it?" F.P. Kendall of the Oregon Fish Commission asked. "Are you willing to admit that American ingenuity and engineers are beyond the possibility of figuring out the problem of this fishway?" Sims questioned. "I do not say that it cannot be done," Kendall replied. "I say it never has been done, and we have been working on the problem in Oregon and Washington for twenty years."[683]

Sims did not need reminding. In 1910 he had convened the region's leaders at the Elwha Dam canyon site. The same problems that had beset the Olympic Power Company a decade earlier had not been solved. In 1912, an American Fisheries Society report had retrospectively condemned the performance of fish ladders on logging and mill dams. And in 1922 the society published another paper that discussed the increasing development of large irrigation and power projects notwithstanding the fact that the

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[680] Washington (State), Fisheries and Game Department Fisheries Division, 1924, pp. 17, 21.

[681] Washington (State), Fisheries and Game Department Fisheries Division, 1924, pp. 17, 21.

[682] Washington (State), Fisheries and Game Department Fisheries Division, 1924, pp. 22, 26.

[683] Washington (State), Fisheries and Game Department Fisheries Division, 1924, pp. 1-56, quotes on pp. 46-47.

fishways built for these structures were mostly worthless.[684] "We have got more inefficient fishways than we have efficient fishways today," Kendall added. "We have spent more money on fishways that was absolutely thrown away, ten times over, than we have on fishways that are practical."[685] Leighton saw no gain in pressing the point. "[J]ust leave us power people out of it," he advised, "except as we are invited in to help you out on the engineering end or in any other way." Form a committee to study the problem, he added in parting, "and then call on us for all the assistance that you want."[686]

Leighton's view of the problem of fish passage reflected well a technical impasse that existed between the engineering and the fisheries industries. Most power engineers believed that if their dams caused problems for fish, then it was up to those who valued the fishery to find a solution. This view was prevalent throughout the electrical industry since its inception. Tellingly, few if any industry trade journals dedicated to discussing and promoting technologies in generating and transmitting electricity had ever mentioned the problem of fish passage. "In all the active discussions of water-power problems there is almost a painful absence of reference to the fisheries aspects," Robert E. Coker, a U.S. Biological Station director wrote in a 1913 overview of water power development on the Mississippi River. He pointed to a pattern wherein water-power developments across the country contained fishways that did not work, and there was no effort to figure out how to make them work. "It is not alone an insufficiency of knowledge and experience which

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[684] Washington (State), Fisheries and Game Department Fisheries Division, 1924, p. 13; *Pacific Fisherman* 23,4(April 1925), p. 6; Coker, R.E., in *Report of the Commissioner of Fisheries for 1913, Appendix VIII* (1914), p. 23; Cobb, J.N., "Protecting migrating Pacific Salmon," *Transactions of the American Fisheries Society* 52(1922), pp. 146-156, quote on p. 146.

[685] Washington (State), Fisheries and Game Department Fisheries Division, 1924, pp. 46-47.

[686] Washington (State), Fisheries and Game Department Fisheries Division, 1924, pp. 32, 34.

confronts us, but a real negligence." There was no mutual effort to understand the biological and engineering complexities of fish passage. The professions shared no common ground on which to develop solutions. As far as the power industry was concerned, it was not their problem.[687]

Only when the hydropower industry accelerated the pace of securing water rights and building dams across major rivers in the early 1920s did the fisheries establishment sound an alarm. Until then, it had watched the evolution of water power on the Pacific slope with minimal response. During this period, many believed that hatchery mitigation in lieu of fish passage worked. But the failure of these hatcheries coupled with cumulative impact of habitat loss, overfishing and dam building had many officials worried that large dams would be too much for the fisheries to endure.[688]

The industry was put on notice in 1921 when a company proposed to build a dam across the Klamath River in California. When the state's fish and game commission threatened to sue the company, it was as if the engineers had finally woken up to the problem. The commotion "put California hydroelectric engineers on their mettle with a new problem," the *Journal of Electricity and Western Industry* wrote. The editors introduced the problem of designing fish passage as one that "had not been previously attacked," and which has "added an interesting chapter to the hydroelectric note books." They even acknowledged that their profession had no idea how to pronounce "the ferocious scientific name the salmon uses."[689]

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[687] Coker, R.E., in *Report of the Commissioner of Fisheries for 1913, Appendix VIII* (1914), pp. 6, 22.

[688] *Pacific Fisherman* 23,10(October 1925), p. 8.

[689] *Journal of Electricity and Western Industry* 47,3(August 1, 1921), p. 107.

The power industry proposed that the dam should be used as an experiment in studying fish passage techniques. Both the fisheries establishment and conservationists balked at the idea. They saw no reason to build large dams until the problem of fish passage had been solved. The case went to court and citizens petitioned for a state ballot to prevent power development on the river.[690] The *Journal of Electricity* called the effort hasty and suggested that California follow the Northwest approach that was to study the problem rather than preclude development. The opportunity exists, the journal wrote, "for King Salmon and King Kilowatt to cooperate to mutual advantage."[691]

In the meantime, such an experiment was underway on the Baker River in Washington's northern Cascade Range. The state had allowed a power company to begin work on a high dam but only on the condition it installed and operated fish passage equipment. John Cobb at the University of Washington was tasked to supervise the fish passage research. In 1925 construction difficulties at the dam coupled with equipment failures led to the loss of that year's sockeye run. But by the following year Cobb's team had managed to design a small railway and metal car that could carry fish over the dam.[692]

Although the project was experimental many viewed its outcome as critical to determining the future of dam-building in the region. Whether Cobb had succeeded or failed was subject to interpretation. But how the project was construed proved to be its most significant outcome. Industry interpreted his work as proof that a technological

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[690] *Pacific Fisherman* 22,4(April 1924), p. 8; *Pacific Fisherman* 22,6(June 1924), p. 8.

[691] *Journal of Electricity* 53,3(August 1, 1924), p. 78.

[692] *Journal of Electricity* 53,1(July 1, 1924), p. 28; *Pacific Fisherman* 23,10(October 1925), pp. 9, 28; Cobb, J.N., 1927, pp. 181-201; *Journal of Electricity* 57,6(September 15, 1926), pp. 195-198.

solution had been achieved. “Power and fish interests alike rejoice at the success of the fishway at the 260-ft. Baker river dam…” the *Journal of Electricity* announced in 1926. “It is predicted that no longer will the power companies be restrained from building as high a dam as is needed across any of our salmon streams,” the journal wrote. “[N]o longer will the great salmon industry of the state be menaced as a result of such power dams.”[693]

In response to a similar claim printed in *Electrical World*, Cobb informed the Federal Power Commission that industry’s characterization of his work was unfounded. The research was experimental and unfinished, he retorted. “We are still far from being in such accord.”[694] He pointed out that numerous fish passage studies at Cascade power projects in Condit and Concrete had repeatedly stressed that each dam was unique. Solutions at one dam were not universal.[695] While his team had gained a tentative understanding of mechanical lifts, they also reconfirmed the difficulty of inducing salmon to enter fishways. Moreover, they learned that downstream migration of young salmon over dams or through turbines represented a serious and unsolved problem.[696]

By 1927, experts were already showing that the Baker River power dam was not a solution to fish passage. Researchers found unsuitable conditions for salmon survival in the dam’s reservoir, including barely detectable currents, increased water temperature and low oxygen levels. And during the summers of 1926-1927, less than 50 percent of the

[693] *Journal of Electricity* 57,6(September 15, 1926), pp. 191, 197.

[694] *Pacific Fisherman* 24,10(September 1926), p. 13.

[695] *Pacific Fisherman* 24,8(July 1926), p. 13; *Pacific Fisherman* 24,9(August 1926), pp. 6, 8, 16.

[696] Cobb, J.N., 1927, pp. 181-201.

sockeye lifted over the dam actually reached Baker Lake upstream. Further, scientists suspected that the young fish could not safely drop 200 feet over the dam and shoot through turbines on their downstream migration.[697]

But it was too late. Even before Cobb had completed his first year of work, the Federal Power Commission, through the Secretary of War, granted a license to the Washington Irrigation & Development Company to proceed with construction at Priest Rapids. The seemingly unilateral decision was highly controversial and unexpected. The Commission's other member, Secretary of Commerce Herbert Hoover, argued that a practical fishway had not yet been devised. There was no basis on which to take Cobb's findings as a signal to grant the license. He reminded his colleague that the responsibility for fish passage "should be placed primarily and absolutely upon the licensee itself." The Bureau's O'Malley protested that the permit for construction "came as an entire surprise to me." The *Pacific Fisherman* said the salmon industry had been "double-crossed" and warned of more to come.[698] "Steady encroachments upon the salmon streams … may be looked for from now on…."[699]

Industry continued to advertise Cobb's preliminary successes as proof that Priest Rapids and other power projects had no negative impact on the health of the salmon fisheries. This led to further outrage and cries of foul. The *Pacific Fisherman* called it propaganda designed "to create the impression that the problem of carrying fish over high dams has been definitely solved." Leading fisheries officials comprising the International

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[697] Ward, H.B., "The influence of a power dam in modifying conditions affecting the migration of the salmon," *Proceedings of the National Academy of Sciences* 13,12(December 15, 1927), pp. 827-833.

[698] *Pacific Fisherman* 23,8(August 1925), p. 20; *Pacific Fisherman* 23,4(April 1925), p. 6.

[699] *Pacific Fisherman* 23,3(March 1925), p. 16.

Pacific Salmon Investigation Federation charged the power industry with promoting "constant and nation-wide propaganda" in newspapers, engineering and technical magazines that falsely suggested a solution to the problem of fish passage at power dams had been found.[700]

The Priest Rapids project as conceived in the 1920s never happened, perhaps because the idea to develop power on the river before there was a demand was premature. But it had triggered two events. First, the project compelled the fisheries establishment to assess its use of technologies to mitigate the impacts of dams. The Bureau of Fisheries tried to assert the rights of fishing interests prior to those of power applicants by demanding the electrical industry prove fish passage could work. Also, many scientists jettisoned their support for hatcheries as a substitute for upstream fish passage. Second, the Priest Rapids project awakened the fisheries establishment to the risk of precedent. If the power industry wanted to build one dam on the river, then how many more would follow?[701]

The possibility of building several large dams on the Columbia River without a workable mitigation plan gave rise to the ultimate question: where would a reckoning between the two industries leave the salmon? There seemed to be a sense of inevitability. "From now on there will be an increasing number of proposals" for power projects, the *Pacific Fisherman* warned its readers in 1924.[702] Fish commissioner Kendall asked his colleagues whether it made sense to "kill one industry to build up another." He did not

[700] *Pacific Fisherman* 24,13(December 1926), p. 11.

[701] *Journal of Electricity* 52,11(June 1, 1924), p. 466.

[702] *Pacific Fisherman* 22,5(May 1924), p. 17.

understand why the "vested rights" of the commercial fisheries "should be sacrificed because we want to progress."[703] But as expressed by an engineer for the Geological Survey in 1928, the fishing industry was already "waning" and water power was now the "most stable and permanent of all natural resources" in the Pacific Northwest.[704]

In 1932 the Corps of Engineers outlined a ten-dam plan for the 1,214 mile-long Columbia River. President Roosevelt and congress immediately authorized the construction of two projects. The future of Washington and Oregon was recast. Fifty years later, the mainstem Columbia held 14 dams. Its largest tributary, the Snake River, held 13 more. By the final decade of the twentieth century the rivers and streams of the Columbia Basin held 58 hydropower dams and 78 multi-purpose dams. It was also home to thousands of smaller dams serving municipal, industrial, irrigation and livestock uses. Ninety percent of the Pacific Northwest's electrical energy came from hydropower.[705] What the defenders of the commercial fisheries industry had ultimately feared had come true.

The dam builders made considerable effort to provide fish passage on the river. The stated goal was "fish and power, too."[706] The first mainstem dam on the Columbia arose 453 miles from its mouth, at Rock Island. The Puget Sound Power and Light Company built the structure in 1933. At 38 feet high, the dam contained fish ladders and locks. That year construction of Bonneville Dam started at river-mile 145, finishing in

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[703] Washington (State), Fisheries and Game Department Fisheries Division, 1924, pp. 46, 48.

[704] Parker, G.L., "Water resources of the Pacific Northwest," *Northwest Science* 2,1(March 1928):28-32, p. 28.

[705] National Research Council, 1995, p. 52.

[706] Netboy, A., 1973, p. 287.

1938. Seven million dollars was spent on designing and implementing fishway facilities over the 70 foot high barrier.[707] Milo Bell, a member of the team, had recently completed his master's thesis on fish ladders and mechanical lifts. "[S]ome method must be devised," he wrote, "whereby water power development, irrigation, and fishing may go on side by side without crippling any of the industries."[708]

Even so, experts feared that the technology was inadequate. The history of dam-building and fish passage argued against success. "The entire Columbia River watershed may well be confronted with an entirely new biological condition," former Commissioner O'Malley warned. [709] There was little to express but doubt. The engineers admitted the concepts were experimental. The original cost estimates were half the final amount. As the construction progressed many could only wonder what would happen. There were no guarantees, only hope.[710] "Perhaps they can adapt themselves to a harnessed river," the *New York Times Magazine* reported of the salmon in 1941. "If the salmon succumb now to the dams, the fishermen might, in theory, be settled on some new reclamation project."[711]

The Bonneville experience was similar to events on the Baker River in the

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[707] O'Malley, H., "Some problems which confront the fishery experts in the construction of dams in the Inland Empire," *Northwest Science* 9,1(1935), pp. 23, 23-24.

[708] Milo C. Bell, *Fish Ladders and Mechanical Lifts* (Thesis submitted for the degree of Bachelor of Science in Mechanical Engineering, University of Washington, 1929), pp. 3-4.

[709] O'Malley, H., "Some problems which confront the fishery experts in the construction of dams in the Inland Empire," *Northwest Science* 9,1(1935), pp. 23, 23-24.

[710] Netboy, A., 1973, pp. 285-289; Griffin, L.E., "Certainties and risks affecting fisheries connected with damming the Columbia River," *Northwest Science* 9,1(1935), pp. 27, 25-30.

[711] Lampman, H.S., "$10,000,000 fish story," *The New York Times Magazine* (September 14, 1941), pp. 28, 16.

previous decade. Proponents of Columbia River dam development concluded that fish passage technology at Bonneville was a success. The U.S. Bureau of Reclamation and Corps of Engineers gave the go-ahead to build more dams. Others saw failure and argued that federal claims were "contrary to the contention of every competent fishery biologist who has made a study of the subject." They argued that salmon losses at both dams were too significant to conclude success.[712]

In 1941 the Bureau of Reclamation finished Grand Coulee dam at river mile 597. The structure rose twice as high as Niagara Falls, 550 feet above the river's bed. It created a reservoir 150 miles long and forever blocked the ascent and descent of migratory fish to the country's borderlands and Canada. No fish passage was attempted. The project was completed eight months before the attack on Pearl Harbor. In two years' time 96 percent of the Columbia River's electricity was used for war manufacturing. The dams together produced 42 percent of the country's aluminum, thousands of planes, hundreds of ships and fuel atomic bomb development. Navigation, flood control and irrigation were additional functions as well as supplying energy to the region's growing population that rose 44 percent from 1940 to 1948.[713]

The National Research Council quantified the costs to the fisheries in 1995. The dimension of physical and biological change was tremendous. Dam construction had eliminated 31 percent of the stream miles and 55 percent of the original salmon and steelhead habitat available in the Columbia Basin. The John Day and McNary Dam

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[712] Cellars, J.H., "Hydro kills the fishing industry," *Public Utilities Fortnightly* 41,7(March 25, 1948):417-425, p. 418.

[713] Orsborn, J.F., "Fishways—historical assessment of design practices," *American Fisheries Society Symposium* 1 (1987):122-130, p. 124; William Dietrich, *Northwest Passage, The Great Columbia River* (New York: Simon & Schuster, 1995), pp. 284-285.

pools, for example, inundated about 137 miles of river.[714] The provision of fish passage facilities at most of the dams was not enough. In addition to passage mortalities at Bonneville foreseen by the U.S. Fish and Wildlife Service in 1947, a host of other problems surfaced at all the projects. Varying water temperatures above and below the dam, altered patterns of seasonal river flow, silt deposition in reservoirs and nitrogen supersaturation created by heavy spills of water over the dams were some of the changes intolerable to salmon. At each dam losses of upstream and downstream migrants accrued, sometimes rendering a fishery almost non-existent after the steeplechase was finished. In 1970, Bonneville mortalities for migrating adult chinook salmon were reported at 13 percent. Dalles Dam reported adult mortalities of 12-25 percent. The following year the Washington Department of Fisheries charged that supersaturation killed more than 5 million fish in the Columbia and Snake Rivers, including over 90 percent of chinook salmon and steelhead smolts.[715] The salmon were not coexisting with the dams.

The impact to the fisheries was catastrophic. According to the Northwest Power Planning Council, in 1992 on the Columbia 99.7 percent of the wild spring/summer chinook salmon, 92.7 percent of fall chinook and 99 percent of sockeye deaths resulted from juvenile and adult migration through hydroelectric systems. As two scientists concluded the following year, in spite of technological measures to mitigate using fish passage on the hydropower projects, “their costs can be high, and their effectiveness may

[714] National Research Council, 1995, pp. 52-53, 59.

[715] National Research Council, 1995, p. 59; Netboy, A., 1973, p. 297.

be poorly understood."[716] No redemption was offered to the fishermen or the fish. "Fifty years ago the river was crowded with netsmen," salmon historian Netboy wrote in 1973. "The Columbia is now a sleeping giant, its surface only occasionally ruffled by the strong winds that blow through the gorge."[717]

Chapter 22 Technology and Risk

In her study of the salmon rituals performed by Native groups of the Northwest Coast, the anthropologist Erna Gunther described a worldview that held salmon to be supernatural. In the Native world, fish were immortal beings that required human supplication. Such beliefs had profound consequences on collective social behaviors, Gunther concluded. These behaviors, or cultural mores, had served an important regulating mechanism. They promoted the longevity of the fisheries resource and, in turn, ensured the survival of Pacific Northwest societies over many centuries. For example, Native communities held elaborate ceremonies to mark the arrival of salmon in each season's run as the fish moved upriver. Formal procedures proscribed every ritual interaction with the fish, including how its bones and waste were to be treated. "[D]isposing of the refuse," Gunther wrote, "is one of the most widespread regulations regarding the salmon, based on the concept of their immortality." The Native groups believed that proper disposal ensured the salmon would return. As they could not afford to insult the spirits of the fish for fear of losing the

[716] Hallock, T., "Power to the salmon: the federal dams in a Northwest salmon strategy," *Trout* 34,3(1993):30-33, p. 31; Cada, G.F. and Sale, M.J., "Status of fish passage facilities at nonfederal hydropower projects," *Fisheries* 18,7(July 1993):4-12, p. 4.

[717] Netboy, A., 1973, pp. 299-300.

resource, they made sure to follow the rules. Great effort was made "not to offend them by being careless with their bodies so that they will come abundantly."[718]

As described by Gunther, these long-ago Pacific Northwest communities had developed mechanisms that infused their worldview with fear, reverence and awe toward the resources that drove their economy. Early Native groups were practitioners of a form of risk management that connected them closely to the natural resources they needed for their survival. They oriented their economy and culture to protect the fisheries over the long-term. In so doing they developed cohesively organized systems of regulations that ensured everyone had responsibilities and required everyone to participate. This made sense because everyone had a stake in ensuring their society as they knew it would not collapse. Everyone lived within the framework of survival, not apart from or in opposition to it.

The regulatory system that Leslie Darwin inherited in Washington State in 1913 was entirely different. The nation had already suffered the indignity of watching its prized East Coast fisheries collapse. The West Coast was now rushing headlong into the same fate. As the nineteenth century came to a close, new federal policies began to respond to the crisis. They promoted the conservation of natural resources through centralized scientific management. "The new realms of science and technology, appearing to open up unlimited opportunities for human achievement," historian Samuel Hays argued, "filled conservation leaders with intense optimism."[719] The establishment of the U.S. Fish Commission in 1871 was an early example of the movement toward applied

[718] Gunther, E., in *University of Washington Publications in Anthropology*, 1928, pp. 143, 158, 150-151.

[719] Hays, S.P., 1959, pp. 2, 1-4, 122-127, 261-266.

science as a corrective policy. Congress saw the Commission as a branch of government that used scientific method and investigation to promote healthy economic advancement of the fisheries. It attempted to rebuild the nation's fisheries using aquaculture technologies.[720]

Within 20 years of the Commission's start fish culture had become a mania. At the behest of fishermen and salmon cannery owners, early hatchery use was an attempt to produce greater numbers of fish in less space and shorter time than the natural production of streams and lakes. Experts believed that hatcheries could not only rebuild fish populations formerly damaged by human activities, but also could substitute for the future loss of spawning habitat. The technology was "one of the best examples of the way in which science may be utilized in behalf of a great industry," George Brown Goode of the Smithsonian declared in 1893. He called the work of federal and state scientists a "national industrial welfare."[721]

By 1914 the federal Commission had invested more than $1 million into fish culture stations and facilities in the country, operating 24 hatcheries.[722] By the close of Darwin's final term, in 1921, he recommended continued reliance on the technology. "My years of experience in this Department only confirm me in the belief that the maintenance of our salmon runs lies in increased artificial propagation," he wrote. Hatcheries should be on every salmon stream should the state wish to maintain its runs,

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[720] Connery, R.H., 1935, p. 115; Evermann, B.W., "The investigation of rivers and lakes with reference to the fish environment," in *Bulletin of the United States Fish Commission, Volume 13, for 1893* (Washington, D.C.: Government Printing Office, 1894), p. 69.

[721] Goode, G.B., in *Bulletin of the United States Fish Commission, Volume XIII, 1893* (1894), pp. 56, 54.

[722] *Tenth and Eleventh Annual Reports of the State Fish Commissioner*, 1899-1900 (Washington State Fisheries Commission, 1901), p. 18; *Pacific Fisherman* 8,2(February 1910), p. 12; *Pacific Fisherman* 12,4(April 1914), p. 11.

he advised. “Any other activity of the Department can well afford to be sacrificed in order to carry on the hatchery work.”[723]

The work was important to Darwin because economic development in the Pacific Northwest posed a direct challenge to the survival of the commercial fisheries industry. Irrigation, manufacturing, dams and lumbering were among several activities detrimental to fish but “essential to the great future” of Washington State, as an earlier commissioner explained. In the developing western states, large railroad land grants and other private-interest federal subsidies peaked between 1870 and 1910. The region had embraced an industrial mindset that was considered imperative to the public interest. Darwin’s agency was not expected to stand in the way of the region’s growth. Such activities “must not be hampered or held back for the salmon industry.”[724] Hatcheries were politically expedient.

Like their Native predecessors, the Euro-Americans of North America and those living in the Pacific Northwest had valued the continent’s abundant freshwater and marine fisheries. Their early economies had relied heavily on the fisheries. But additional economic activities competed for access to and use of the rivers. These activities imposed additional risks onto the fisheries by threatening habitat and the reproductive capacity of the resource. Decision makers were thus confronted with a thorny dilemma over how to balance these competing uses, how to accommodate everyone. Hatcheries seemingly offered a way out of the problem. The regulatory policy that Darwin’s generation favored

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[723] *Thirtieth and Thirty-First Annual Reports of the State Fish Commissioner*, 1919-1921 (Washington State Fisheries Commission, 1921), p. 37.

[724] Scheiber, H.N., “Property law, expropriation, and resource allocation by government, 1789-1910,” in *American Law and the Constitutional Order: Historical Perspectives*, Lawrence M. Friedman and Harry N. Scheiber, editors (Cambridge: Harvard University Press, 1978), pp. 132-141; *Sixteenth and Seventeenth Annual Reports of the State Fish Commissioner*, 1905-1906 (Washington State Fisheries Commission, 1906), p. 16.

held that aquaculture could accommodate everyone. Technology tempered or eliminated the problems of competition among user groups. Society's risk managers believed they had found a way to satisfy everyone's needs.

But the strategy was flawed for several reasons. The idea that hatcheries could solve the nation's fisheries problems was so powerful that it blinded society to the possibility that the technology had downsides. One shortcoming was that the widespread acceptance of fish culture compelled federal and state decision makers to neglect the development of pure fisheries science. Such study would have provided a better understanding of the natural conditions of the fisheries, their habitat requirements and population characteristics. This knowledge could have informed fisheries management decisions relating to the impact of other practices that impacted fishery health as well as assess the effectiveness of hatcheries.

To his credit, Spencer Baird, Assistant Secretary of the Smithsonian and the Commission's first director, surrounded himself with eminent specialists who together worked to amass physical and biological data on all of America's waters. Congress had charged the Commission to investigate the causes of fisheries problems and advise what could be done to solve them. Baird's team was responsible for much of the early scientific record on salmon.[725] He wanted to understand not only the life histories of species of economic value but every detail of their interaction with the environment.[726]

Nonetheless, the appeal of hatcheries to the general public, fisheries industry,

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[725] Connery, R.H., 1935, pp. 115-118; Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, pp. 1139-1145.

[726] Goode, G.B., in *The Fisheries and Fishery Industries of the United States*, 1884, pp. 1139-1145, 1164-1180.

politicians and regulators quickly dominated the scientific establishment's agenda and legislative funding. Periodically, one or two scientists questioned whether the technology was actually working. But their voices went ignored or unheard. In 1893, for example, Barton Evermann argued to his peers that fish culture and fishery legislation should first depend upon "a series of comprehensive and exhaustive investigations" into the natural conditions and factors influencing marine and freshwater species.[727] Regardless, over the next half century there was no sustained critique of the hatchery technologies and whether they actually worked. The proper development of fisheries science in America remained inhibited by meager research budgets and professional disinterest, leaving subsequent scientists blind to the development of other management possibilities.[728]

The early hatchery movement helped to foster and engrain the separation of fisheries science from the natural systems it was intended to observe. While the movement relied on the work of scientists and applied technology, it is reasonable to conclude that it was neither wholly informed nor tested by rigorous scientific method. Such an outcome was not unique to the hatchery movement. The methods and aims of science were always at peril of failing to understand itself and see its limitations. In his twentieth century studies of the interaction of science and phenomena, the philosopher Maurice Merleau-Ponty found the prospect worrisome. Such blindness, he argued, could lead the discipline to forget it was based on "concepts of nature," instead believing it was

[727] Evermann, B.W., in *Bulletin of the United States Fish Commission, Volume 13, for 1893*, 1894, pp. 70, 73.

[728] McHugh, J.L., in *A Century of Fisheries in North America*, 1970, pp. 27, 47; Idyll, C.P., in *Origins of American Conservation*, 1966, pp. 82-83; Larkin, P.A., "Fisheries management—an essay for ecologists," *Annual Review of Ecology and Systematics* 9(1978):57-73, p. 65; *Pacific Fisherman* 23,2(February 1925), p. 8.

based on its own inventions and techniques. Phenomena thus "worked-out" by science was "more likely produced by the apparatus than recorded by it," a condition that erroneously promoted "all sorts of vagabond endeavors."[729] Stephen Toulmin, whose enquiries also described the complex underpinnings of society and science, likewise warned that "when it comes to interrogating Nature, in the laboratory or in the field, we must leave her to answer for herself—and answer without any prompting."[730]

Likely both philosophers would have been troubled by the claims of Washington State's superintendent of hatcheries, John Crawford, who frequently defended fish culture by appealing to the ability of applied science to improve upon nature. The spawn taken from hatcheries, he argued in 1910, was "so much greater than" the same amount produced by salmon under natural conditions, that the state did not need all of its wild spawning streams "to produce the same amount of young salmon." This belief had served as the central assumption guiding fisheries risk management policy recommendations for decades.[731]

The heavy reliance of regulators on hatchery technologies was also problematic because it constrained society's ability to rely on other methods of coping with habitat destruction and overfishing. Decision makers charged to protect the fisheries did not look to the use of restrictive laws and cultural mechanisms, believing these had failed to prevent the loss of fisheries in the Northeast. "Experience has clearly demonstrated," a

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[729] Merleau-Ponty, M., "Eye and mind," in *The Primacy of Perception*, James M. Edie, editor, (Northwestern University Press, U.S.A., 1964), pp. 159-160.

[730] Stephen Toulmin *Foresight and Understanding: An Enquiry into the Aims of Science* (New York: Harper & Row, Publishers, Incorporated, 1963), pp. 109, 101.

[731] *Pacific Fisherman* 8,9(September 1910), p. 16.

Commission bulletin noted in 1893, "that, save in exceptional cases, merely restrictive laws furnish no adequate remedy for existing evils, nor is it probable they ever will."[732] State and federal risk managers instead believed that artificially rearing fish could do away with the need for legislation restricting exploitive behavior.

This "golden hammer" approach to risk management employed technology as an all-purpose tool. It reduced the complex problem of protecting the fisheries into a single solution. It gave society false assurances that aquaculture could compensate for a variety of threats and behaviors that were harmful to the fisheries. Such a policy removed much of the responsibility from the citizenry to respect the fisheries resource and restrain poor conduct. It actually compromised society's ability to manage itself. It hastened the demise of the fisheries by leaving unchecked the very forces responsible for their damage.

Leading up to the 1930s when the Columbia River mainstem dams started to rise, the mistaken belief that competing users could coexist on the region's rivers had served an important function of social denial. Hatcheries had helped decision makers and the public to avoid addressing the difficult question of whether one user group was more important than another. Whether, for example, one industry gave way and terminated if coexistence were impossible. The gap in the engineering community was an especially problematic issue that hatcheries had helped to obscure. Technical advances made by the power industry to build large structures in rivers outpaced engineers' ability to design workable fish passage. Using the golden hammer strategy, the state placed hatcheries at the foot of dams to replace whatever spawning habitat the dam blocked. In these and

[732] Spangler, A.M., in *Bulletin of the United States Fish Commission, Volume 13, for 1893,* 1894., pp. 31-32.

other ways aquaculture technology was used to blunt the hard question of whether the fisheries should be sacrificed for the benefit of another economic use.

Across the Pacific Northwest dating back to early settlement, streams, rivers and lakes had already been damaged by other economic interests. With each decade more and more habitat was harmed. On the Skokomish River in 1927, for example, the City of Tacoma's dam destroyed an important salmon stream. The state fisheries commission concluded that "power is of more importance to society than the salmon."[733] In eastern Washington, federal reclamation projects on the Yakima and other rivers prompted one commission report to call competing policies "one of the dark spots" in the national government, wherein one department attempted to protect the fisheries while another "unnecessarily destroys fish life by the millions."[734] While in Oregon, exasperated fisheries officials discussed their inability to prevent logging operations from destroying the state's coastal streams. "Good bye, salmon," one expert said to another. "Yes, good bye salmon on those streams," was the response.[735]

But "saying goodbye to salmon" in the Columbia Basin was an altogether different matter. The question of the extreme sacrifice—permanent dams on the mainstem of the river—erupted by the late-1920s with the prospect of damming Priest Rapids. Competition over rivers intensified as fisheries resources dwindled and large-scale irrigation and hydroelectric projects were developed. By this time, hatcheries were

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[733] *Pacific Fisherman* 23,10(October 1925), p. 8; *Thirty-Sixth and Thirty-Seventh Annual Reports of the State Fish Commissioner*, 1925-1927 (Washington State Fisheries Commission, 1927), p. 40.

[734] *Thirty-Sixth and Thirty-Seventh Annual Reports of the State Fish Commissioner*, 1925-1927 (Washington State Fisheries Commission, 1927), p. 39.

[735] "Proceedings of Second Annual Convention of Oregon Salmon Hatchery Superintendents," Portland, Oregon, February 3-4, 1925, pp. 87-88.

no longer an option and fish passage remained problematic. Faith in these technologies had begun to wane as scientists questioned their success over the past half century and wondered whether they could compensate for large multiple use projects (Figure 22.1). The promise that hatcheries could forever sustain the commercial fisheries amid the region's economic growth had not come true. During the 1930s, fisheries authorities in British Columbia started to discontinue fish culture operations. Even the American establishment scrutinized the practice. When Livingston Stone's landmark salmon hatchery on the McCloud River fell to power and irrigation development in 1938, many knew an era had ended.[736]

Federal dams in the Columbia Basin soon powered war factories. The Pacific Northwest fisheries—already severely perturbed from decades of overfishing and other threats—met a fate similar to its counterpart in the Northeast. Leslie Darwin's society had asked the impossible of his resource managers. Between the demands of the commercial fisheries and the rest of the region's expanding economy, biologists and engineers were expected to harmonize the needs of salmon with the conflicting needs of development. They thought the technology of hatcheries could reduce the risk of fisheries collapse. But the tool failed in several unexpected ways (Table 22.1). Over 50 years after the Corps of Engineers built Bonneville Dam in the Columbia River Gorge, northwest author William Dietrich travelled the entire river from source to mouth, visiting many of the mega dams along the way. "The water is different," he reflected. "It is older, dirtier, tireder than it

[736] Larkin, P.A., 1979, p. 101; Lichatowich, J.A. and McIntyre, J.D., "Use of hatcheries in the management of Pacific anadromous salmonids," *American Fisheries Society Symposium* 1(1987):131-136; James, M.C., "Baird fish culture station now closed," *The Progressive Fish Culturist* 37(April 1938), pp. 22-25.

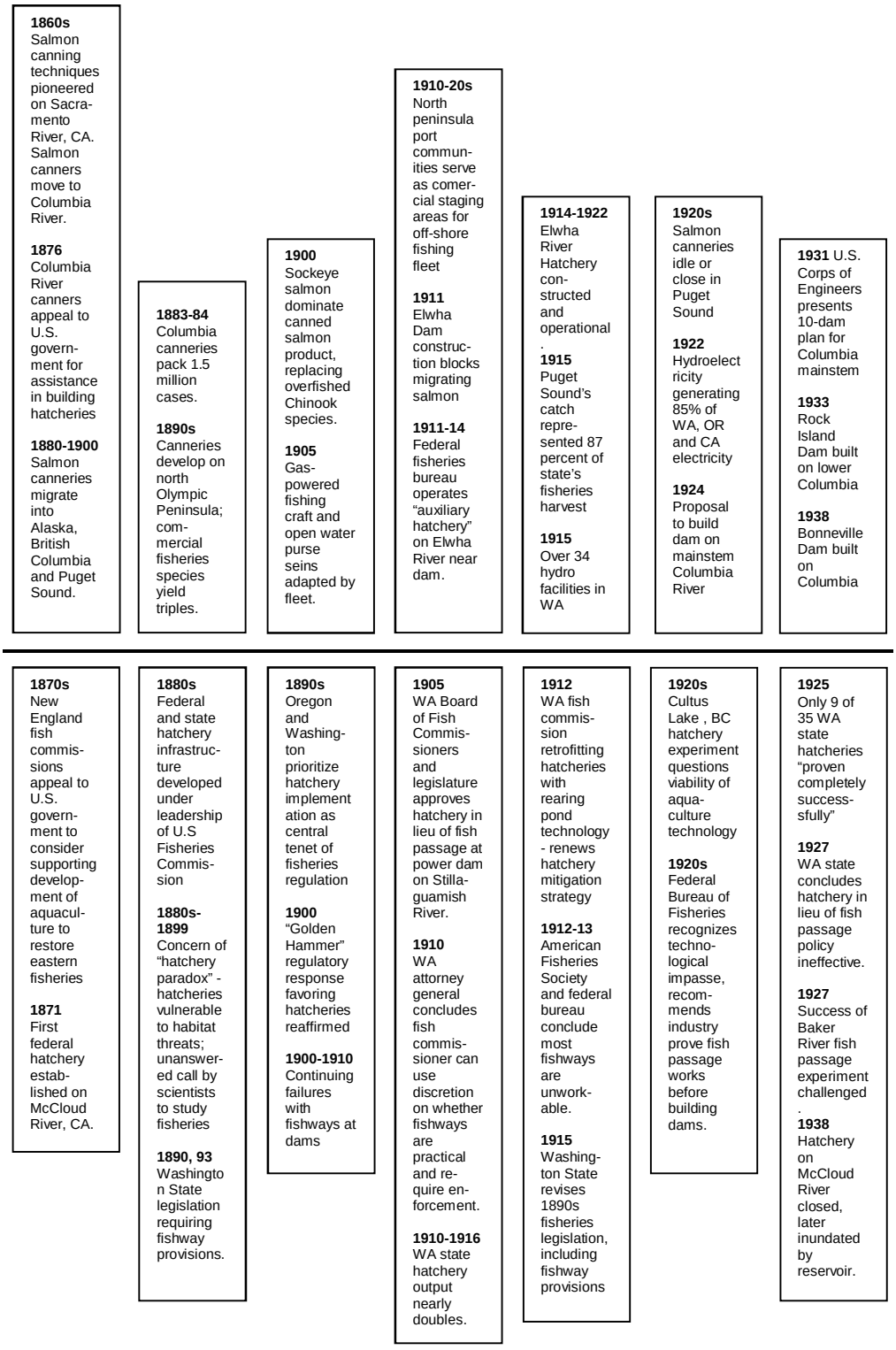
used to be by the time it reaches the sea."[737]

Table 22.1 Adverse effects of reliance on hatchery technology to regulate Pacific Northwest salmon fisheries as understood during the period 1870-1930

Outcome	Context
Repression of scientific study	Governmental funding prioritized aquaculture activities with minimal support of basic fisheries science and biological investigation.
Lack of rigorous hypothesis testing	Scientific assertions and anecdotal claims of hatchery success rarely subjected to formal study and analysis.
Intolerance of criticism	Fisheries establishment dismissive of investigation or concerns that countered hatchery mentality.
Minimal promulgation and enforcement of regulations limiting fishing and habitat threats	Regulatory emphasis on hatchery implementation restricted use of regulations that checked inappropriate behaviors and actions.
Disregard of cultural methods to control adverse individual and community behaviors	Use of hatcheries fostered socially exploitative attitudes toward the fisheries. Few cultural mores promoted conservation and preservation of the resource.
False public confidence in governmental response	Regulatory institutions and experts conveyed to society idea that hatchery technology could successfully mitigate threats to fisheries.
Societal detachment from fisheries protection	Centralized regulatory use of hatcheries created disincentive for public to share responsibility in protecting fisheries.
Moral ambiguity	Belief that hatcheries could make possible coexistence of competing extractive uses of rivers avoided explicit ethical debate of trade-offs and sacrifice.
Over-simplification of problem	Use of hatcheries as all-purpose solution to complex fisheries problems created "golden hammer" regulation.

[737] Dietrich, W., 1995, p. 309.

Figure 22.1 Timeline of events relating to technological and regulatory evolution of fisheries management in Puget Sound and Olympic Peninsula, Washington, 1860s-1930s



Part 7. An Olympic National Park

Chapter 23 It was Strangely Like War

In the summer of 1941, *Evening News* editor Charles Webster met with Irving Brant to warn him that a Port Angeles plywood mill wanted to log in the hills behind the city. The Morse Creek watershed provided the community's drinking water supply and was too valuable to risk damaging. Webster said the city was nearly uniform in favor of seeing the area permanently protected within the boundaries of the newly established Olympic National Park. But the owners had persuaded the chamber of commerce to recommend against the idea. In 1938, Congress had carved Olympic National Park out of preexisting federal lands on the peninsula. The park's original bill provided for enlargements. Brant was in Port Angeles to finalize boundary recommendations to the U.S. Department of Interior. Webster appealed to him to help save the city's water supply by placing it within park boundaries.[738]

The problem Webster faced was at root a problem of local governance. Port Angeles governing institutions had reached a breaking point because civic leaders could not agree on which group should have priority. On the one hand a local manufacturer desired to cut nearby forests in order to continue its plywood business. On the other, the community at-large relied on the same forested area to protect its drinking water source. The chamber of commerce favored the plywood facility, other community representatives favored public water. Port Angeles could not effectively manage critical matters of

[738] Irving Brant, *Adventures in Conservation with Franklin D. Roosevelt* (Flagstaff, AZ: Northland Publishing Company, 1988), p. 231.

economic and public health risk because of a stalemate over how best to use its timber and water resources, respectively.

There was likely no better person for Webster to reach out to than Irving Brant. A well regarded journalist and historian, he was also an advisor to Secretary of Interior Harold Ickes and part of the inner circle of President Franklin Roosevelt on conservation matters. Brant had already sparred with Aldwell and other interests on the peninsula. He was a master strategist and considered by many integral to the establishment of Olympic National Park. He had scouted much of the peninsula in the 1930s to recommend to the President what areas deserved inclusion in a national park. The timber and pulp and paper industries had fiercely resisted the park's creation. So, too, was the Forest Service antagonistic to transferring its jurisdiction to another agency. Although Brant was a veteran of many such battles to preserve lands, he called the situation on the Olympic Peninsula the "greatest of all such conflicts." Its forests were too valuable to industry to receive permanent protection.[739]

The loggers had already worked through much of the country's forests. They had reduced the vast sweep of virgin hardwoods that had covered the eastern third of the United States down to one large tract of close to 200,000 acres directly north of Wisconsin, on the western tip of Michigan's northern peninsula. State by state, the experience was typically brief and rough. In his legal history of the lumber industry in Wisconsin, J. Willard Hurst described how the heavily timbered state was cut to exhaustion "in the course of a headlong pace of growth within a span of scarcely thirty years." Of Wisconsin's 35 million acres, about 30 million bore significant stands of

[739] Brant, I., 1988, p. 72; Guy Fringer, *Olympic National Park: An Administrative History* (Seattle, WA: National Park Service, Pacific Northwest Region, May 1990), pp. 40, 55.

valuable hardwoods and pines, much of which was converted into farms by 1900. Brant understood the history of the timber industry and saw into the future. It was looking for more accessible wood. It would not quit the west slope of the Pacific Northwest until everything was cut. He had seen what happened just south of the peninsula in the forests adjoining Grays Harbor. Industry had turned it "into a waste of slash and brush that was still barren desert" many years later.[740]

The cutting had started in the mid-nineteenth century when East Coast and Midwestern timber entrepreneurs based in San Francisco set up mill outposts on Puget Sound's tidewaters. These staging areas enabled the cutters to clear the trees along the shore and then move inland as far as their horse and oxen could pull out the massive logs. Land in Washington Territory was cheap and the public domain readily available. Far removed from the discourse of national events, the remote region essentially functioned like a lumbering colony. The lumbermen enjoyed an isolation that "facilitated the gathering of vast timber holdings," as explained by historian Robert Ficken. They controlled the land.[741]

The 1880s were a transitional decade for the fate of western Washington's forests. The cutting would accelerate. The Great Lakes timber supply was falling off. At the same time, cross country railroads had finally reached the Pacific Northwest. Seattle and Tacoma would become major population centers, also serving as headquarters for timber investors. Increasing demand and markets for lumber, coupled with new extraction

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[740] James Willard Hurst, *Law and Economic Growth: The Legal History of the Lumber Industry in Wisconsin, 1836-1915* (Cambridge: Belknap Press, Harvard University, 1964), pp. 1-3, quote on p. 2; Brant, I., 1988, pp. 227, 76 (quote).

[741] Ficken, R.E., 1987, p. xiv.

technologies such as steam engines or "donkey engines" that replaced the bull teams, gave rise to feverish inland cutting beyond the tidewater. The deep forests began to fall at a rapid pace.[742]

The industry targeted southwestern Washington where lowland forests held hundreds of thousands of acres of heavy timber. These were old forests—so old, in fact, as described by nature writer Tim McNulty, that a 250-year old stand of coniferous Northwest forest was considered "'young' for old growth." Lack of transportation infrastructure spared them until well after much of Puget Sound was cut.[743] The coastal trees were thick, straight and tall. They were unique stands—beyond the ability of most humans to describe. "Only the wonderfully lit, startling black and white photographs of the late nineteenth century show what an empire of colossal giants there once was in the lowlands," a Northwest writer eulogized a century later. Today, nearly every historical society archive in the region holds photographs of men sitting within the sawed out clefts of the large trunks. Perched on spring-boards well off the ground to avoid the fluting bole, they cut a V-shape into the trunk before finishing off the centuries-old tree.[744] "It is as if they were making an attempt to reduce the trees to human scale, to human comprehension…." a local historian wrote of the hundreds of photographs of the giant

[742] Ficken, R.E., 1987, pp. 59, xiv, 55; Murray Morgan, *The Mill on the Boot: The Story of the St. Paul & Tacoma Lumber Company* (Seattle: University of Washington Press, 1982), p. 66; Morgan, M., 1976, p. 129.

[743] Ficken, R.E., 1987, pp. 57-59; Morgan, M., 1976, pp. 128-129; Tim McNulty, *Olympic National Park. A Natural History* (Seattle, WA: University of Washington Press, 2009), p. 107; National Research Council *Environmental Issues in Pacific Northwest Forest Management* (Washington, D.C.: National Academy Press, 2000), pp. 44-59.

[744] William Dietrich, *The Final Forest* (New York: Simon & Schuster, 1992), p. 121.

trees, “an attempt to somehow come to terms with something so colossal, so enormous as to be nearly beyond human comprehension.”[745]

The cutting was furious. “It was strangely like war,” historian Murray Morgan wrote of the mentality responsible for logging Washington’s southwestern trees surrounding Grays Harbor, Hoquiam, Aberdeen and Cosmopolis. “They attacked the forest as if it were an enemy to be pushed back from the beachheads, driven into the hills, broken into patches, and wiped out.”[746] The land area was as large as the Olympic Peninsula. And when they were through with the lower quadrant of the state they would move northward onto the peninsula where more coastal forest lay.

In 1936, botanist George Neville Jones reflected upon his research and visits to the Olympic Peninsula over the past decade with this summation: “Two major catastrophic events have occurred in the recent history of the vegetation of the lowland areas of the Olympic Peninsula—the Ice Age and the Caucasian Invasion.” He was not sure which event posterity would regard as “the more destructive,” but noted that nearly the entire region from sea level to about 4,000 feet once had been “covered by magnificent forests.” Jones had come too late to see these forests. “At present, however, scarcely any of the original forest remains in the lowlands which are now occupied chiefly by logged-off areas and more or less cultivated farms,” he noted. Only “at low altitudes in the mountains smaller stands of fine forest remain.”[747]

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[745] Irene Martin, *Beach of Heaven: A History of Wahkiakum County* (Pullman, WA: Washington State University Press, 1997), p. 39.

[746] Morgan, M., 1976, p. 130; Dietrich, W., 1992, pp. 21-22, 26.

[747] George Neville Jones, *A Botanical Survey of the Olympic Peninsula, Washington* (Seattle, University of Washington, 1936), p. 15 [Viewed as electronic text via http://babel.hathitrust.org/cgi/pt?id=mdp.39015035549214#page/2/mode/1up (Hathi Trust Digital Library), January 26, 2013.]

By the 1930s the Roosevelt administration was to open to the possibility of permanently protecting these remaining stands. Remotely preserved on the Olympic Peninsula, they represented the country's last surviving intact coastal temperate rain forests. But this prospect was deeply unsettling to the sawmills surrounding Grays Harbor and the pulp mills of Port Angeles.[748] Since the turn of the century, much of the peninsula forests and mountains were under federal jurisdiction. Subject to the competing agendas of conservationists and lumbermen, control of the lands bounced back and forth. In 1897, President Grover Cleveland created the Olympic Forest Reserve comprising over 2 million acres or two-thirds of the Olympic Peninsula in recognition of the area's unique value and the withering pace of industrial lumbering in the country. The national reserve was later reclassified as a national forest under the control of the Department of Agriculture. In 1909, President Theodore Roosevelt proclaimed 615,000 acres of the national forest area as Mount Olympus National Monument to provide more habitat protection to the summer range and breeding grounds of the Olympic elk (*Cervus canadensis roosevelti*).[749] But in 1915 President Woodrow Wilson reduced the size of the monument in half to 300,000 acres comprising mostly non-commercial timber and mountainous areas. The change enabled the Forest Service to cut valuable timber in the newly opened land.[750]

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[748] Brant, I., 1988, pp. 73, 76, vii, viii, 90-91.

[749] Ficken, R.E., 1987, pp. 124, 219; Susan Schultz, "Summary of Review of Legislative History for Statements of Mandated Resource Management Goals/Policies Relating to the Elwha Dams Issue," Olympic National Park, 1992 (Miscellaneous material, Library, Olympic National Park, Port Angeles, WA); Brant, I., 1988, pp. 72-73; Fringer, G., 1990, pp. 20-23, 34.

[750] Olympic National Park, *Resources Management Plan* (U.S. Department of Interior, Olympic National Park, May 1991), pp. 2-6; Ficken, R.E., 1987, pp. 219-223; Fringer, G., 1990, pp. 42-46.

After a controversial elk hunt within national forest boundaries in 1933 during a four-day open season, public pressure to protect western peninsula forests by designating them a national park intensified. In 1933 Roosevelt assigned responsibility for management of all national monuments to the U.S. National Park Service. This created uncertainty for industry on the Olympic Peninsula, as the Mount Olympus National Monument was now under Park Service jurisdiction. The unknown status of the peninsula's national monument—whether it would ultimately become a national park with enlarged boundaries—left the timber and pulp and paper industries nervous. Several hundred thousand acres of valuable timber could be forever barred from cutting.[751]

The timber industry had long maintained close relations with federal agencies on the peninsula. Thanks to the government, wood and pulp mills based in Port Angeles enjoyed rail access deep into the wilderness of the north peninsula. During World War I, the federal War Department had built one of the nation's most expensive railroads from the city stretching westward 36 miles toward the Pysht and Hoko Rivers. Aldwell had even secured a chamber of commerce donation to the effort, offering the logging division a saw mill site at the mouth of Ennis Creek on the city's eastern harbor. The unused line was finished shortly after the war. The government sold the tracks, 12,000 acres of uncut holdings and the new mill to the timber companies. The railroad proved invaluable because it offered access points into formerly impenetrable timber stands that thick country would have blocked for many more years. Companies such as Merrill-Ring and

[751] Brant, I., 1988, p. 72; Ficken, R.E., 1987, pp. 219-223, Fringer, G., 1990, pp. 51-52.

Bloedel Donovan employed thousands of men in north peninsula forests cutting hundreds of millions of board feet on tens of thousands of acres.[752]

Leading up to the 1930s, industry believed it had a ready supply of timber from the public lands. City boosters had promoted Forest Service estimates of wood supply to attract saw mills and pulp and paper manufacturers to the region. E.M. Mills, Aldwell's early financing partner for the Olympic Power Company's Elwha River dam, had encouraged the Zellerbach family to build their new mill on Ediz Hook in 1920. The major draw was the belief that Port Angeles accessed more pulp and paper timber than anywhere in the country. In 1929, Mills himself built a pulp mill on the former mill site at Ennis Creek.[753]

Industry exerted considerable pressure on state representatives and federal agencies to block the creation of a large Olympic National Park. A park confined to higher elevations where timber was inaccessible and of poor quality was one thing. But should park boundaries "reach far down in to the well timbered foot hills" within Forest Service jurisdiction, was something altogether different. The mills were depending on these forests for a steady supply of timber. "We have room for both Industry and Recreation. Let us develop both according to their values," the Port Angeles chamber of commerce stated in 1936.[754] But if the timber industry had its way with the forests of the Olympic Peninsula, Irving Brant argued, it would reduce the region to "an indestructible

[752] Morgan, M., 1976, pp. 146-149; Dietrich, W., 1992, pp. 89-91; Aldwell, T.T., 1950, p. 137; *Port Angeles Evening News*, April 1941 (Aldwell Files, Box 3, Folder 3, clipping. University of Washington Libraries, Seattle, WA); Aldwell, T.T., 1950, pp. 133-139.

[753] Morgan, M., 1976, pp. 194-197; Aldwell, T.T., 1950, pp. 128-129, 137-138.

[754] "Report on the Enlarged Boundaries of Mount Olympus National Monument, Suggested by Port Angeles Chamber of Commerce, Prepared August 20, 1936, Chris Morgenroth," (Miscellaneous material; Library, Olympic National Park, Port Angeles, WA).

mountain surrounded by a wilderness of stumps."[755]

Both Brant and Roosevelt believed that the nation's public owned the ancient rain forests of the Olympic Peninsula and should be preserved forever rather than chewed up by the plywood and pulp industries. They were, in the words of Brant, "the last great forest wilderness still standing" in the country.[756] Fundamentally, the issue reflected whether the country could govern itself in such a way as to balance the short-term economic desires of a few with the long-term benefits of the collective whole. The debate went beyond local and even regional desires because the forests were truly a national treasure. They were among the only remaining forests of their kind. They had been spared from cutting because of their remote location on shores that, until recently, were far removed from the press of advancing settlement.

Olympic National Park was finally established in 1938. According to Brant, passage of the bill had required "greatly disproportionate time and attention" from Roosevelt, who provided support to Washington State's politicians in the face of stiff resistance from the timber industry.[757] The highest levels of the nation's government had intervened to help ensure that federal lands on the peninsula received the greatest degree of protection possible. Against great odds, society had demonstrated an ability to weigh competing interests and protect a natural resource in spite of intense economic pressure. Had it failed to achieve the balancing of exploitation and preservation, according to anthropologist Mildred Dickeman the loss would have signified a "breakdown of social

[755] Brant, I., 1988, p. 93.

[756] Brant, I., 1988, pp. 71-82 (quote on p. 71).

[757] Brant, I., 1988, p. 113; See generally: Fringer, G., 1990, pp. 20-84.

integration," an inability "to bring into harmony the desires of short-term advantage and the necessity of long-term advantage."[758]

But for many the National Park Service was an unwelcome presence on the Olympic Peninsula. Created in 1916 and housed in the Department of Interior, the Park Service's Organic Act preservation mandate was in direct contrast to the National Forest Service's management approach.[759] With its federal ally losing a significant portion of forest domain on the peninsula, the timber industry believed its future was in jeopardy. As early as 1933, if an Olympic Park were to succeed amid such resentment, Park Service leadership had concluded it would need to develop strategies to placate the region. The monument and newly formed Olympic National Park would turn to the fish in its rivers and lakes as a means of providing recreational opportunity for the community on the peninsula. It would compete for public acceptance with already established state and Forest Service fishery programs.[760]

Chapter 24 Fishing for Leisure

In summer 1934, Preston Macy visited the Elwha River to scout its usage by campers. He found that the shelters were overflowing with people who were there to fish. And "practically all were having all they wanted to eat." The Park Service had appointed Assistant Chief Ranger Macy and wildlife biologist and fish culturist David Madsen as

[758] Dickeman, M., "Demographic consequences of infanticide in man," *Annual Review of Ecology and Systematics* 9(1975):107-137, p. 133.

[759] See generally: Richard West Sellars, *Preserving Nature in the National Parks* (New Haven, CT: Yale University Press, 1997), pp. 28-46; Fringer, G., 1990, pp. 23-84.

[760] Olympic National Park, 1991, pp. 2-6; Brant, I., 1988, p. 72; Ficken, R.E., 1987, pp. 219-223.

custodians of the monument. It was their job to figure out how to win over the public to support the new presence of the Department of Interior on the peninsula. The men quickly realized that fishing was popular among Port Angeles locals, especially along the Elwha River and at Lake Crescent. "There is no question but the Elwha is the best trout stream in the Olympics," Macy reported. "But it is going to be necessary to restock in order to keep it so."[761]

For the next few decades, Park Service natural resource managers at Olympic would rely on hatcheries to build strong public relations with local sports groups. The idea was based on precedent at other Park Service units where fish stocking programs designed to build good will had been successful. Although the agency's jurisdiction over the Olympic monument had stemmed from the need to protect elk from hunters and poachers, it viewed recreational fishing as vital to its future.[762] The park would actually welcome fishermen into its waters and facilitate their exploitation of fish. The integrity of the fisheries in monument waters, essentially, was sacrificed in order to establish and perpetuate an Olympic National Park. Moreover, the Elwha River and Lake Crescent would bear most of the burden because of influence of nearby sports groups in Port Angeles.

Given the vulnerable status of the new monument, Park Service Wildlife Division Chief George Wright considered the development of an Olympic fishing strategy "an emergency measure of the greatest importance" to justify the monument's presence and

[761] Macy to Tomlinson, August 20, 1934 (Elwha File, Olympic National Park, Port Angeles, WA).

[762] Tomlinson to Cammerer, September 7, 1935; Wright to Tomlinson, December 18, 1935; "Proposed Fish Planting Program for Mount Olympus National Monument, Justification for Fish Planting," 1935 (Fisheries File, Olympic National Park, Port Angeles, WA); Sellars, R.W., 1997, p. 81.

work toward creating a national park. “I have become convinced that the speeding up of this fish program will do as much as anything to win over the opposition,” he reported to Director Arno B. Cammerer. “If we can only bring about a condition whereby fishing in the national parks is actually better than it is elsewhere, we will have a big talking point.” Accordingly, the National Park Service instructed Madsen to survey the monument’s waters in order to implement a stocking plan as soon as possible.[763] It would turn to hatchery technologies as a means to manage the risks of strong public and inter-agency antagonism toward its newest monument.

North peninsula trout fishing had always been a popular pursuit, drawing locals to nearby lakes and visitors.[764] By the turn of the century Lake Crescent had developed a national reputation for its trout. A flamboyant outdoorsman named Admiral Beardslee popularized the lake’s trout, which in turn drew fish experts interested in learning more about a peculiar species of trout believed endemic to the lake. An improved road in 1911 made the lake easily accessible from Port Angeles. Fishing resorts along the lake’s shores followed. In 1913, state Fish Commissioner Leslie Darwin recognized the importance of the lake to the region through an appropriation to build a trout hatchery, with assistance from Thomas Aldwell and the Olympic Power Company.[765]

The power company also advertised its reservoir behind the Elwha Dam as a

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[763] Wright to Cammerer, July 29, 1935; Wright to Cammerer, July 31, 1935 (Fisheries File, Olympic National Park, Port Angeles, WA).

[764] *Port Angeles Evening News,* November 28, 1953; See for example: *Olympic Leader*, June 16, 1911; *Olympic Leader*, May 26, 1911; *Olympic Leader,* August 1, 1913.

[765] Steelquist, R.U., “Admiral Beardslee goes fishing: the early exploitation of Lake Crescent trout,” in *Proceedings of the Olympic Wild Fish Conference, March 23-25, 1983,* James Meade Walton and Douglas B. Houston, editors (Port Angeles, WA: Fisheries Technology Program, Peninsula College and Olympic National Park, 1984), p. 65; *Port Angeles Evening News,* November 28, 1953.

place to fish. "New Fishing Resort Just Outside City Limits. Trout of All Clans Will Gather There," the *Olympic-Leader* announced in December 1910 during early construction of the Elwha Dam. "'Think what a fish pond it will make,' said Foreman F.W. Mandau, of the Olympic Power Co., Monday morning, 'why, we'll grow trout nine feet long!'" The company representative pointed out that the reservoir would provide good fishing closer to home. It would be "a new Lake Sutherland" but only seven miles' drive from the city. "'We'll have a new summer resort with electric launchings and all the fancy trimmings.'"[766] Favorable newspaper accounts argued that a lake on the Elwha River would provide better trout fishing than the river itself.[767]

During the 1920s, salmon fishing started to rise in popularity on the Olympic Peninsula. John Cobb's 1921 *Pacific Salmon Fisheries* noted the increase of recreational fishing on the West Coast, predicting it would become superior to Atlantic coast sport salmon fishing.[768] In Port Angeles, the idea of catching salmon for fun was still novel, but within a decade would consume the town. E.B. Webster, publisher of the *Port Angeles Evening News*, wrote a book in 1923 titled *Fishing in the Olympics*, in which he reminisced early days pursuing salmon when it was still largely an unknown sport. The Elwha chinook, he remarked, had been much more common at the turn of the century before the dam was built. "I once hooked a Tyee off the mouth of the Elwha—it was in the fall of 1900—that towed my boat a half mile or more." But not many fishermen

[766] *Olympic Leader*, December 16, 1910.

[767] *Seattle Daily Times*, March 20, 1911; *Olympic Leader*, Lake Crescent Number, June 9, 1911. Similar arguments were made during construction of the Glines Canyon dam in 1927: *Port Angeles Evening News*, April 7, 1927; *Port Angeles Evening News*, April 22, 1927.

[768] Cobb, J.N., 1921, p. 90.

attempted to catch Elwha salmon, or any for that matter, in those days for sport. Few Port Angeles sportsmen had ever fished for salmon with gear. "I have seen larger Tyee than that," he added. "I once saw an average-sized man carrying a Tyee up from the wharf, holding the fish's head on his shoulder, and the tail swept the planking."[769]

By 1924 the fishing scene on Ediz Hook had changed. *The Olympic-Tribune* reported the success of Sunday sportsmen fishing the log booms near the end of Ediz Hook. "[E]very one of them had good luck" using steel rods and light tackle baited with live smelt to catch black-mouth and silver salmon. The fishermen "declare that there is no sport that equals it, as the fish are fighters and only give up after they are worn out."[770] By the end of the decade, the Port Angeles Chamber of Commerce, Izaak Walton League and city Boating Club worked together to lease a site on the spit for a fishing lodge and small boat mooring float in response to demand from salmon fishers.[771]

In 1933 the Port Angeles Salmon Club was organized to conduct annual salmon derbies to promote salt water sports fishing in the area. The event soon took on mammoth proportion. The first derby hosted 181 contestants. By 1940 the salmon club held over 2,500 members. Derby prizes totaled $5,000 in value including three cars, outboard boats and fishing merchandize presented by the state's governor. So many people wanted to enter the derby that qualifying rounds were required in Seattle, Tacoma, Victoria and peninsula towns. A state patrol boat was used to maintain order in the waters off Ediz Hook. Ashore, salmon "ladders" sometimes held over one ton of "trophy fish," with

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[769] E.B. Webster, *Fishing in the Olympics* (Port Angeles, WA: The Evening News Inc., E.B. Webster Press, 1923), pp. 17-19.

[770] *Olympic Tribune*, October 31, 1924.

[771] *Olympic Tribune* [fragment, newspaper uncertain], November 1, 1929.

medallions awarded for specimens weighing over 25 pounds. “Local business revenues are swelled by the expenditures of hundreds of visitors who are attracted in increasing numbers to this popular event,” the *Port Angeles Evening News* free 1941 Derby Edition reported. “The would-be salmon catcher has to have intricate gear which would have been unthinkable to the placid, lonely fisherman of the pre-derby era.”[772]

By the time Macy and Madsen were charged to increase fishing opportunities in the Olympic Monument, sport fishing in Puget Sound had “reached huge proportions.” Clallam County was on its way to becoming nationally recognized as a salmon sport fishing center and Port Angeles harbor was filling with sport fishing craft.[773] Numerous sporting and conservation groups sprang up across the region commanding the attention of state and federal agencies in matters of conservation and resource management. The clout of the recreational fisheries interests replaced the former influence held by the commercial salmon fisheries industry.[774]

As the salmon canners had done in previous times, the leisure fishers pressured government agencies to provide a steady stream of fish plantings in the region’s waters. Although the production of artificially propagated fish had begun to decrease in Washington State, sportsmen demanded game fish such as trout and steelhead. J.W. Kinney, who took the helm as the state’s first Game Fish and Game Commissioner after

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[772] *Port Angeles Evening News*, September 4, 1934; August 24, 1940; November 28, 1953; David H. Madsen, *Preliminary Report on the Fish Resources of the Olympic National Park*, 1939 (Fisheries File, Olympic National Park, Port Angeles, WA), p. 11; *Port Angeles Evening News*, August 23, 1941.

[773] *Port Angeles Evening News*, August 24, 1940; November 28, 1953; Madsen, D.H., 1939, p. 11.

[774] Perce, H.W., “Some general remarks on fishing for sport,” *Transactions of the American Fisheries Society* 40(1910): 397-403, p. 397. See generally, for example: Anders Halverson, *An Entirely Synthetic Fish: How Rainbow Trout Beguiled America and Overran the World* (New Haven, CT: Yale University Press, 2010); Tony J. Pitcher and Chuck Hollingworth, editors. Recreation Fisheries: Ecological, Economic, and Social Evaluations (Oxford: Blackwell Science, 2002).

Leslie Darwin resigned, told a meeting of the State Sportsman's Association in 1924 that fish culture activities should ensure that "every pond, pot hole and lake in the state should contain some kind of fish."[775]

Game officials made sure Clallam County was amply stocked. "The Lake Crescent hatchery is literally loaded to the guards with eggs and small fry for distribution to lakes and streams of the county," *The Olympic-Tribune* reported in May 1926. Area lakes were loaded with hundreds of thousands of eastern brook trout and cutthroat. There was even talk of reopening the shuttered hatchery at the foot of the Elwha Dam "to care for the overflow of fish fry." In 1929 the county game warden augmented fish spawn takes by building new traps in the Lyre River and Indian Creek. The state deposited Eastern Brook, Rainbow, Cutthroat, Wisconsin Rainbow, Montana Black Spot, Sockeye or Silver Trout, and Black Bass and Croppie into Lakes Crescent, Sutherland, Pleasant and Ozette as well as the upper and lower Elwha River and its tributary Little River.[776]

Madsen's survey of monument waters led to his findings of "many hundreds of miles of potential trout waters" and a recommendation to plant over 1 million native steelhead, cutthroat and rainbow trout in the Quinault, Queets, Hoh, Bogachiel, Sol Duc, Elwha, Dungeness, Dosewallips and Duckabush Rivers, "each year until further studies can be made."[777] In 1935 the *Seattle Post-Intelligencer* announced the Park Service's plan to stock peninsula streams. The paper described monument custodian and Rainier

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[775] *Olympic Tribune*, October 24, 1924.

[776] *Olympic Tribune* [fragment, newspaper uncertain], May 29, 1926; *Olympic Tribune* [fragment, newspaper uncertain], September 18, 1929.

[777] "Fish Planting Program—Mount Olympus National Monument," Olympic National Park (Fisheries File, Olympic National Park, Port Angeles, WA).

National Park Superintendent Major Tomlinson as "a firm believer in preserving and building up the game fishing facilities both within and outside of the national park boundaries of the Northwest."[778] Monument literature proclaimed itself a "paradise for sport and recreation." And on the Elwha River, "excellent fly fishing is afforded all along the stream as far up as the Elwha Basin," with offerings of Cutthroat, Rainbow, and Eastern Brook trout that "readily strike the well chosen fly."[779]

Inter-agency competition over the peninsula's fisheries followed and tensions surfaced as state fisheries and game departments, as well as the National Forest Service, adversely reacted to Park Service efforts to manage its fisheries. State agencies considered monument waters to be within their management domain. They were not interested in sharing. To avoid relying on the state's Lake Crescent hatchery, Madsen procured 600,000 eggs from federal stations at Quilcene and Quinault.[780] "It is my opinion that they are afraid we may cause fish to become more attractive and better in the monument than outside," Macy reported to Tomlinson while discussing difficulties in securing Elwha planting records from the Department of Game.[781] The massive planting achieved its desired objective, having "a very fine effect on the local sportsmen," Tomlinson concluded, as well as taking away "…some of the ammunition of our critics."[782]

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[778] *Seattle Post-Intelligencer,* March 22, 1935.

[779] "Mount Olympus National Monument," Olympic National Park (Fisheries File, Olympic National Park, Port Angeles, WA).

[780] Tomlinson to Madsen, October 22, 1935 (Fisheries File, Olympic National Park, Port Angeles, WA).

[781] Macy to Tomlinson, July 5, 1935 (Fisheries File, Olympic National Park, Port Angeles, WA).

[782] Tomlinson to Madsen, October 22, 1935 (Fisheries File, Olympic National Park, Port Angeles, WA).

With the successful establishment of Olympic National Park in 1938, Madsen and newly appointed Superintendent Macy set out to secure increased public support not only for a park fisheries program, but also for the cession of state fish and game control within the park's boundaries. They appealed to the self-interests of local fishing groups. During a meeting with the Port Angeles Chamber of Commerce, for example, Madsen stressed the park's intention of developing a progressive stocking program at Lake Crescent, now park property. He explained that service policies did not require fishing licenses if states ceded full jurisdiction over wildlife to the Park Service. "It makes little difference to us in the service whether there is a fishing license charge or not," he said, "but it makes a lot of difference to you people, particularly to those of you who hope to attract tourists and fishermen from outside states to the new park and your communities." Although the state did not officially cede its jurisdiction of fish and game to Olympic until 1942, the park immediately began stocking.[783]

Winning over the public was a struggle that would never end, especially with those who believed the Park Service should not be on the Olympic Peninsula. A strong opponent was Port Angeles Salmon Club president and State Game Commission member Harry LeGear. He had once described the Department of Interior as "an octopus with forty-eight arms reaching out for more land and more power," and joined with the Department of Game to appeal to congressmen to prevent the relinquishment of state control of park waters.[784] Their stiff opposition fueled a sort of arms race in fish plantings that lasted for the next two decades. Olympic National Park adapted its fisheries policies

[783] *Port Angeles Evening News,* August 13, 1938; Schultz, S., 1992.

[784] Madsen to Cammerer, September 7, 1938; McCauley to Wallgren, February 11, 1938 (Fisheries File, Olympic National Park, Port Angeles, WA).

to win over local recreational fishing interests as a means of gaining management autonomy and lessening public resistance to the agency.[785]

The contest over the Elwha River was especially rough. Sport fishermen had been asking the state to do something about the power dam's operations since the early 1930s. There was the perception that chinook runs had been rebuilding since the hatchery had stopped operating. Fishermen at the foot of the dam saw the large numbers of salmon pooling and wondered why the state was not collecting fish spawn.

In 1930 state Dungeness River hatchery superintendent Ernie Brannon visited the Elwha to see the commotion. "This year I fished ten different days catching one hundred eighty-one female chinook and two hundred fifteen male chinook salmon with only a gaff hook," he reported to the department supervisor. "These fish were all very large and in fine shape. Some of the female weighed more than sixty lbs. each and I caught several males that would weigh one hundred lbs. each." On every riffle large numbers of fish were spawning. Brannon had concentrated on only one of them, below the railroad bridge. "There were times I could catch five and six females in that many minutes. The whole river was the same from the dam, down near the salt water, but most of the places were hard to fish with just a gaff hook." He concluded the Elwha should be used as a source of spawn, and that with racks or a trap over 20 million chinook eggs could have been taken.[786]

Brannon returned the following year. "We worked down stream clear to the

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[785] Macy to Tomlinson, September 15, 1938; Madsen to Tomlinson, November 3, 1938; Tomlinson to Madsen, November 9, 1938 (Fisheries File, Olympic National Park, Port Angeles, WA); Madsen, D.H., 1939.

[786] Ernest M. Brannon to State Supervisor of Fisheries, November 3, 1930 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

mouth of the river and there were salmon rolling and jumping in all the deep holes, every one of them were very large ones," he observed. "I saw three spring salmon caught that would weigh around 40 lbs. Wilson's hardware has had five spring salmon weighing 42 to 48 lbs each on display this week." Clearly there were enough fish to supply nearby hatcheries with spawn.[787]

The Olympic Power Company was fortunate to have developed hydroelectric power on the Elwha River before salmon fishing became a popular sport on the river. In 1910 when dam construction started at Aldwell's canyon site only the commercial salmon packers had voiced concern. The promise of a hatchery satisfied them. But by 1930 the dam's water flow manipulation provided strong evidence to sportsmen that the Port Angeles pulp and paper industry was destroying what was left of the lower Elwha River's salmon. Because the reservoirs had limited storage capacity, dam operators manipulated water flows with abrupt and extreme effect by bottling up the river to fill reservoirs in anticipation of heavy mill operations and later releasing the water to generate power. These same problems had frustrated Darwin's office and led to the abandonment of the original hatchery. Fishermen sometimes found thousands of dead smolts on the banks along with large fish marooned in pools. They were disgusted by the experience. It did not seem fair.[788]

The situation worsened when the city built a water diversion channel to serve the

[787] Ernest M. Brannon to State Supervisor of Fisheries, July 15, 1931 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

[788] Chas. R. Pollock to T.J. Owens, City Engineer, December ?, 1929; Robert J. Schoettler to E.K. Browne, February 20, 1951; John M. Hurley to Fred M. Veatch, March 26, 1951; Chas. R. Pollock to H.M. Fisher, December 7, 1929; Chas. R. Pollock to J.W. Hedricks, Mayor, December 20, 1929; Chas. R. Pollock to H.M. Fisher, December 20, 1929; Milo C. Bell to Chas. R. Pollock, June 27, 1930; L.E. Mayhall to Chas. R. Pollock, June 28, 1930 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

mills at Port Angeles harbor. A state permit allowed the city to feed up to 150 cubic feet of water per second from a diversion works in the lower river. Constructed in 1930, the pipe line carried over 97 million gallons per day. But despite the Department of Fisheries' efforts to ensure adequate protections, the channel did not include a workable screen to divert fish from the water intake pipeline. The problem persisted for many years. The permit duration was 30 years at a fixed annual cost of $59,000. And it was renewed at that price for two additional 30-year cycles. To the frustration of many sport fishers, the Elwha River was functioning as an industrial lifeline of electricity and water to pulp mills with limited attention given to the health of the salmon.[789]

There was little if any progress in spite of continuing complaints by the fishermen. In 1931, state surveys concluded that dam shut downs and water diversions caused extreme low water that forced fish to retreat to deep holes or left them dead in dried out sections of river bed. The condition was severe for a one-mile stretch between the diversion intake and its outlet where excess water was returned to the river. Department of Fisheries Supervisor Charles R. Pollock approached the power company but got nowhere in his negotiations.[790]

In 1934, a department inspector notified Director B.M. Brennan that "this condition is called to my attention almost every day by people interested in the natural

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[789] Chas. R. Pollock to T.J. Owens, City Engineer, December ?, 1929; Robert J. Schoettler to E.K. Browne, February 20, 1951; John M. Hurley to Fred M. Veatch, March 26, 1951; Chas. R. Pollock to H.M. Fisher, December 7, 1929; Chas. R. Pollock to J.W. Hedricks, Mayor, December 20, 1929; Chas. R. Pollock to H.M. Fisher, December 20, 1929; Milo C. Bell to Chas. R. Pollock, June 27, 1930; L.E. Mayhall to Chas. R. Pollock, June 28, 1930 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA); *Pacific Fisherman* 8,1(April 1910), p. 18; Maib, C.W., 1952a, p. 27; *Peninsula Daily News*, January 19, 1990; May 17, 1990; May 20, 1990 (quote).

[790] Personnel to State Supervisor of Fisheries, September 9, 1931; Chas. R. Pollock to Norman B. Gibbs, September 25, 1931 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

propagation of the salmon." He recommended the department at least gain needed publicity by challenging the company "even if [it] was impossible to force them to do anything." In 1938, on behalf of area sportsmen Representative Francis Pearson advised Brennan of the problem, stating that fishermen were willing to volunteer their services to collect spawn for a hatchery. Brennan replied that his department was "handicapped by the existing contract when attempting to formulate any betterment of this situation...."[791]

That same year, the department finally ordered the Dungeness hatchery to collect Elwha spring salmon eggs, bowing to the wishes of the Port Angeles Salmon Club and a resolution passed by the city's chapter of the Izaak Walton League demanding the state rear Elwha salmon and then release the fry back into the river. As one official explained, the measure would "substitute for both spawning grounds and feeding areas cut off by the dam and help in a way to off-set the damage from water regulation." The strategy was simply a repeat of earlier efforts by regulators to use technology to cope with circumstances beyond their control.[792] "It is good to hear that the far too long delayed reconstruction of Dungeness hatchery is near at hand," the *Evening News* editorialized in September 1938.[793] In response, Olympic National Park officials solicited emergency funds from their own agency for Elwha plantings in order to keep pace with state planting

[791] E.M. Benn to B.M. Brennan, March 15, 1934; Francis Pearson to B.M. Brennan, received August 24, 1938; B.M. Brennan to Francis Pearson, August 27, 1938 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

[792] Milo Moore to Charles A. Faussett, December 26, 1946; B.M. Brennan to Francis Pearson, August 27, 1938; department personal correspondence, unsigned to E.M. Brannon, November 8, 1946 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

[793] *Port Angeles Evening News*, September 7, 1938.

levels.[794]

The new hatchery effort was seen as a guarantee of the Salmon Derby's continued success. Local fishermen believed a tide rip that set in off the mouth of the Elwha running to Port Angeles was followed back and forth by feeding salmon waiting to enter the river. The current carried silt that had eventually formed and continued to lengthen Ediz Hook. It seasonally provided a constant flow of adult salmon. "Most of the spring salmon caught in the vicinity of Ediz Hook are en route to the Elwha river to spawn," the paper explained. "To retain good fishing here it is pointed out there must be many spring salmon fry going out of the Elwha so they may come back to that stream to spawn."[795] May was the usual month when the Salmon Club prepared for the summer fishing season, declaring the first day of June as the official opening day, "a time when big salmon will undoubtedly be biting off Ediz Hook." While catches at nearby Sekiu and Dungeness served as a harbinger of expectation at Port Angeles, club members began constructing the derby ladder and giant plywood salmon signs.[796]

Power company operations and the need for more hatchery production on the Elwha were not the only concerns of the sports fishers. They also pressed officials to limit Native fishing on the lower Elwha River. In 1938, the federal government established the Lower Elwha Indian Community on 353 acres near the mouth of the river. But unlike the Port Gamble S'Klallam reservation at the mouth of the Hood Canal, the

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[794] Macy to Tomlinson, September 15, 1938; November 3, 1938, Madsen to Tomlinson, November 3, 1938; Tomlinson to Madsen, November 9, 1938 (Fisheries File, Olympic National Park, Port Angeles, WA); Madsen, D.H., 1939.

[795] *Port Angeles Evening News*, September 7, 1938; August 24, 1940; February 27, 1947; September 23, 1954, "Wandering Scribe."

[796] *Port Angeles Evening News*, May 14, 1940.

government did not designate the Elwha tribal community as a reservation.[797] The plan failed in large part because of local opposition from nearby non-Indian land owners and sports fishing groups.[798] The Washington State Sportsmen's Council, for example, called on the Bureau of Fisheries and state fish and game departments to help block the reservation. They argued it would "deprive the sportsmen of the privilege of fishing one of the best steelhead and salmon rivers in the north Olympic Peninsula" and "destroy the wonderful salt water fishing near Ediz Hook" controlled by the Port Angeles Salmon Club.[799]

The Native peoples in the lower Elwha valley had been experiencing increasing pressure from local and state officials to limit their fishing well before the Salmon Derby promoters arrived. Native groups in Washington were subject to the same regulations as non-Indians in commercial fishing but under treaty law were allowed unrestricted fishing for personal needs. The state began to challenge these rights in the early twentieth century as the fisheries intensified.[800] Legislation attempted to control where and when fish were caught to protect the commercial industry. Restrictions were placed on fishing grounds including traditional Native sites. It was felt that distinctions between personal and commercial fishing had blurred. Before long, almost all types of Native fishing led to confrontation. In 1911, a state committee investigating poor enforcement practices recommended the department improve its policing of fish laws and repeal of the act of

[797] Morrison, H.L., 1939, pp. 8, 17-18, 127.

[798] Morrison, H.L., 1939, p. 19.

[799] Cited in Lane and Lane Associates, 1981, pp. 35-36.

[800] Rathbun, R., in *Report of the Commissioner of Fisheries, 1899* (1900), p. 344.

allowing persons to fish for their own use during closed fishing seasons, except with hook and line only.[801]

The new Fisheries Commissioner, Leslie Darwin, increased enforcement efforts, especially by county game wardens.[802] Citing federal and state court decisions, he considered federal Indian treaty rights as inapplicable and relied instead on the interpretations of these courts to back legal measures favorable to his conservation policies. He viewed Natives who fished under treaty provisions "at any time, at any place or at any point that they might choose, in total disregard of the laws" as "vexing problems," believing what rights Indians had were limited to reservation waters. Backed by attorney general opinions, Darwin frequently arrested off-reservation fishers and those blocking hatchery streams with nets. He confiscated fishing gear and forced Natives to court.[803]

Federal Indian agents in Whatcom, Chehalis, Thurston and Benton Counties responded by challenging the state in courts to determine whether Natives still possessed treaty rights to fish. They had understood treaty law to guarantee Natives fishing at "usual and accustomed places" whether on or off reservations. Additional laws had exempted Natives from fishing license requirements.[804] Tulalip Indian Agent Charles M.

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[801] *Twenty-Second and Twenty-Third Annual Reports of the State Fish Commissioner*, 1911-1912 (Washington State Fisheries Commission, 1912), pp. 20, 28-29, 38, 40.

[802] *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), pp. 16-17.

[803] *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917), pp. 32-33; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), p. 42.

[804] *Twenty-Sixth and Twenty-Seventh Annual Reports of the State Fish Commissioner*, 1915-1917 (Washington State Fisheries Commission, 1917), pp. 32, 32-33; *Twenty-Fourth and Twenty-Fifth Annual Reports of the State Fish Commissioner*, 1913-1915 (Washington State Fisheries Commission, 1915), p. 42.

Buchanan argued to the legislature that the state's "harsh application" of its conservation laws was making it "increasingly precarious" for Native fishers to subsist.[805]

Even though the state's fishery code provided for subsistence fishing by Natives within reservation or adjacent marine waters, those living in the lower Elwha River valley without reservation status were especially vulnerable. The Treaty of Point No Point in 1855 had consigned them to a reservation at the Skokomish, where they chose not to live. In 1916, A.N. Taylor, a school teacher at the Jamestown day school and field agent of the Department of Indian Affairs, wrote to a superior in response to Natives arrested for fishing in the Elwha and Dungeness rivers. "I surely will not advise them to sit out on the beach and starve with the river full of fish that are being protected just to enhance the wealth of a few fish trap managers."[806] Elwha Natives often resorted to fishing at night to try to avoid arrest.[807] Federal land agents who appraised the lower Elwha valley in the 1930s to assess the possibility of creating a reservation voiced serious concerns for the welfare of the Natives. Natives could not catch enough fish for their own use as food and sometimes resorted to gathering dead fish killed from power dam operations. But even that sometimes resulted in arrest. Those caught fishing out of season could not afford to pay fines and would thus have to serve jail sentences.[808]

Soon after the lower Elwha Native community was established, local groups and

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[805] Buchanan, C.M., "Rights of the Puget Sound Indians to game and fish," *The Washington Historical Quarterly* 6,2(April 1915):109-118, p. 110.

[806] Cited in Lane and Lane Associates, 1981, pp. 33-34.

[807] Lane and Lane Associates, 1981, pp. 33-35.

[808] Morrison, H.L., 1939, p. 18.

public officials voiced further concerns about the fisheries.[809] The growing clout of the sports fishers strengthened the criticism leveled onto the Elwha Natives. In Port Angeles, the *Evening News* published articles and editorialized on the issue. "Means must be found to stop the commercial sale by Indians of fish taken in disregard of state conservation laws," the paper wrote in its 1940 Salmon Derby Edition. The following year, editor Charles Webster shared his apprehension "over the future fishing of the Olympic Peninsula, because of the Indian fishing situation" to Olympic National Park and Fish and Wildlife Service officials.[810]

In the meantime Superintendent Macy faced a serious challenge from sports fishing interests. In 1940, Olympic National Park grew by nearly 188,000 acres to include Hurricane Hill behind Port Angeles and the Elwha River valley north to Glines Canyon Dam reservoir. The park's boundaries now included highly desired fishing waters including Lake Mills and all of Lake Crescent.[811] That year the Port Angeles Chamber of Commerce's fish and game committee passed a resolution requesting a new trout hatchery. Reduced wartime budgets and a dwindling emphasis on supplying game fish

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[809] See for example: Bowles to Collier, February 24, 1938, cited in Lane and Lane Associates, 1981, p. 38a; Morrison, H.L., 1939, p. 43.

[810] *Port Angeles Evening News*, March 8, 1940; August 24, 1940; Webster to Macy, January 26, 1941; Webster to Gabrielson, February 13, 1941 (Fisheries File, Olympic National Park, Port Angeles, WA).

[811] Olympic National Park as established in 1938 did not contain the Glines Canyon Dam and its reservoir Lake Mills. The park's Elwha River border was at river mile 17.5 (Lien, C. "The Olympic boundary struggle," in *The Mountaineer*, Nancy Bickford, editor (Seattle, WA: The Mountaineers, volume 52, number 4, March 1, 1959), pp. 18-39; Schultz, S., 1992). A 1937 Park Service memorandum to Director Demaray explained: "The only reason this area is not included is that it contains the Northwest Power and Light Company power development on Lake Mills, an artificial reservoir. If the power development could be overlooked this area would be almost as desirable as the adjoining blocks because in this region the main entrance to the park is likely to be situated" (Horning to Demaray, November 8, 1937 (Ben Thompson File, Olympic National Park, Port Angeles, WA). In 1940, 187,411 acres were added to the park, including an addition of 65,600 acres comprising Hurricane Hill, Obstruction Point and the Elwha River valley that formed the original 1897 boundary and present park boundary at river mile 9.75 (Brant, I., 1988, pp. 123, 143-144; Schultz, S., 1992).

upset local groups. They appealed to Olympic Park and the state Department of Game to do something about the problem. "Members of the committee related how tourist cabins near streams house hundreds of out-of-the-county fishermen during the trout and steelhead seasons," the *Evening News* reported in 1940, "and that this drain on the fishing resources of the peninsula should be compensated by heavy plantings of game fish."[812]

The proposal sparked inter-agency conflict that continued for several years as park and state game officials accused each other of inaction. In a 1945 speech to the Olympic Conservation Association, LeGear blamed the park for the scarcity of fish, mocking its self-promotion as a "Fisherman's Paradise." He argued that peninsula waters would "never be adequately stocked" until the Fish and Wildlife Service built a hatchery on the peninsula.[813] Privately, Macy acknowledged that the park was low on fish and stocking had been inadequate.[814]

With the conclusion of World War II, sportsmen again called on the government to provide hatchery resources for the north peninsula. They especially focused on the need for more rearing ponds at the Dungeness hatchery. This helped to "perpetuate the sports fishing for salmon here and make it possible to hold an annual salmon derby," *Evening News* reporter Jack Hensen explained. He had shadowed Ernie Brannon during a trip to the Elwha to collect spawn and was awestruck by what he saw. "As we looked at the battalions of spring, almost every one of which was a derby winner, in the riffles and

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[812] *Port Angeles Evening News,* March 8, 1940; May 9, 1940.

[813] *Port Townsend Leader* (typed copy), November 22, 1945, in Macy to Kemmerich, December 3, 1945 (Fisheries File, Olympic National Park, Port Angeles, WA). The U.S. Fish and Wildlife Service was created in 1940, preceded by the U.S. Bureau of Fisheries and Biological Survey.

[814] Macy to Kemmerich, December 3, 1945 (Fisheries File, Olympic National Park, Port Angeles, WA).

on the spawning grounds," Henson wrote, "the thought came that fishermen in this locality must have been asleep on the job when the tremendous run went past Ediz hook and the Elwha mouth fishing grounds."[815]

In addition, the department continued to field complaints from fishermen about industrial operations on the Elwha. They wondered why there was no fish passage requirement at the dam, now owned by Crown Zellerbach. They also complained about large numbers of salmon needlessly lost to the water diversion and canal on the lower river. "I received a number of complaints about the number of salmon coming thru the Industrial water supply from the Elwha," Brannon of the Dungeness hatchery wrote in 1945 after visiting the river. "The fish were so thick the hook hardly had a chance to hit the water."[816]

The Department of Fisheries found itself in a difficult position. Its leaders recognized the power company's impact on the fisheries was causing "a public problem," but believed they did not have any regulatory authority to undo the agreement made by Darwin and the Olympic Power Company. Director Brennan had understood the contract binding after consulting with state lawyers in 1941, concluding that "insofar as we are able to determine from the legal interpretation by the State Attorney General's office the early agreement is binding at the present time."[817]

Further attempts to communicate with power company officials stagnated

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[815] *Port Angeles Evening News*, October 3, 1945; September 23, 1954.

[816] Fred J. Foster to R.A. Dupuis, October 25, 1944; Milo Moore to Charles A. Faussett, December 26, 1946; B.M. Brennan to Lew R. Thompson, May 28, 1941; Ernest M. Brannon to Director of Fisheries, May 28, 1945 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

[817] Milo Moore to Charles A. Faussett, December 26, 1946; B.M. Brennan to Lew R. Thompson, May 28, 1941 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

repeatedly. In 1944, the state approached Elwha Dam owners about complaints by sportsmen and the possibility of studying the problem. Two years later, in response to queries from a Port Angeles citizen, new Fisheries Director Milo Moore considered the situation inequitable, writing: "You may be assured that this Department is not in accord with the original contract, no[r] do we believe that the dam owners and operators are properly fulfilling their obligations to the migratory fish in the Elwha River."[818]

The agency had considered building a new Elwha hatchery, but there was no way to assure safe downstream fish passage if salmon were transported above the dam. Moreover, it was doubtful company owners would help investigate the problem of water flow regulations.[819] The loss of fish on the river continued, even after the Bonneville Power Administration began to supply the Olympic Peninsula with Columbia River electricity in 1949.

While the state and federal agencies felt powerless to sort out the power company and water intake problems on the Elwha, they did have the ability to ramp up hatchery production on the north peninsula. The strategic response was nearly identical to the work of Leslie Darwin and his turn-of-the-century predecessors who likewise used fish culture as a means to mitigate threats they could not control. The Department of Fisheries completed 12 of 24 planned Dungeness rearing ponds by 1947. These provided space to

[818] Fred J. Foster to R.A. Dupuis, October 25, 1944; Milo Moore to Charles A. Faussett, December 26, 1946 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

[819] B.M. Brennan to Francis Pearson, August 27, 1938; department personal correspondence, unsigned to E.M. Brannon, November 8, 1946 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

rear over 4 million chinook eggs harvested from Elwha waters between 1944 and 1951.[820] The federal hatchery at Quilcene added six ponds in 1947, rearing over 1.1 million fingerlings for planting through 1951, of which about 340,000 were deposited into the Elwha River.[821]

Hence the use of fish culture technologies continued to guide regulatory management of the region's fisheries. But it was no substitute for the cause of problems on the Elwha: the dam blocked fish passage to the upper river; the power plant dewatered the river below the dam, stranding and killing fish; and the industrial water intake diverted fish and water from the lower river. "The conditions existing on the Elwha river concerning the salmon and trout fingerlings are about as sorry a mess as can be found," the local Poggie Club complained to the department's director in 1951.[822]

There was hope for a solution, however, during the 1950s when federal and state agencies reexamined the possibility of restoring salmon runs at high dams in the Pacific Northwest. They used the Glines and Elwha dams to experiment on downstream fish passage in response to encountering high mortality losses at Columbia River dams. Engineers had largely dismissed or ignored the problem dating back to early publications

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[820] *Port Angeles Evening News*, February 27, 1947; October 9, 1947; Charles W. Maib, *Previous Investigations and Observations Concerning the Elwha River* (Olympia, WA: Washington State Department of Fisheries, Stream Improvement Division, 1952b), p. 12.

[821] "Progress Report—A Review of Past Management Studies and the Proposed Trout Management Program for Olympic National Park Waters in 1957, May 7, 1957" (Fisheries File, Olympic National Park, Port Angeles, WA); "Proposed Distribution of Trout to Waters of Olympic National Park," 1946 (Fisheries File, Olympic National Park, Port Angeles, WA); *Port Angeles Evening News*, June 15, 1949; August 3, 1949; March 18, 1949; Browne to Macy, December 15, 1942 (Fisheries File, Olympic National Park, Port Angeles, WA).

[822] Francis Pearson to Alvin Anderson, October 25, 1949 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA); Maib, C.W., 1952a, p. 28; Maib, C.W., 1952b, p. 9; North Olympic Peninsula Chapter Poggie Club, E.K. Browne to Director, Washington State Department of Fisheries, February 14, 1951 (Box 1010-38, "1911-1951 file." Washington State Archives, Olympia, WA).

by the Fish Commission in the 1870s.[823] But more dams were slated for construction on the mainstem Columbia and Snake Rivers—eleven structures were in development in 1949. And yet the salmon problem had never been solved. Evaluations of the original fish passage apparatus at Bonneville and Rock Island dams revealed significant mortality to migrating fish. Engineers feared tens of thousands of missing adult salmon that had managed to surmount the hundreds of steps above the structures died from exhaustion before reaching their natal streams. Fifteen percent of downstream juvenile fish were estimated to have perished because of the trauma of passing through the dams.[824] The current cost of fish mitigation was sizeable, nearly 10 percent of the total project amount. Planners could not justify the use of fish ladders that were both expensive and inadequate. One scientist called them "concrete monuments" to the nation's poor development of natural resources.[825] Since the 1850s the list of "new and improved" fishways that later failed to perform had grown long. Again, the root cause was partly because of poor understanding of fish.[826]

The Washington Department of Fisheries planned several studies to examine how to improve fish passage and rearing at dams on the Elwha, Nisqually, White Salmon,

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[823] *Port Angeles Evening News*, March 19, 1952; April 26, 1952; Atkins, C.G., in *Report of the Commissioner of Fisheries, 1872 and 1873* (1874), p. 591.

[824] Paul R. Needham, "Dam construction in relation to fishery protection problems in the Pacific Northwest," *Transactions of the Fourteenth North American Wildlife Conference* (Washington, D.C., Wildlife Management Institute, 1949), p. 280; Bell, M.C., "Salmon fisheries versus power development," *World Fishing* (November 1954), pp. 393-394.

[825] Pretious, E.S., Kersey, L.R., Contractor, G.P., "Fish protection and power development on the Fraser River," (Vancouver, University of British Columbia, 1957), p. 11; Needham, P.R., 1949, pp. 277-281.

[826] Collins, G., "The measurement of performance of salmon in fishways," in *The Investigation of Fish-Power Problems*, P.A. Larkin, editor (Vancouver, University of British Columbia, Institute of Fisheries, Vancouver, 1958), p. 86.

Yakima and Baker Rivers. The end goal was similar to that envisioned by the federal Fish Commissioners on the Elwha in 1910, wherein hatcheries could operate above dams. Engineers now tested whether new advances in technology could turn reservoirs into massive rearing ponds and pass hatchery fingerlings safely downstream over dam spillways or through turbines.[827] At the Elwha River research sites scientists released hundreds of thousands of young silver and chinook salmon to study how to measure and improve downstream passage. Although sizeable numbers of fish died, officials concluded that restoration of Elwha salmon runs appeared possible.[828]

Believing it could rehabilitate the Elwha fisheries—in spite of the power company's operations—the Department of Fisheries approached Olympic National Park for permission to proceed. "It is economically feasible to return the salmon runs to the Elwha although there is a considerable loss in passing the two dams," Director Robert Schoettler wrote to Superintendent Fred Overly in 1954. Schoettler provided perhaps the best reason for Olympic to agree by noting favorable sentiment among area residents. The department's plan, he argued, "would be viewed with favor by the local public."[829]

Over the next four years the experiment would unfold. The Elwha River portion above Glines was for all practical purposes converted into a test incubator, or "gigantic

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[827] *Port Angeles Evening News*, April 26, 1952; Washington State Department of Fisheries news release, number 37, May 25, 1954 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA); Dale E. Schoeneman and Chas. O. Junge, Jr., "Investigations of Mortalities to Downstream Migrant Salmon at Two Dams on the Elwha River," (Washington State Department of Fisheries, Research Bulletin Number 3, April 1954), pp. 3-4.

[828] *Port Angeles Evening News*, March 19, 1952; April 8, 1952; April 26, 1952; May 26, 1954; Schoeneman, D.E. and Junge, Jr., C.O., 1954, pp. 47-49; Bell, M.C., 1954, p. 422; Pretious, E.S., Kersey, L.R., Contractor, G.P., 1957, pp. 31-33; Washington State Department of Fisheries news release, no. 37, May 25, 1954 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA).

[829] Schoettler to Overly, April 21, 1954; Schoettler to Overly, May 26, 1954 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA).

rearing pond." Ernie Brannon was busy gaffing Elwha chinook and silver and Dungeness spring chinook eggs for rearing at the Dungeness hatchery. The progeny was destined for the Little River and Indian Creek tributaries as well as the mainstem Elwha above Glines Dam and between the dams.[830] "The young salmon will feed in the upper river and migrate through the two power dams to the sea and return to their parent stream to spawn," the *Evening News* reported in 1955.[831] By 1957 the department had planted nearly 1 million silver salmon, 1 million spring and fall chinook and 3,800 sockeye salmon above the dams. It also developed cost estimates for a fish ladder and handling facilities to trap and haul adult salmon upstream or to the Dungeness hatchery. But when the state approached Crown Zellerbach to pay nearly $310,000 for the equipment, the plan died.[832]

Nor did the hatchery salmon return. In 1959 Director Moore explained the project's fate to the Washington State Grange. "[T]here was practically no return of marked adults to the river," he said, noting that "…the plantings have had no appreciable result on the abundance of returning salmon."[833] Calling to mind all the programs and efforts to rebuild the Elwha salmon runs over the past decades, the Grange Master told

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[830] Washington State Department of Fisheries news release, May 21, 1956 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA); *Port Angeles Evening News*, May 26, 1954; June 26, 1954; September 23, 1954; C.H. Ellis to Fred J. Overly, May 14, 1954; Schoettler to Overly, May 26, 1954 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA).

[831] *Port Angeles Evening News*, May 5, 1955.

[832] Milo Moore to A. Lars Nelson, August 13, 1959; Washington State Department of Fisheries news release, May 21, 1956 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA); William L. Shannon to Department of Fisheries, July 30, 1956; Shannon to Washington State Department of Fisheries, July 30, 1956, August 16, 1956 ("Elwha Dam File." North Olympic Library System, Port Angeles Branch, Port Angeles, WA); Milo C. Bell to Francis Pearson, January 10, 1957 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA).

[833] Milo Moore to A. Lars Nelson, August 13, 1959 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA).

Moore that "a lot of talk with no action" had left the sports fishers to face "an alarming decline in salmon and other game fish in the area."[834] The experiment to restore the Elwha salmon fisheries came to an end. Ernie Brannon summed up the matter in a letter to the department. The river "used to be one of our finest Salmon & Steelhead producers years back, before industry took the river with power dams, water fluctuation and drying stream beds."[835]

As for the Columbia River, officials voiced reservations about their ability to develop workable and affordable fish passage devices. Some engineers suggested that the cost of such facilities did not justify the value of the resources protected.[836] They instead implemented a program to construct new hatcheries on the lower river, screen irrigation ditches and erect fishways over smaller dams. By 1958, 14 hatcheries had been built or partially completed with dozens more to come. Into the next decade, fish culturists incorporated newly developed science to rear hatchery fish using formulated feeds and antibiotics. Technological faith was renewed that hatcheries could help keep salmon in the region's rivers.[837]

The National Park Service, however, did not share the faith. Its own scientists and

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[834] "Resolution Adopted by the Delegate Body, Washington State Grange..." June 15-19, 1959 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA); "Future for our Natural Resource – Migratory Fish" (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA); Paul H. Conner to Washington State Department of Fisheries, March 1959 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[835] Ernest M. Brannon to Department of Fisheries, October 5, 1958 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA).

[836] Collins, G., in *The Investigation of Fish-Power Problems*, 1958, p. 86; Pretious, E.S., Kersey, L.R., Contractor, G.P., 1957, p. 21.

[837] Needham, P.R., 1949, pp. 277-279; Anthony Netboy, *Salmon of the Pacific Northwest: Fish vs. Dams* (Portland, OR: Metropolitan Press, 1958), pp. 67-70; Larkin, P.A., 1979, p. 104; Lichatowich, J.A. and McIntyre, J.D., 1987, pp. 147-149; National Research Council, 1995, p. 44.

resource managers had been questioning the legitimacy of its fishing policies as early as the 1920s. They had emphasized the value of natural production over human interventions. They had called for basic research and cautioned against increased use of fish culture in park waters. Nonetheless, the desire to overcome criticism from sport fishers and build public support had muted Park Service inclinations to conduct a different brand of fisheries management for decades. By the 1960s the agency would start to move away from hatchery technologies. But the split was difficult, especially at parks such as Olympic that faced inter-agency competition and the strong influence of recreational fishing groups.

Chapter 25 The Ecosystem

Forty years after Preston Macy made a reconnaissance of the Elwha River that led to the recommendation of game fish stocking in monument waters, in 1974 Olympic National Park ended planting in Lake Mills. In 1975 the park ceased all stocking.[838] The move had signaled a strong shift in the park's resource management policies that followed more closely ecological principles set forth in two guidance documents prepared for the National Park Service as well as the 1964 Wilderness Act.[839] The ecological system, or an "ecosystem," was a term that referred to a group or complex of physical factors that interacted with organisms to form the environment. The concept and its application to scientific research began to receive serious attention by policymakers in the 1960s,

[838] "Annual Aquatic Resources Report for 1971," Olympic National Park, January 14, 1972 (Fisheries File, Olympic National Park, Port Angeles, WA); Fringer, G., 1990, p. 135.

[839] Sellars, R.W., 1997, pp. 204-205.

although it had been defined as early as the 1930s.[840] The external group of scientists that prepared the documents embraced the concept. They summoned the Park Service to recognize the complexity of its natural systems and to pay attention to their scientific value. They advocated for research that focused on the long-term considerations of ecosystems, not the short-term desires of park users.[841]

Both reports were released in 1963. Chaired by Starker Leopold, the so-called *Leopold Report* called for a more honest interpretation of the Park Service's original legislative mandate of preservation and use. In light of deteriorating ecological conditions and swelling visitation threatening the parks, the report called for more responsible stewardship. It argued for the recognition of "the enormous complexity of ecologic communities and the diversity of management procedures required to preserve them."[842]

Often referred to as the Park Service's dual mandate, the 1916 act established the service to "promote and regulate the use of" the national parks, whose "fundamental purpose" was "to conserve the scenery and the natural and historic objects and the wild life therein" as well as "to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." This seeming management contradiction became more challenging for the Park Service to implement over time. Each new decade saw growing recreational demands, revived

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[840] Kristina A. Vogt, John C. Gordon, John P. Wargo, Daniel J. Vogt, Heidi Asbjornsen, Peter A. Palmiotto, Heidi J. Clark, Jennifer L. O'Hara, William S. Keeton, Toral Patel-Weynand, Evie Witten, *Ecosystems. Balancing Science with Management* (New York: Springer, 1997), pp. 14, 16; Berry, J., Brewer, G.D., Gordon, J.C., Patton, D.R., "Closing the gap between ecosystem management and ecosystem research" *Policy Sciences* 31(1998):55-80, p. 56.

[841] Sellars, R.W., 1997, pp. 214-215.

[842] A. Starker Leopold, "Wildlife Management in the National Parks" (U.S. Department of the Interior, Advisory Board on Wildlife Management, 1963), pp. 4, 8.

efforts to exploit natural resources within park boundaries, and increasingly complex scientific questions.[843]

The second report, prepared by the National Academy of Sciences and chaired by William Robbins, called for a reorientation of Park Service management philosophy. It reinforced the type of stewardship recommended by Leopold's committee. The report urged the Park Service to hire more biological scientists in order to develop the capacity for informed natural resources decision making. The 1964 Wilderness Act, mandating the development of wilderness recommendations for national parks, served to reinforce the findings of the two committees.[844]

Olympic Park's 1976 Master Plan leaned heavily on these recommendations, setting out a management process to "restore and perpetuate environmentally regulated ecosystems" in the park. Such objectives recognized that "the ecological process must be encouraged to evolve naturally, free of man-imposed restraints" and that humans were "non-consumptive users of the area."[845]

With respect to the fisheries, the reports reiterated what some Park Service scientists had been arguing for decades. First, both documents noted that rigorous science should drive fisheries resource use decision making, not public pressure. Second, they

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[843] Act of August 25, 1916, ch. 408, § 2,39 Stat. 535; Sellars, R.W., 1997, pp. 45-46, 89-90. For examples of recreational, resource extraction and scientific management pressures, see, respectively: Joseph L. Sax, *Mountains Without Handrails. Reflections on the National Parks* (Ann Arbor: The University of Michigan Press, 2001); Carsten Lien, *Olympic Battleground: The Power Politics of Timber Preservation* (San Francisco: Sierra Club Books, 1991); Alston Chase, *Playing God in Yellowstone: The Destruction of America's First National Park* (Boston: Atlantic Monthly Press, 1986).

[844] Commission on Research and Resource Management Policy in the National Park System, "National Parks: From Vignettes to a Global View" (Washington, D.C.: National Parks and Conservation Association, 1989), p. 3; Fringer, G., 1990, p. 133.

[845] Olympic National Park, "Master Plan," (U.S. Department of the Interior, National Park Service, 1976), p. 48.

argued that the fisheries resources within the national parks should be accorded equal management status as terrestrial resources. In these two ways the agency could more effectively manage short- and long-term threats to the fisheries resource and minimize the risk of its collapse. This also served the public interest by assuring that the fisheries would exist for their benefit so long as human use of the fisheries was in keeping with the resource's survival requirements.

Early on, George Wright was perhaps the most forceful advocate for science-based decision making within the Park Service. He called on park management to distance itself from the influence of agencies whose policies differed from the Park Service's own mandates. Wright believed that technicians and scientists housed within the agency could better promote the responsible welfare of its natural resources than those outside. In 1932, he published fauna surveys that gained wide readership and acceptance, thereby demonstrating that the Park Service could generate independent and high quality science without relying upon other agencies. This accomplishment lead to the establishment of the agency's first wildlife division.[846]

Scientists—both within and outside the agency—soon suspected that exotic fish from hatchery plantings and bait fishing had biologically damaged Park Service fisheries. They believed these practices were already threatening or had replaced native species and compromised genetic strains.[847] In 1936 the agency concluded that its stocking programs had permanently established no less than twenty to thirty non-native species into park waters. By the 1940s some fisheries biologists had started to call on the Park Service to

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[846] R. Gerald Wright, *Wildlife Research and Management in the National Parks* (Chicago, IL: University of Illinois Press, 1992), pp. 55, 14-16.

[847] Schullery, P., "A reasonable illusion," *Rod and Reel* 5(November/December 1979):44-54, pp. 44-54.

use different stocking techniques. Others recommended a cessation. One scientist argued the need to protect and value wild trout populations rather than "cater to the meat fisherman, the politician, and other commercial interests." In this way "true sportsmen and conservationists" could enjoy fishing "unspoiled by artificiality."[848]

Many scientists early on recognized the value of Olympic's unique fisheries resources. Its fish populations were diverse, abundant and awesome. "There must be … more than casual mention made of the fish life within the park," biologist Arthur Einarsen of Oregon State College wrote in 1938. Olympic was the only national park in the contiguous United States that contained a fish population consisting of anadromous salmonids and resident lake trout. Its waters were home to all five species of Pacific salmon as well as steelhead and cutthroat trout. He described the park's incredible migratory salmon runs as "countless hordes" and "a sight never to be forgotten" that "should be perpetuated to all Park visitors." Einarsen also recognized the long-term value of the park and predicted it might someday "be the means of saving a nucleus of all of our anadromous sea run fishes on the Pacific Coast as present safeguards are entirely inadequate."[849]

David Madsen likewise foresaw the future value—and complexities—of Olympic National Park's fisheries resources. In his 1939 preliminary report of park fish resources he laid out the challenges that park management would face. Madsen reduced the problem to one of human boundaries and natural movement. Migratory fish crossed

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[848] Wright, R.G., 1992, p. 55; Hazzard, A.S., "Wild trout fishing endangered in National Parks," *Outdoor America* (September/October 1944).

[849] Arthur S. Einarsen, "An Aesthetic and Recreational Evaluation of Olympic National Park," 1938, pp. 5-8 (Fisheries File, Olympic National Park, Port Angeles, WA); Fringer, G., 1990, pp. 3, 133.

jurisdictional lines to reproduce. Watersheds on the Olympic Peninsula would become increasingly carved into private, state, federal and tribal areas (see Figure 25.1). Downstream user groups and competing management approaches would affect the supply of fish in Olympic's waters, remaining "beyond the control" of the agency. This would present "in many respects the most difficult fish problem of any of our National Parks," he wrote. For example, the neglect of fish planting or the work of the commercial fisheries beyond park waters could, he predicted, leave the park's waters "barren of fish," except on the Elwha River above Glines Dam. Only sound and independent policy could protect the resource. But Madsen recognized that at least early on Olympic had no choice but to cooperate with other agencies and to form cooperative fish planting programs with the Forest Service and state. Over the long-term he advised the park to assert its independence in fisheries management. He stated the necessity of developing a scientific program to survey and study the area's rivers and lakes.[850]

Although Olympic National Park adhered to heavy stocking and fishing policies up until World War II, Superintendent Macy and other staff worried about the potential adverse consequences of these actions. Their efforts to recommend protective policies and to secure scientific resources usually failed. In 1938, for example, Madsen backed off designating the Elwha River a fly fishing-only area in fear of antagonizing the state game department and causing a public backlash.[851] In 1940, Macy called on the Park Service's Wildlife Division to start "an immediate comprehensive study of fish problems," even

[850] Madsen, D.H., 1939.

[851] Macy to Tomlinson, September 15, 1938 (Fisheries File, Olympic National Park, Port Angeles, WA); Madsen to Tomlinson, November 3, 1938; Tomlinson to Madsen, November 9, 1938 (Fisheries File, Olympic National Park, Port Angeles, WA); Madsen, D.H., 1939.

before Olympic was finally granted jurisdiction of its waters. He also considered the restriction of all fishing to the use of flies.[852] Such concerns continued. In 1946 National Park Service headquarters recognized that Olympic was "in dire need of adequate basic information," with which to inform its fisheries policy.[853]

Postwar pressures from the recreational fisheries left the National Park Service in a difficult position. On the one hand, its scientists understood the negative impacts that sustained stocking was having on park waters. On the other, public pressure to increase hatchery use was impossible for park management to ignore. Fishing had become a tradition in the national parks, where hotels, boat liveries and tackle shops accommodated its visitors. Though the National Park Service was charged to protect its natural resources, leadership did not view recreational fishing as a policy violation, so long as stocking was performed within reason. "A lot of thought and effort has gone into maintaining the lake or stream so that you can enjoy your favorite spot," a 1947 Park Service publication on fishing in national parks explained. Noting its policy "to keep the plants, animals, and park scenery in as nearly an unspoiled condition as possible," the pamphlet explained that an "exception to the general plan" was made for fish. "Wise management will enable us to use them without destroying natural values."[854]

And yet the Park Service had already begun to shift its policies. In 1945 the agency notified the Fish and Wildlife Service of its intention to provide "quality fishing

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[852] Macy to Cammerer, attention Acting Chief, Wildlife Division, August 22, 1939 (Fisheries File, Olympic National Park, Port Angeles, WA).

[853] Drury to Barr, July 13, 1946 (Fisheries File, Olympic National Park, Port Angeles, WA).

[854] Schullery, P., 1979, pp. 44-54; Wright, R.G., 1992, pp. 54-55; National Park Service, *Going Fishing?* 1947 (Fisheries File, Olympic National Park, Port Angeles, WA); Sellars, R.W., 1997, p. 163.

rather than quantity." It instead left the latter policies to states or other agencies "that may wish or be forced to cater to that type of enjoyment."[855] In 1946, Park Service Director Newton Drury warned agency superintendents amid growing concern of obsessive stocking campaigns that the parks "cannot compete with the fish market as sources of meat."[856] In 1951 Park Service Biology Branch Chief Victor Cahalane noted that continued annual stocking when combined with heavy fishing and the effects of non-native species had "modified the aquatic communities of practically all park waters." Nonetheless, he admitted it would be "impossible at present to close the parks to the angling fraternity." Efforts were therefore needed to regulate fishing "in accordance with the natural productivity of the waters."[857]

Efforts to find the right balance between sport fishing and preservation of Olympic National Park fisheries prompted a crisis at the start of Superintendent Fred Overly's term. His first fish stocking program was so contrary to Park Service science that region-level biologists and directors balked. A regional official said the plan was of "grave significance," "rather hazardous" and required "mature consideration." He could not understand why Olympic attempted to stock exotic species in Lake Crescent and alpine waters. Park Service leadership cautioned Overly and recommended that scientific studies precede any actions to study potential impacts.[858] Biologists now believed that nearly 50 years of random stocking had left Lake Crescent's native fisheries at serious

[855] Tomlinson to Region Four Areas, February 24, 1945 (Fisheries File, Olympic National Park, Port Angeles, WA).

[856] Drury memorandum, January 16, 1946 (Fisheries File, Olympic National Park, Port Angeles, WA).

[857] Cahalane, 1951 (Library, NPS Policies Vertical File, Olympic National Park, Port Angeles, WA).

[858] Lee to Merriam [no date] (Fisheries File, Olympic National Park, Port Angeles, WA).

risk.[859] One scientist called the problem "one of the most serious dilemmas" that the region had ever faced with respect to wildlife. The situation called for cessation of fishing on the lake. But there was no public support behind such a measure. Closing the lake to fishing, he admitted, "would certainly provoke such a widespread and hostile reaction as to jeopardize also the future of elk range, predators, wilderness, and many other park values" besides trout.[860]

Overly successfully argued that the plantings had to proceed. Olympic had been requesting scientific assistance for such studies for years, with little assistance given by the Park Service, he noted. What was needed immediately, he said, "was positive action even if it is not based upon the best scientific data," else there would be strong public criticism.[861] National leadership granted his request for "prompt and positive action" and allowed Olympic to bypass Park Service fisheries codes to "prevent further deterioration of public relations." It allowed Olympic to introduce large-sized plants to "buffer" declining Beardslee trout (*Oncorhynchus mykiss irideus f. beardsleei*) populations from over-fishing. It also recommended a permanent biologist for the park.[862]

As for fish management needs at Olympic National Park, Overly later stated, "very often there are more serious problems involved than mere fish."[863] In other words, fish management served the larger need of public relations management to ensure

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[859] Sumner to Merriam, November 30, 1951 (Fisheries File, Olympic National Park, Port Angeles, WA).

[860] Sumner to Merriam, November 30, 1951 (Fisheries File, Olympic National Park, Port Angeles, WA).

[861] Overly to Merriam, November 19, 1951 (Fisheries File, Olympic National Park, Port Angeles, WA).

[862] Merriam to Director, November 30, 1951 (Fisheries File, Olympic National Park, Port Angeles, WA).

[863] Sumner to Merriam, November 30, 1951; Sumner, March 24, 1952; Overly to Merriam, July 3, 1953 (Fisheries File, Olympic National Park, Port Angeles, WA).

Olympic's whole viability. In 1955 he introduced a five-year stocking plan "to alleviate the local public relations problems." Regional directors supported the plan, saying it was "a big factor in a public relations program at Olympic."[864] From 1952 to 1957 the park stocked over 1.4 million fish including about 190,000 Elwha plants.[865]

Overly had simply followed earlier strategies set forth by monument officials and Superintendent Macy. Fear of adverse public response compelled Olympic National Park to appease the recreational fishers. By this means the park risked compromising the biological integrity of its fisheries. It knew such actions undermined scientific principles and management requirements. But Park Service officials nonetheless supported Olympic's policy. They helped management sidestep the agency's preservation mandate not to disturb or damage park resources. The balance instead shifted toward the mandate to provide for public enjoyment. So long as sport fishers insisted on stocked waters officials could not find a way to meet both mandates.

Soon after his departure, Overly's actions prompted serious evaluation and reflection by the Park Service. The cumulative damage that fish planting had inflicted upon some park waters appeared irreparable. In 1958, a visiting biologist observed that Olympic's stockings had saturated Lakes Crescent and Mills. On Crescent, the park had planted 167 fish for each angler-day of effort. Moreover, indiscriminate stocking predating the park had "so diluted" the lake's Beardslee and Crescenti trout

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[864] Merriam to Wirth, April 8, 1955; Overly to Merriam, April 1, 1955 (Fisheries File, Olympic National Park, Port Angeles, WA).

[865] "Fish Planting Data—National Park System 1954"; "1955 Fish Planting Data—National Park System"; "Progress Report—A Review of Past Management Studies and the Proposed Trout Management Program for Olympic National Park Waters in 1957," May 7, 1957; Overly to Merriam, January 9, 1956; "A Summary of Trout Management Activities in Olympic National Park Waters During 1958," April 27, 1959 [totals may not be inclusive] (Fisheries File, Olympic National Park, Port Angeles, WA).

(*Oncorhynchus clarki clarki f. crescentii*) populations "that it is doubtful pure strains can exist."[866] Olympic Park's Chief of Interpretation, Dorr Yeager, observed in 1957 that fish stocking as a management tool had forced the park to a decision-making "crossroads." He pointed out the inconsistencies of managing fisheries differently from other natural resources. "Aside from scenic considerations, it would be just as logical to harvest mature trees and replant seedlings," he argued. "Because fish are relatively easy to produce in hatcheries does not alter the basic fact that such fish are not produced naturally."[867]

Fisheries management problems persisted well beyond Overly's term. Throughout the 1960s the park continued to lack its own fisheries biologist. "In order to develop a sound fisheries management program, proper use of the material collected to date must be made," one official wrote to the regional director in 1963. "An intensive and comprehensive investigation of the endemic fishes of the streams in the Park is needed." In 1965 the park made another request. "The need for fishery management and research is ever present," Olympic's superintendent wrote. He called for the study of Lake Crescent and back country lakes.[868]

By this time, the arrival of the Wilderness Act and Leopold and Academy reports could not have been more overdue. They helped to strengthen the Park Service's resolve to develop scientific capabilities and broaden wildlife management to include fisheries protection. The agency finally began to emphasize the need to protect its fisheries from

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[866] Wallis, "Management of the Fishes, Objectives and Guidelines for Fishery Management," June 24, 1959 (Fisheries File, Olympic National Park, Port Angeles, WA).

[867] Yeager to Newman, Sumner, January 18, 1957 (Fisheries File, Olympic National Park, Port Angeles, WA).

[868] Nattinger supplement, McComas to Regional Director, January 10, 1963; Gale to Regional Director, January 13, 1965 (Fisheries File, Olympic National Park, Port Angeles, WA).

the risk of collapse over the need to protect its image from the risk of public ill-will.[869] In addition, groups from outside the agency pressured the Park Service to reorient its management approach. "The privilege of fishing in the national parks is one that needs radical reconsideration," the Conservation Foundation argued in 1969. Calling to mind the historical legacy of fishing that was considered "the almost inalienable right of every American," authors Fraser Darling and Noel Eichhorn argued that times had changed. Those who dared to hunt in most national parks were convicted of poaching. Why should fisheries management use different criteria? The ecological benefits of protecting fish were as sound as those protecting other forms of life. The Park Service had done a disservice to its 1916 Organic Act, they said.[870]

At Olympic National Park, Superintendent Roger Allin started to dismantle fish stocking, gradually phasing out its use. The park had already concluded that fish plantings were having either an inconsequential or negative effect on the sport fishery. After 1958, Olympic discontinued planting its rivers to conform with Park Service policy that now confined the stocking of fingerlings to lakes. From 1958 to 1967 the park planted nearly 1 million fish. The majority went to Lake Crescent with just over 130,000 to Lake Mills. Beginning in 1964 stocking numbers dropped. The final three years comprised only 16 percent of the total.[871] This complemented Park Service policy that

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[869] Fringer, G., 1990, p. 133.

[870] Darling, F.F. and Eichhorn, N.D., "Man and nature in the National Parks: reflections on policy," *National Parks Magazine* (Washington, D.C.: National Parks Association, 1969, reprint). Park service management already recognized that rock-collecting, berry and flower-picking, tree-cutting and animal feeding were inappropriate. So, too, would new attitudes toward consumptive and non-consumptive natural resource use point to the treatment of fish (Schullery, P., 1979, pp. 44-54).

[871] "A Summary of Trout Management Activities in Olympic National Park Waters During 1958," April 27, 1959; Acting Superintendent Stanley McComas to Regional Director, January 10, 1963; "Annual Fishery Resources Report," Doerr to Regional Director, January 14, 1964; "Annual Fishery Resources

promoted the use of artificial lures and flies, catch and release fishing, and the use of natural populations.[872] Allin's work set the stage for eventual cessation of the entire practice. In 1971, Olympic suspended its mountain lake stocking program because of "the increasingly heavy impact in these alpine areas by fishermen for the past several seasons." Olympic ended the program the following year with all stocking terminated in 1975.[873]

Allin also called for a systematic investigation of the park's fisheries and asked regional directors to send biologists. But his attempts were offset by a lack of funds. Earlier superintendents had experienced similar frustration. A dedicated scientific resource management program continued to elude the park in spite of the clear threat to its fisheries. In the meantime, the park sought out local faculty and visiting scholars rather than relying on staff from competing agencies.[874]

Olympic's fisheries management policies further divided from traditional views held by other governing entities on the peninsula. With this difference in management, friction between the park and other agencies increased. In 1978, for example, the state Department of Fisheries planted 150,000 diseased coho salmon in the Sol Duc River within park boundaries. The fish subsequently damaged one of the only pure runs of coho remaining in the state. The agency's director brushed off Olympic's concerns. He flatly

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Report," Gale to Regional Director, January 13, 1965; "Annual Fishery Resources Report," Gale to Regional Director, January 12, 1966; "Annual Aquatic Resources Report for 1966," Acting Superintendent Carlson to Regional Director, January 15, 1967 (Fisheries File, Olympic National Park, Port Angeles, WA).

[872] Wright, R.G., 1992, p. 55; Orthello L. Wallis, "The challenge of fishing-for-fun," 1963 (Fisheries File, Olympic National Park, Port Angeles, WA).

[873] "Annual Aquatic Resources Report for 1971," January 14, 1972 (Fisheries File, Olympic National Park, Port Angeles, WA); Fringer, G., 1990, p. 135.

[874] Fringer, G., 1990, pp. 108-110.

told the superintendent that the park should have no role in salmon stocking policy.[875] Another disagreement occurred when a fisheries instructor at Peninsula College in Port Angeles proposed a trap and haul device to move salmon over the Elwha dams. The Department of Fisheries replied that hatcheries and fish farms were its preferred method of management, not natural production.[876] Olympic viewed the idea more favorably because it supported the concept of restoring the upper Elwha ecosystem, including "anadromous runs and the associated life forms which depend upon such runs." But without technical or scientific capability the park could not pursue the proposal.[877]

Both conflicts demonstrated how little understanding and control Olympic had over its fisheries even 40 years after its creation. The problem reinforced what advisors had been saying for decades: Olympic's migratory runs were subject to the actions of downstream entities; the park needed internal scientific capacity upon which to base its management decisions. President Franklin Roosevelt had envisioned an Olympic National Park containing at least three wide river-to-ocean corridors including the Bogachiel, Hoh and Queets Rivers. Had this occurred park autonomy could have ensured greater protection of its migratory fish in those basins.[878] Instead, as one park specialist observed in 1978, the region's neighboring agencies "seem to be willing to ride roughshod over us." The park's growing emphasis on preserving and restoring native fish

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[875] Sandison to Coleman, Jr., August 9, 1978 (Elwha File, Olympic National Park, Port Angeles, WA).

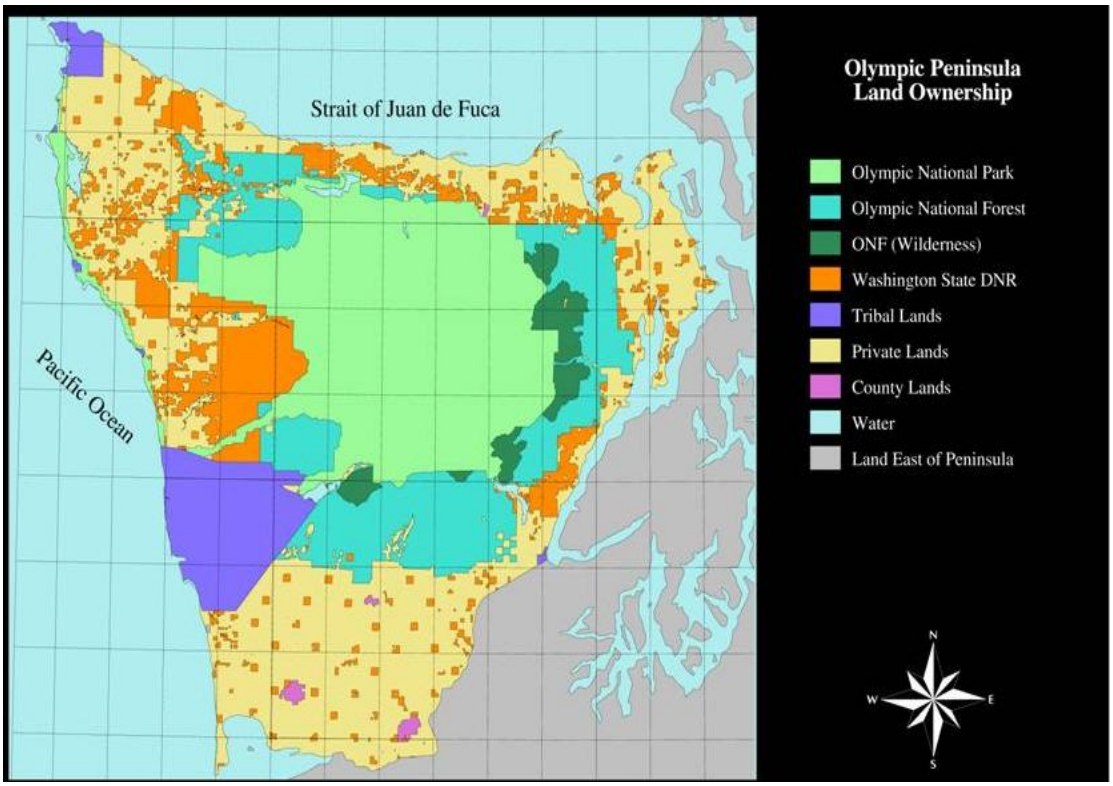
[876] *The Daily News*, May 10, 1977; November 17, 1978; Sandison to Mausolf, July 31, 1978 (Elwha File, Olympic National Park, Port Angeles, WA).

[877] Coleman to Regional Director, July 17, 1978 (Elwha File, Olympic National Park, Port Angeles, WA).

[878] In 1953 the Park Service obtained a thin strip protecting the mainstem Queets River to the Quinault Indian Reservation border, several miles from the Pacific (Brant, I., 1988, pp. 98-99, 144, 311-312); Fringer, G., 1990, pp. 55-84.

and promoting ecosystem-scale management was vulnerable to competing interests. Some viewed the park as "an annoying obstruction" in spite of its status as a major agency responsible for "sound fish management." And yet, he advised the superintendent, Olympic itself was "unclear about our role in the overall fisheries picture."[879] But this would change within a few years when Olympic National Park leadership further developed its vision of fisheries preservation by calling for the rehabilitation of the Elwha River wild fisheries and ecosystem.

Figure 25.1 Public land ownership, Olympic Peninsula



Source: Map provided by Olympic National Park, Fisheries.

[879] Crawford to Coleman, August 29, 1978 (Fisheries File, Olympic National Park, Port Angeles, WA).

The establishment of Olympic National Park and its early experiences in natural resource management were rooted in conflict. The park faced stiff resistance to its creation from the timber industry and local economic interests. Moreover, existing state and federal agencies challenged the park's authority over fisheries resources within its own waters (see Figures 26.1 and 26.2). These threats compelled Olympic leadership to cater to the demands of sport fishers in spite of the reservations of its scientific advisors. The park mimicked the policies of other agencies that relied upon fish culture as a primary management tool. Agencies competed to supply as many fish as possible to the recreational fishers.

But Olympic ultimately took a different course. In contrast to other agencies, park policies banned bait fishing, eliminated hatcheries and embraced tenets of wilderness and ecosystem management (see Figure 26.3). In these ways, Olympic National Park redefined its interaction with peninsula visitors, residents and regulatory entities. The park set the guidelines for how users would view and treat its fisheries resource. It emphasized the protection of resources from human threats. Essentially, it tried to reorient and change terms of behavior. By taking these steps Olympic Park was attempting to manage the risk of losing its fisheries in spite of opposing views by sports groups and competing agencies.

The story of Olympic National Park thus demonstrates how the presence of a governing agency served to protect not only the long-term interests of the environment, but also the future interests of society. By the 1930s it was clear to many that local behavior if left unchecked could destroy what remained of the Olympic Peninsula's

forests, rivers and wildlife. The permanent preservation of a portion of the peninsula's rain forests stopped an uncontrollable pattern of exploitation. These wild areas continued to exist as important terrestrial and aquatic ecosystems for the benefit of the environment as well as humans. Even so, the north peninsula pulp economy accessed a supply of raw material outside of park boundaries that kept the mills employing three shifts over 24 hours and seven days a week for decades.[880]

Olympic also countered a prevailing mentality among other agencies on the peninsula that managed the fisheries at the behest of recreational fishers. Such policies were wrecking what remained of the region's fisheries. The Park Service introduced new ways of managing the resource that diverged from the exploitation mentality of other governing entities. It no longer allowed the consumptive use of fisheries in park waters.[881] Olympic Park came to view its fisheries as inherently important to the well-being of the park as well as the larger peninsular environment upon which human communities depended. Fish in park waters were no longer used solely as a management tool to placate strong interest groups for the sake of public relations.

The idea to create a national park on the Olympic Peninsula had stemmed in part from the recognition that without such governance a significant natural resource could be lost forever. Such an outcome did not seem appropriate—a fate that had visited much of the Pacific Northwest and continental United States where extensive forests and fisheries and other natural resources already had been destroyed. The loss of important commercial fisheries during the eighteenth and nineteenth centuries in New England, for

[880] *Port Angeles Evening News*, July 16, 1929; November 28, 1953.

[881] Schullery, P., 1979, pp. 44-54.

example, had prompted some states to establish fish commissions. They attempted to introduce new forms of governance to control large-scale threats. At this time, no express authority of federal government over wildlife had existed except where incidental to the exercise of other delegated powers. State government used its "police power" to regulate the taking of animals, along with a sovereign capacity to own animals found within state borders.

But these efforts were insufficient. As the twentieth century neared, a spiraling collapse of natural abundance continued to follow in the wake of increasing human economic activity. The old theories of inexhaustibility had led to the disappearance of too many once prolific species. In response the federal government started to take action. In the late 1800s Congress established the Biological Survey to protect wild game and fur animals. Congress also created the Fish Commission to cope with the increasing demand for food fish products in response to the decline of certain fisheries on the East Coast.[882]

The rise in government regulatory activity carried with it increasingly complex management challenges. In rural regions heavily dependent upon natural resources such as the Olympic Peninsula, agencies were often confronted with competing claims of exploitation, conservation and preservation. These were as much economic and political problems as they were environmental. In effect, the fisheries problems faced by government officials were fundamentally human problems rooted in social and behavioral factors.[883] Sports groups came to influence which policies were promulgated,

[882] On this topic see generally: Connery, R.H., 1935.

[883] On this topic, see generally, for example: Ludwig, D., Hilborn, R. and Waters, C. "Uncertainty, resource exploitation, and conservation: lessons from history," *Science* 260,5104(1993):17+36, p. 36; Clark, W.C., in *Societal Risk Assessment. How Safe is Safe Enough?*, 1980, p. 287; Steven Lewis Yaffee, *The Wisdom of the Spotted Owl: Policy Lessons for a New Century* (Washington, D.C.: Island Press, 1994); McEvoy, A.F.,

how laws were enforced, how rights would be adjudicated among conflicting user groups and even the means by which agencies were funded.[884]

The tensions and events that took place on the Olympic Peninsula were not unique. By the close of World War II the public's use of parks and wildlife-dependent activities in the United States began to accelerate rapidly. Fishing experienced the largest rise and contribution. Between 1955 and 1985 the annual number of anglers and number of angling days increased from about 20 to 45 million, and from about 400 to 1,100 million days, respectively. In the Pacific Northwest, the rise in demand in some ways mirrored the pressures faced by turn of the century decision makers when the region had experienced a rapid influx of immigrants and new economies arose. Several decades later, as more and more humans placed increasing demands on finite natural resources in new ways the government once again was pressed to grapple with competing pressures and uses.[885]

In addition to the pressures of interest groups, problems of scale and coherence emerged as different agencies attempted to manage migratory species such as salmon that moved across jurisdictional boundaries. The use of hatcheries by other departments presented an especially difficult challenge for Olympic National Park once the agency tried to rid its waters of artificial fish. In the United States, the early promotion of fish culture technology was partly a mitigation response to the threat posed by resource

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1986; Tim W. Clark, Richard P. Reading, Alice L. Clarke, editors, *Endangered Species Recovery: Finding the Lessons, Improving the Process* (Washington, D.C.: Island Press, 1994).

[884] See for example: Lund, T.A., 1980, especially p. 61.

[885] Manfredo, M.J., Vaske, J.J., Decker, D.J., "Human dimensions of wildlife management: basic concepts," in *Wildlife and Recreationists. Coexistence Through Management and Research,* Richard L. Knight and Kevin J. Gutzwiller, editors (Washington, D.C.: Island Press, 1995), pp. 4-6.

extractive technologies. Synthetic purse seining, marine power boats, mechanized canneries and hydroelectric dams employed technologies that were hazardous to anadromy. But by the mid-twentieth century it was clear to many scientists that hatcheries had proven to be hazardous to the very fisheries they had purported to protect. There was no technological fix to the problem. As fisheries biologist Jim Lichatowich has argued, a century of salmon hatchery management has actually threatened the existence of the species rather than ensured its survival.[886]

But while Olympic National Park began to phase out the practice and move toward principles of ecosystem management, other agencies actually expanded their hatchery infrastructure. This jeopardized park resources because its streams and rivers flowed through hatchery-dominated jurisdictions before reaching the ocean. The 1960s and 1970s saw a renaissance in hatchery practice throughout the Pacific Northwest. The technology, in Lichatowich's view, was nothing more than the manifestation of a "large scale ecosystem simplification" brought on by a destructive economy.[887] It served as one of several examples wherein a modern industrial society in attempting to control and reduce natural variability, often through the use of unproven technology, actually increased the risk of environmental failure. And in the process, scientific discourse was stifled.[888] The political scientist James Scott has similarly described this phenomenon with respect to agricultural simplification at the hands of government-dominated institutions. Its unintended consequences, he argues, have been manifold. They include

[886] Lichatowich, J.A., 1999, p. 221.

[887] Lichatowich, J.A., 1999, pp. 208-211, p. 221.

[888] Clark, W.C., in *Societal Risk Assessment. How Safe is Safe Enough?* 1980, p. 295; Lichatowich, J.A., 1999, pp. 147-150.

increased system vulnerability through the introduction of new threats such as disease and genetic compromise, as well as a constriction of scientific inquiry.[889]

In spite of these external risks, the ability of the National Park Service to assess its management tools and attempt to reframe how humans interacted with their environment was an important accomplishment. In some ways it mirrored broad social changes during the 1960s and 1970s that reflected a rising sensitivity to environmental deterioration. An emerging environmental movement helped to propel the creation of a new federal regulatory infrastructure, one that expanded the capacity of the federal government to manage risk.[890] Congress passed legislation to create acts to protect the environment and human health, as well as to establish agencies to enforce anti-pollution laws. The Wilderness Act, the National Environmental Policy Act (NEPA), the Endangered Species Act and the Clean Water and Clean Air Acts increased federal management responsibilities and procedures. In 1970, President Nixon created the U.S. Environmental Protection Agency, a centralization of federal powers that absorbed five major pollution programs including the Federal Water Quality Administration, Department of Health, Education, and Welfare, and solid waste and air pollution entities. The Office of Technology Assessment was created in 1972 and formal governmental environmental risk assessment processes were developed in the early 1980s.[891] The regulatory agencies

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[889] James C. Scott, *Seeing Like a State. How Certain Schemes to Improve the Human Condition have Failed* (New Haven, CT: Yale University Press, 1998), pp. 268, 304.

[890] See generally: Lawless, E.W., Jones, M.V., Jones, R.M., "Methods for comparing the risks of technologies," in *Risk Evaluation and Management*, Vincent T. Covello, Joshua Menkes, Jeryl Mumpower, editors (New York: Plenum Press, 1986).

[891] Walter A. Rosenbaum, *The Politics of Environmental Concern* (New York: Praeger Publishers, 1973), pp. 117-124, 135, 140-147; see Hays, S.P., "From conservation to environment: environmental politics in the United States since World War Two," *Environmental Review* 6(Fall 1982):14-41. And see generally:

charged to implement these acts were called upon to supplement legislative bodies and courts as mechanisms to manage threats of pollution and natural resource depletion.[892]

NEPA, passed in 1969, was perhaps the most significant legislation to come from this surge of activity. In 1963, its principal architect, Lynton Caldwell, had argued for the need of society to generate the means to think about environment as an important area of policy in the same way as, for example, prosperity and other social values. With increasing pressures of population growth and the use of technology the risk of huge failures would only increase over time, he argued. This would lead to "bigger, more disastrous, and more irremedial environmental mistakes." NEPA attempted to counter such outcomes by providing a mechanism to try to achieve "a common denominator among differing values and interests" in order to "follow a wiser course."[893]

Specifically, the purposes of the Act were to "encourage productive and enjoyable harmony" between humans and the environment; to lessen or prevent damage to the environment while increasing human health and welfare; to increase understanding of ecological systems and natural resources; and to establish an environmental council to advise the executive branch.[894] The key instrument of the Act was the requirement that all

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Norman J. Vig and Michael E. Kraft, editors, *Environmental Policy. New Directions for the Twenty-First Century* (Washington, D.C.: CQ Press, 2003); Michael J. Bean and Melanie J. Rowland, *The Evolution of National Wildlife Law* (Westport, CT: Praeger, 1997); National Research Council, 1983.

[892] See for example: Edwards, W. and von Winterfeldt, D., "Public disputes about risky technologies. Stakeholders and arenas," in *Risk Evaluation and Management*, Vincent T. Covello, Joshua Menkes, Jeryl Mumpower, editors (New York: Plenum Press, 1986).

[893] Caldwell, L.K., "Environment: a new focus for public policy?" *Public Administration Review* 23,3(1963):132-139, p. 138.

[894] Lynton K. Caldwell, *Science and the National Environmental Policy Act. Redirecting Policy through Procedural Reform* (University, AL: The University of Alabama Press, 1982), p. 1; Blumm, M.C., "The National Environmental Policy Act at twenty: a preface," *Environmental Law* 20(1990):447-483, p. 449.

federal agencies consider the likely environmental effects of their activities by preparing environmental impact statements. Caldwell called the impact statement a "procedural invention" that would "force federal officials to consider the possible consequences of decisions having major implications" on the environment as it related to humans. Implicit was the assumption that human and natural systems coexisted and that this mutual relationship, if managed poorly, would adversely affect the country's social and economic objectives.[895]

Reflecting upon the Act years later, Caldwell believed it had "worked to reorient public attitudes and behaviors" toward the hope of slowing a relentless environmental decay. The survival of society, he believed, required "self-discipline" and social structures "to protect us against our susceptibility to error."[896] NEPA was such a structure, in his view. Many scholars agreed. The family of acts passed during the 1960s and 1970s helped to bring further analytical capacity to assess the proliferation of large-scale technologies with uncertain environmental impacts. Such legislation also attempted to address administrative fragmentation in managing natural resources and the environment by recognizing the complexity of the challenges.[897]

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[895] Caldwell, L.K., 1982, pp. 1-12 (quote on p. 1); See also, generally: President's Science Advisory Committee, Environmental Pollution Panel, "Restoring the quality of our environment" (Washington, D.C.: The White House, 1965); Dreyfus, D.A. and Ingram, H.M., "The National Environmental Policy Act: a view of intent and practice," *Natural Resources Journal* 16(1976):243-262, pp. 245-247; Culhane, P.J., "NEPA's effect on agency decision making," *Environmental Law* 20(1990):681-702, pp. 695-702.

[896] Caldwell, L.K., 1982, pp. 149, 151.

[897] See generally: Peterson, R.W., "The Impact Statement-Part II," *Science* 193(1976):4249, p. 193; Caldwell, L.K., 1963, 1982; Dreyfus, D.A. and Ingram, H.M., 1976; K.S. Shrader-Frechette, *Science Policy, Ethics, and Economic Methodology: Some Problems of Technology Assessment and Environmental-Impact Analysis* (Boston: D. Reidel Publishing Company, 1985a).

Two decades after the passage of NEPA, policy experts reaffirmed its significance. Natural resource law expert William Rodgers characterized the Act's success by its ability to consider early warnings of future consequences, its consideration of cumulative and second-level effects on decision making, and its capacity to elicit a broad scope of interests and opinions on potential government actions.[898] The environmental impact statement process was credited with encouraging agencies to consider the environmental impacts of their actions, diversifying staff expertise within agency planning and facilitating public and inter-agency participation.[899] The tool has even been applied to other regulatory issues including energy, inflation and employment. States and foreign nationals have likewise adopted the technique into policy processes.[900]

In these respects, it could be argued that NEPA and NEPA-like tools have provided societies with methods to conduct high level risk management. As defined by one risk scholar, the management of risk requires the need to "evaluate, order, and structure inevitably incomplete and conflicting knowledge" in order to act most effectively.[901] As such, the aim of the Act has been to improve the social and environmental sensitivity of government by wedding science and legal tools into a multidisciplinary decision-making instrument. Although Caldwell understood that no single tool could realistically serve as the government's main assessment device, he had

[898] Rodgers, Jr., W.H., "NEPA at twenty: mimicry and recruitment in environmental law," *Environmental Law* 20(1990):485-504, pp. 488, 490; Blumm, M.C., 1990, pp. 454-455.

[899] Culhane, P.J., 1990.

[900] Rodgers, Jr., W.H., 1990, pp. 487-491.

[901] Clark, W.C., in *Societal Risk Assessment. How Safe is Safe Enough?* 1980, p. 287.

hoped it could broaden government's ability to evaluate expansive science and engineering agendas.[902]

Success has been mixed. One analysis of the impact statement process found the use of social science tools deficient even though the likely social and cultural consequences of many projects were substantial. Another study concluded that the precision and accuracy of many forecasted impacts has been poor.[903] Even so, the ability of NEPA through the environmental impact statement process to exert "effective external pressure" onto federal agencies as they make their decisions has been understood by many experts to be perhaps the Act's most enduring contribution to environmental policy.[904] To the extent that science has been employed as an analytical workhorse of many impact statements, the process ultimately recognizes that the limitations and strengths of science can best be understood by fostering a variety of viewpoints. These views should bear on how government acts in matters that concern the environment and human welfare. As one risk scholar has noted, "risk is a people problem, and people have been contending with it for a very long time indeed." While federal agencies have noted the need to build their understanding of natural systems using science, at the core of

[902] Caldwell, L.K., 1982, pp. 94-95; Caldwell, L.K., 1963, pp. 138-139.

[903] Friesema, H.P. and Culhane, P.J., "Social impacts, politics, and the environmental impact statement process," *Natural Resources Journal* 16(1976):339-356; Culhane, P.J., Armentano, T.V., Friesema, H.P., "State-of-the-art science and environmental assessments: the case of acid deposition," *Environmental Management* 9,5(1985):365-378; Culhane, P.J., "The precision and accuracy of U.S. Environmental Impact Statements," *Environmental Monitoring and Assessment* 8(1987):217-238.

[904] Friesema, H.P. and Culhane, P.J., 1976, p. 356; Culhane, P.J., "The effectiveness of NEPA," *Science* 202,4372(1978), pp. 1035-1036.

environmental problems lay culture and people. Science becomes merely one part of a larger dynamic.[905]

Coming back to the story of Olympic National Park's first few decades of fisheries management, it is clear that the agency struggled as it sought to balance the needs of humans with the needs of the natural environment. Science served both interests at various times and in certain ways. In the end, the park came to recognize that the use of hatcheries in the service of recreational fishers was a technological blunder. The practice had wrought serious changes to the natural resources. The park's larger ecosystem was compromised and so too was fishing in park waters. Scientific evidence, early on used to support the rise of hatcheries throughout the Pacific Northwest, later demonstrated that aquaculture had failed to work. Its objectives were incompatible with the needs of the natural system.[906] Such an outcome was not a unique occurrence in the history of natural resource management. In the words of Caldwell, "to invoke the aid of science with incomplete or inadequate instructions is to incur the risk of undesired consequences."[907]

The hatchery experience in the United States, moreover, illustrated how the use of science sanctioned and supported by government funding had become disconnected from scientific principles. The application of fish culture as an enterprise to meet the demands of fishers was neither adequately informed nor guided by scientific method—empirical evidence was rarely pursued with rigor or hypothesis-driven investigation. When science

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[905] Clark, W.C., in *Societal Risk Assessment. How Safe is Safe Enough?* 1980, p. 287.

[906] As synthesized by Ludwig: "Technical approaches to resource management must eventually fail unless their objectives are compatible with the natural system." (Ludwig, D., "Environmental sustainability: magic, science, and religion in natural resource management," *Ecological Applications* 3,4(1993):555-558, p. 556.)

[907] Caldwell, L.K., 1982, pp. 31, 123.

did negatively critique the practice, managers mostly ignored its voice in the interest of competing priorities that mainly served the interest of sport fishers.[908] Hence science informed but not always drove governmental management decisions, for better and worse.

Beginning in the 1960s, the concept of managing fisheries as part of an ecosystem began to gain momentum. The National Park Service was among the first government agencies to understand the necessity of this approach in the service of preservation. But its resource managers were never able to shake the reality that, in the words of fisheries biologist Robert Lackey, "the conflict of fundamentally different values and social priorities" would invariably affect the environment. The management of ecosystems purely within the realm of natural processes irrespective of human dimensions never happened. The struggle to find the balance continued into subsequent decades: human systems and ecosystems were too intertwined to function separately even in federally managed wilderness areas.[909]

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[908] Caldwell, L.K., 1982, p. 123.

[909] Lackey, R.T., "Challenges to using ecological risk assessment in implementing ecosystem management," *Water Resources Update* 103(1997):46-49, p. 47. See in general: Berry, J., Brewer, G.D., Gordon, J.C., Patton, D.R., 1998; Brunner, R.D. and Clark, T.W., "A practice-based approach to ecosystem management," *Conservation Biology* 11,1(1997):48-58; Clark, J.S., Carpenter, S.R., Barber, M., Collins, S., Dobson, A., Foley, J.A., Lodge, D.M., Pascual, M., Pielke, Jr., R., Pizer, W., Pringle, C., Reid, W.V., Rose, K.A., Sala, O., Schlesinger, W.H., Wall, D.H., Wear, D., "Ecological forecasts: an emerging imperative," *Science* 293(2001):657-660; Tim W. Clark, Michael J. Stevenson, Kim Ziegelmayer, Murray B. Rutherford, editors, *Species and Ecosystem Conservation: An Interdisciplinary Approach* (New Haven, CT: Yale School of Forestry & Environmental Studies, Bulletin Number 105, 2001); U.S. Environmental Protection Agency, *Framework for Ecological Risk Assessment* (Washington, D.C., 1992, EPA/630/R-92/001); U.S. Environmental Protection Agency, *Guidelines for Ecological Risk Assessment* (Washington, D.C., 1998, EPA/630/R-95/002F); Grumbine, R.E., "What is ecosystem management?" *Conservation Biology* 8,1(1994):27-38; National Research Council, *Ecological Knowledge and Environmental Problem-Solving* (Washington, D.C.: National Academy Press, 1986); Power, M., Adams, S.M., "Perspectives of the scientific community on the status of ecological risk assessment," *Environmental Management* 21,6(1997):803-830; Power, M. and McCarty, L.S., "Trends in the development of ecological risk assessment and management frameworks," *Human and Ecological Risk Assessment* 8,1(2002):7-18.

What is notable about the Olympic story is how the agency was able to overcome stiff public and inter-agency resistance and pressure to conform to traditional management and conventional science tenets. A few reasons could explain this. First, the dual mandate of the National Park Service had created inherent frictions that compelled its leadership to consider viewpoints often at odds with each other—namely, the interests of wilderness and preservation that stood in contrast to interests of the public's use of natural resources within park jurisdictions. Second, the Park Service had from its beginning solicited reputable scientific advice—both from within and outside its ranks. While often tabling or even ignoring such advice, the agency did maintain a connection to these disciplines as it determined how best to fulfill its preservation mandate.

Perhaps the foremost reason the Park Service transitioned into a new management response was that the status quo had simply failed. The creation of national legislation that articulated the emergence of wilderness and ecosystem principles was, in some respects, a reaction to environmental failure. The agency was open to incorporating new principles into its policymaking. It had already seen the devastating effects that customary management and acquiescence to interest groups had wrought on its environment. The agency's capacity both to reconsider and revise its methods of protecting its assets, in the end, helped to ensure the survival of the Park Service as a viable entity, Olympic included. Namely, it sought to ensure the long-term protection of the natural resources that it was charged to manage, a charge given it by Congress in response to society's pattern of ill-conceived exploitation leading up to the early 20th century.

In sum, the evolution of fisheries management at Olympic National Park from the 1930s into the 1970s derived in part because the agency had gained a better empirical understanding of natural systems, recognized the adverse impacts of aquaculture technology on these systems, devised targeted regulatory schemes specific to localized species and habitat, and developed the capacity to shape social attitudes to foster more responsible human behavior within the systems it managed.

These actions, in fact, harmonized with the very attributes demonstrated by some ancient and pre-industrial societies that had achieved long-term balance with their environments. As listed in Table 26.1, governing attributes of societies that successfully managed their natural resources to reduce the risk of failure over long time periods included the following traits: an intimate knowledge of the resource; the ability to demonstrate flexibility and adaptation; and the power to modify human behavior and to compel action by individuals and small groups.[910]

Moving into the final chapters of this Elwha River story, the role of the individual citizen as a feature of social risk management and governance is explored. For the modern story of the river above all relates to advocates—both outside and within government—who pressured their communities and colleagues to see the river renewed as a free-flowing organism. Laypersons and experts alike helped to determine the fate of the Elwha's fish. The true value of the river was realized and set on a course of renewal by those who were most familiar and intimate with the Elwha itself.

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[910] J. Donald Hughes, *Ecology in Ancient Civilizations* (Albuquerque, NM: University of New Mexico Press, 1975), p. 147; Clark, W.C., in *Societal Risk Assessment. How Safe is Safe Enough?* 1980, p. 295; Roy A. Rappaport, *Ecology, Meaning, & Religion* (Berkeley, CA: North Atlantic Books, 1979) pp. 98, 100-101; Jared Diamond, *Collapse. How Societies Choose to Fail or Succeed* (New York: Penguin, 2005), pp. 430, 432.

Table 26.1 Successful governing attributes of long-term societal management of natural resources and environment

Attribute	Feature	Inverse feature
Attitudes toward nature and behaviors	Directed in ways appropriate to well-being of system, and effectively implemented	Inappropriate direction; dismissal of respectful attitudes and behavior as relevant to interactions with nature
Knowledge of nature	Empirical and objective, but as needed to guide behavior irrespective of total accuracy or certainty especially where unpredictable or uncontrollable; knowledge critical but subservient to respect	Knowledge as substitute for respect regardless of empirical certainty or uncertainty
Understanding of constraints and limits of nature	Resource managed to benefit larger society through long-term preservation of whole	Resource consumed in short-term to benefit individual users or small groups
Appropriate use of technology that affects environment	Imposes little stress on system as a whole	Imposes significant stress on system
Social controls over treatment of environment	Actionable at individual and small group level	Centralized
	Capable of timely modification	Incapable of short-duration modification
	Flexible and adaptable	Inflexible and unable to adapt

Figure 26.1 Timeline comparison for evolution of preservation (top) / conservation-exploitation (bottom) public property regimes on Olympic Peninsula, 1880-1980

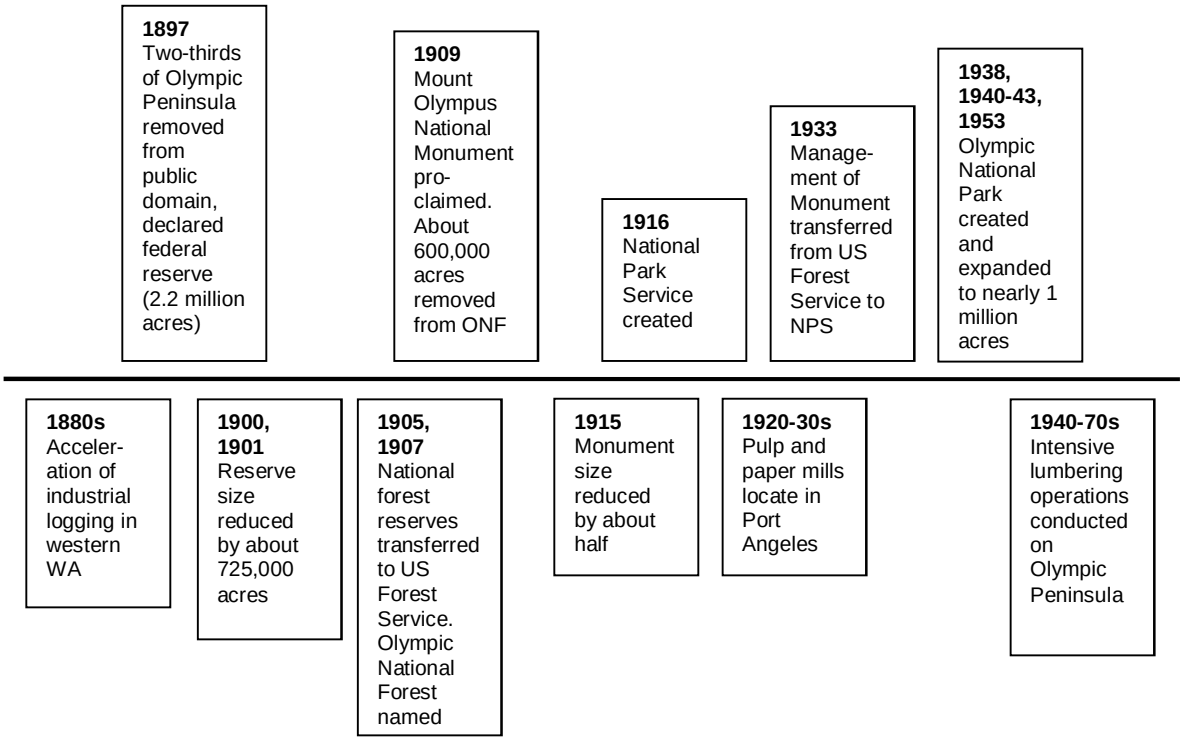


Figure 26.2 Timeline of government hatchery management (top) in relation to ascent of recreational fisheries (bottom) on north Olympic Peninsula for Lake Crescent and Elwha River waters, 1900-1960

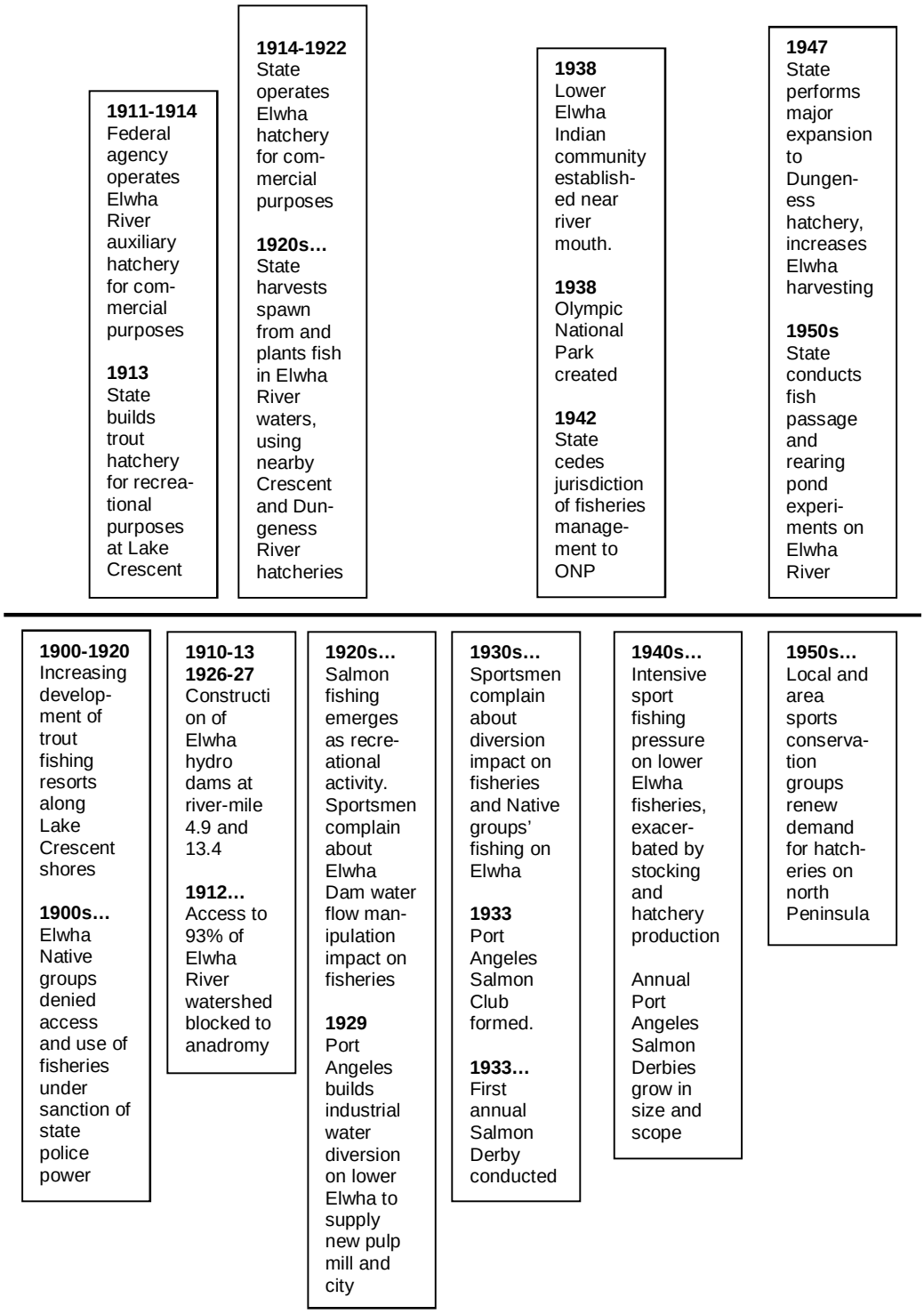
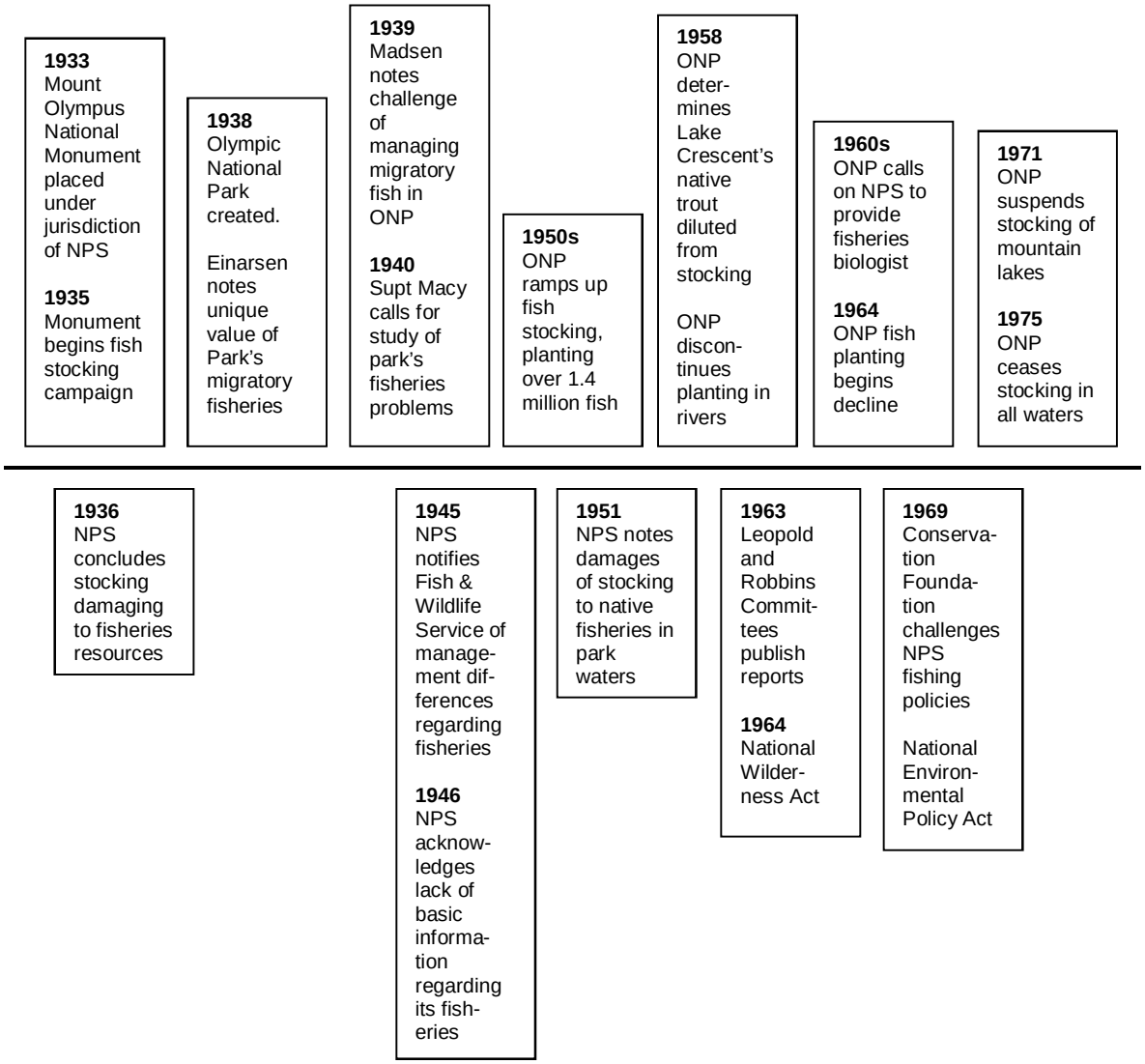


Figure 26.3 Evolution of Olympic National Park fisheries management, 1935-1975



Part 8. Elwha: Value of a River

Chapter 27 Is It Time?

Dick Goin worked at the Rayonier pulp mill most of his life. When the plant's expensive machinery broke, he fixed it. Idled equipment was the worst thing that could happen at a mill that operated nonstop, every hour of the day, every day of the year. Down time at the facility was lost production, lost money. It was stressful work. He also fished. Dick fished so much in fact that his wife Marie once estimated that on average he had spent upwards of 200 days a year on peninsula waters. Over half of these days Dick had fished on the Elwha River. He called it "a river of canyons, cataracts and huge salmon."[911]

By the early 1980s, Goin had become something of an icon and legend on the north peninsula. He seemed to know more than anybody else about the rivers and fish, and he remembered more than anybody else about their history. He didn't behave like most fishermen behaved. Goin had never participated in the Port Angeles salmon derbies. He had never trophy-fished. And he had never believed in artificial propagation. Even though he was a fierce advocate for the peninsula's wild fish, he kept to himself. "I'm not associated with any interest group, I'm just for the fish," he once told a reporter.[912]

Dick Goin's long experience on the Olympic Peninsula's rivers, uncommonly precise memory and perception, and deep reverence for fish were extraordinary. "When I was about 15 years old," he once reflected, "I noticed that most fishermen didn't really think about why fish did what they did. That's when I started asking why." He would

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[911] Dick Goin presentation to Elwha River Science Symposium, September 17, 2011 (digital recording, Philip R.S. Johnson).

[912] *Peninsula Daily News*, June 28, 1989.

interrogate the natural world and in so doing refine his understanding of how fish behaved and survived. Over time, his fishing skills and knowledge of rivers became matchless. A typical outing with Goin was often a mix of the past and present, as if the two phases could flip on and off like a switch in his mind. “On a lovely day in about 1952,” he might casually mention while wading to a gravel bar, “I saw 14 fish all at once at this spot.” His peers were few. Most understood that Goin was, in the words of one colleague, a master of masters. “The relationship between him and the marvelous metallic fish is a personal one,” a local sports writer wrote in awe as Goin neared his 65th birthday. “At a minimum, Dick Goin knows when, where, and how.”[913] For many who cared about river conservation on the Olympic Peninsula, Goin was a touchstone resource. His memory and field diaries provided a rare chronicle of the region’s historical conditions and changes over several decades. He was a twentieth century baseline.

During his lifetime, much of the remaining old forests outside of Olympic National Park were cut (see Figure 27.1). This accelerated the decline of salmon on the rivers. Between 1960 and 1988, United States log exports to Asia increased from 210 million to 4.2 billion board feet. California, Oregon, Washington and Alaska forests generated 90 percent of the timber. Nearly two-thirds of the wood came from Washington State. Outbidding domestic retailers, foreign purchasers of virgin timber fueled the liquidation of the remaining first-growth stands of the western peninsula that had never been cut. Some called it the last hurrah of logging. Dick Goin witnessed it all. He had known the forests and rivers before they were cut. And then he saw the devastation it

[913] Dick Goin, personal communication, unrecorded, October, 17, 2008; Roger Contor, The Olympic Wild Fish Conference Proceedings, Port Angeles, WA, 1983 (cassette tape and digital recording, Philip R.S. Johnson); *Peninsula Daily News*, February 10, 1994.

wreaked on the ecosystems afterwards.[914]

Just south of the small town of Forks there was a jumble of valleys and ridges lying above the Queets and below the Hoh Rivers that held more nonfederal virgin timber than anywhere in the state. The Clearwater River drainage was a state-owned forest that somehow fate and remoteness had spared. The entire area was cut rapidly. It was barely recognizable once the cutters had left. To the north of Forks, in the marshy flatness east of Lake Ozette where some of the mightiest remaining trees grew, the timber embracing the Dickey River also quickly fell. This had been one of Goin's favorite deep woods and coastal river systems. "They attacked it furiously," Goin remembered bitterly, speaking of the area where for years he hunted elk. It was true wilderness, lowland forests and drainage systems so thick and confusing that hunting parties sometimes got lost for days. "The Dickey is scabbed and dead," he said. "They cut it all—every goddamn inch."[915]

Goin also watched the growing destruction of streams from the rapid cutting of forests west of Port Angeles, closer to home. On the north peninsula both the Crown Zellerbach and ITT Rayonier pulp mills owned extensive timber lands. Much of this wood was cut and sold as raw, unprocessed timber to export markets.[916] In 1985, international financier Sir James Goldsmith acquired Zellerbach and sold off its pulp mill holdings and 257,000 acres. Some of the remaining 700,000 acres comprised a large portion of peninsula land. Within five years it was logged. Then Goldsmith sold off the

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[914] Dietrich, W., 1992, p. 94.

[915] Bruce Brown, *Mountain in the Clouds. A Search for the Wild Salmon* (New York: Collier Books, 1982), pp. 39-42, 184; Dietrich, W., 1992, p. 95; Dick Goin, personal communication, unrecorded, October 5, 1995.

[916] Aldwell, T.T., 1950, p. 133; *The Daily News*, September 22, 1977. In 1968, the International Telephone and Telegraph, Corp. purchased Rayonier and was renamed ITT Rayonier.

company. By the end of the decade, ITT Rayonier had likewise cut all of its peninsula virgin timber. And so, too, would its parent company leave, dropping Rayonier a few years later. Global markets and financing eliminated huge swaths of mature peninsula forests in less than ten years. The scale and pace and fury of the logging was never seen again.[917]

Figure 27.1 Aerial views of logging activity outside of Olympic National Park



Source: TerraMetrics, Google Maps, 2013. Quadrant pictured about 55 x 70 miles

The logging took its toll on the peninsula's fisheries. First the commercial fisheries had raided the waters. Next, the leisure fishers came. Throughout both phases the loggers and dam builders and other human impacts accrued. But the elimination of the remaining forests that had been spared—natal holdouts where the wild fish had

[917] Dietrich, W., 1992, pp. 44, 173-174, 185, 204, 231; "James River, Goldsmith Divide Up Zellerbach in a $1.5-Billion Deal," December 17, 1985. http://articles.latimes.com/1985-12-17/business/fi-30300_1_forest-products [Viewed February 24, 2013].

managed to persist—seemed almost perverse. Salmon had evolved to survive in habitat that provided cold, oxygen-rich waters. They arose from the boreal and subboreal climates of the Ice Age. Over thousands of years they developed migration patterns taking them great distances through and along terrestrial drainages and marine currents. They spent their adult years in the ocean swimming circuits thousands of miles long. They colonized rivers flowing into both the Pacific and Atlantic Oceans. Some species swam inland to points as deep as 1,800 miles from the sea. They went up the rivers to reproduce. The word anadromous is derived from two Greek roots—the first, *ana*, or upward; the second *dromos*, or a running. Anadromous fish not only run up but also run down rivers, patterns that mark the beginning and end of their lives.[918]

This trait vitally connected salmon to the land and made them vulnerable to any changes in riparian areas, or where freshwater and terrestrial environments come together. Eggs, developing juvenile fish, seabound smolts and returning adults all depend on shoreline vegetation that helps to regulate water temperature, checks erosion, creates homes for nutrient-giving organisms and provides large woody-debris that enhances the aquatic environment. In these areas they require aerated gravel to spawn and develop, shade and vegetative cover to hide from predators and acquire food, and regulated water quality. Intensive logging can destroy a watershed's riparian and aquatic habitat.[919]

The loss of forests was not the only problem Goin observed. On the Elwha River,

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[918] Atlantic salmon differ from Pacific salmon in respect to their river and ocean lives, often reproducing more than once. See generally: Thomas P. Quinn, *The Behavior and Ecology of Pacific Salmon & Trout* (Seattle: University of Washington Press, 2005) and National Research Council, *Upstream, Salmon and Society in the Pacific Northwest* (Washington, D.C.: National Academy Press, 1996b).

[919] The marine requirements of salmon are likely as critical as those in freshwater, but only recently have scientists begun to understand this part of their mostly hidden life. See generally: John Stockner, editor, *Nutrients in Salmonid Ecosystems: Sustaining Production and Biodiversity* (Bethesda, MD: American Fisheries Society Symposium, American Fisheries Society, 2003) and National Research Council, 1996b.

the remaining salmon slowly died off as their spawning grounds disappeared. The dams blocked the downstream flow of sediments and gravel needed by salmon to procreate. Rivers meander as gravity pulls water downward, dissipating energy laterally through the process of erosion against canyon walls and valley banks. A river sidewinds back and forth across its floodplain while steering a track seaward. During this process the shape and form of river channels constantly change, creating and destroying sloughs, swamps, oxbow lakes, dry beds and ultimately river again. Massive quantities of rock and soil dislodge and resettle downstream, eventually exiting the river to form estuaries and deltas. The Elwha and Glines Dams had reduced 98 percent of the river's annual sediment discharge. Prior to dam construction, the upper 40 miles of the Elwha had provided about 235,000 cubic yards of material per year. The lower five miles north of Thomas Aldwell's canyon where the first dam would rise had provided only 5,620.[920]

Year after year, what gravels remained in the lower Elwha River below the dams flushed their way into the Strait of Juan de Fuca. Female salmon rely on river gravels, stones and silt to build their nests and protect their young. Using their tails, the adults hollow out cavities inches deep and several feet wide in which eggs are deposited. After fertilization, the mother blankets her eggs with a layer of sediment to protect and stimulate the oxygenation of incubating ova. Tiny alevins then hatch and remain sheltered to feed among the pebbles and rocks until emerging as fry. Over millennia, salmon evolved and thrived by using the eroded material in rivers as natal sanctuaries.[921]

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[920] Olympic National Park, *The Elwha Report* (U.S. Department of the Interior, National Park Service, 1994), p. xiii; Federal Energy Regulatory Commission, 1993, Volume 1, pp. 3-11, 3-13, 3-14, 3-19; Schultz, S., 1992, p. 9.

[921] See generally: National Research Council, 1996b. See also: Quinn, T.P., 2005.

By the mid-1940s Dick Goin had mapped every fish hole, riffle and river bend from the Elwha Dam to the river's mouth. "It was inevitable that the lower runs would be destroyed," he recalled nearly a half century later. "I've seen the loss of nearly all the spawning in the lower river." Over this period of time, 12 to 14 major spawning areas declined to about three small ones. With little upstream replenishment, returning salmon had fewer places to spawn. By 1994, 16 to 18 million cubic yards of material lay trapped in the reservoirs.[922]

At the mouth of the Elwha on the Strait of Juan de Fuca, over thousands of years the river's sediments had created an extensive delta upwards of 5 miles wide, 6 miles long and 200 feet thick. It had formed a ganglion of islands and wetlands where freshwater and tidal currents merged. The area provided a haven for the difficult transfer of anadromous species, where salmon prepare to migrate between freshwater and marine conditions. The area also supported a variety of life including large amounts of shellfish. But like the river, this coastal area diminished as the mineral material ceased flowing into it. The estuary could no longer sustain marsh plant communities and all life that depended upon it. The shoreline receded and steepened. It became unfit habitat.[923]

The dams were not the only cause of the problem. Bulldozers had made matters worse by straightening sections of the river and building jetties. At the behest of property owners, the City of Port Angeles and Clallam County periodically undertook river

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[922] Olympic National Park, 1994, p. xiii; Federal Energy Regulatory Commission, 1993, Volume 1, pp. 3-11, 3-13, 3-14, 3-19; Dick Goin, personal communication, unrecorded, April 30, 1994.

[923] John Downing, *The Coast of Puget Sound: Its Processes and Development* (Seattle: University of Washington Press, 1983), pp. 30-32; Federal Energy Regulatory Commission, 1993, Volume 1, pp. 3-17; Federal Energy Regulatory Commission, 1993, Volume 2, p. F-181; Olympic National Park, 1994, pp. 10-12.

maintenance and flood control measures. Each project shortened the length of the Elwha and quickened its flow. The cumulative effect of these events accelerated the removal of gravels and materials as the river channelized itself into faster-moving waters. The river bends and estuaries that the county destroyed had acted as stabilizing mechanisms by dissipating the force of water. This fostered the growth of rich riparian areas and creation of spawning gravels. Elimination of the river's curvature and meanders destroyed salmon habitat.

As early as 1930, area residents had manipulated channel and estuarine flows by lopping off bends, punching through curves and buttressing or constructing embankments, often to the dismay of state fish and game officials.[924] A few years after the city completed its industrial water diversion intake, engineers added an earthen dike to slow erosion threatening the screenhouse and bypass channel, and reinforced a section of embankment. The work had some effect, but by 1950 the Elwha had reclaimed its former curve, forcing the city to straighten the river's bend by building a rock jetty and overflow channel. The state advised against the project, "due to the fact that the spawning area in the Elwha River is extremely limited and is inadequate to provide for the yearly runs of salmon," but acquiesced.[925]

The most damaging project was completed by 1950 when the county converted a large river bend of prime spawning habitat into a half mile straight line. The work "would

[924] According to City of Port Angeles engineers no such records were kept. Often the projects were considered so minor that records were not deemed necessary, and area newspapers may not have reported all of the work. Clallam County records, however, contain plats for three projects ranging from the late 1940s to the mid-1960s.

[925] Alvin Anderson and Don W. Clarke to Herman Ahlvers, September 8, 1950; Alvin Anderson and Don W. Clarke to Herman Ahlvers, October 2, 1950 (Box 0061-7, "Elwha River, 1926-1964" file. Washington State Archives, Olympia, WA); Maib, C.W., 1952b, pp. 25-26; Dick Goin, personal communication, unrecorded, April 30, 1994; Maib, C.W., 1952b, pp. 28-29; *Port Angeles Evening News*, October 11, 1950.

be definitely disastrous" to chinook, eliminating spawning ground "in a river where it has already been reduced to a minimum," state fisheries director Alvin Anderson wrote the county's board of commissioners. He explained that such projects often met with failure anyhow.[926] "They cut straight from the tail of Spruce Hole to join the river at the end of the big loop, known as the Big Bend Hole," Dick Goin recalled. "It sped up the river's velocity and just slaughtered everything." Within two years, he observed that the smaller fish relying on finer spawning gravels had started to disappear, including cutthroat and resident trout and pink salmon. Eventually only coarse gravels remained, meaning only the larger salmon species could spawn. "Those fish were hard to kill off," Goin recalled. "They knew how to survive." But they, too, succumbed. "The total collapse wasn't until the mid to late '60s, and it was just a free fall. The river was nearly devoid of gravel. For all practical purposes, that was the end of the Elwha."[927]

There had been other projects, as well. House owners at the mouth of the river had convinced the county to bore a small hole through the estuary, turning 800 yards into several feet, and to construct a dike approximately 185 feet long and 10 to 13 feet high on the river's east bank.[928] The Elwha then swung to the west, forcing the county to solicit

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[926] Rost. O'Brien to Alvin Anderson, September 19, 1949; Alvin Anderson to Board of County Commissioners, September 23, 1949 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA); *Port Angeles Evening News*, October 21, 1950; Dick Goin, personal communication, unrecorded, April 30, 1994; Plats B-3-47, 20-30 and 20-31, Clallam County Department of Community Development, Planning Division, Port Angeles, WA (Miscellaneous material, Library, Olympic National Park, Port Angeles, WA); *Port Angeles Evening News*, August 17, 1951.

[927] Dick Goin, personal communication, unrecorded, April 30, 1994.

[928] *Port Angeles Evening News*, January 7, 1950; Plats B-4-49 and B-5-49, Clallam County Department of Community Development, Planning Division, Port Angeles, WA (Miscellaneous material, Library, Olympic National Park, Port Angeles, WA); Dick Goin, personal communication, unrecorded, April 30, 1994; Benj. N. Phillips to Ed Ben, November 23, 1949; Alvin Anderson and Don w. Clarke to Benjamin E. Phillips, November 25, 1949; E.M. Benn to B.N. Phillips, November 25, 1949 (Box 0061-7, "Elwha River, 1926-1964" file. Washington State Archives, Olympia, WA).

assistance from the state and Corps of Engineers in late 1962. No monies were offered, however, and the "maverick river" crept closer to The Place, a group of beach front homes built next to the Elwha's mouth. "By spring, a person could stand on the edge of a 12-foot bank, about 30 feet in front of the home of Mr. and Mrs. W.L. Konizeski," the *Evening News* reported, "and feel the ground shake from waves pounding at the base of the eroded drop-off." In 1964 the county spent $23,000 to tear another hole into the estuary and, that failing, constructed a jetty about 1,000 feet long.[929]

Desperation mounted as the salmon disappeared. Over the next decades, the Department of Fisheries and local volunteers moved tons of cobbles by hand to try to create more spawning habitat.[930] And so, too, was Ediz Hook slowly disappearing, the natural spit that protected Port Angeles harbor. As early as the 1930s some people had argued that its growth had started to slow. At 3.5 miles length, the formation consisted of sands, gravel and cobbles and varied in width from 90 to 900 feet. In 1947 the Evening News reported that many people felt "the hook had not lengthened as fast in recent years as it did in the early days." The paper blamed the dams, noting that the transport of silts in the tide rip between the river mouth and Ediz hook had lessened. In fact, eastern longshore currents in the Strait had historically moved materials from both the river and the shoreline bluffs west of Port Angeles. About 35 percent of the sediments that formed

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[929] *Port Angeles Evening News*, January 24, 1963; February 6, 1963; March 1, 1963; May 6, 1964; August 12, 1964; Plat, June 1964, Clallam County Department of Community Development, Planning Division, Port Angeles, WA (Miscellaneous material, Library, Olympic National Park, Port Angeles, WA); Dick Goin, personal communication, unrecorded, April 30, 1994. In 1989, the Corps of Engineers constructed a setback levee to protect 305 acres of tribal and private lands. By this time most of the damage to the river's fisheries from flood control projects and alterations had already occurred. (Federal Energy Regulatory Commission, Volume 1, 1993, pp. 3-16, 3-17; U.S. Army Corps of Engineers, *Elwha River, Washington, flood damage reduction study* (Seattle, WA: U.S. Army Corps of Engineers, 1987), pp. i, EA-1; Dick Goin, personal communication, unrecorded, April 30, 1994.

[930] Dick Goin to Swift, February 21, 1989 (Dick Goin, personal files, Port Angeles, WA).

the spit came from the Elwha and 55 percent from the coastline.[931] The 1930 industrial pipeline that carried water from the Elwha to the city's mills was buried along the toe of the seacliffs for over three miles. Steel piling and rock riprap were added later. The bluff was no longer eroding. The spit no longer grew. It was actually starting to break apart.[932]

Dick Goin's ability to remember the past as it compared to the present was at times a frustrating burden. "It is quite difficult to tell people about something they have never seen, to explain what it was like to people who have only seen rivers now in their deterioration," he once explained. "You tend not to believe what you haven't seen."[933] Goin's contemporary society could not comprehend a healthy fisheries because for the most part it had never experienced one. "To be able to see masses of fish coming upstream," he once reminisced in awe about the river's pink salmon run, "masses and masses of them coming up the riffles before your eyes…. The fish were literally flopping onto the beach, bank to bank…. absolute wall to wall salmon." Goin routinely encountered skeptical responses and incredulity. "It's very difficult for people to assimilate what the Elwha River was. I can't imagine what I sound like to people who didn't see the Elwha."[934]

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[931] *Port Angeles Evening News,* March 27, 1947; Downing, J., 1983, pp. 30, 115-116; Galster, R.W., "Ediz Hook: a case history of coastal erosion and mitigation," Washington State Department of Natural Resources, Division of Geology and Earth Resources, Bulletin 78(1989):1177-1186, p. 1177.

[932] Federal Energy Regulatory Commission, 1993, Volume 1, pp. 3-17, 3-19; Galster, R.W., 1989, pp. 1177-1178). Between 1937 and 1970 the Coast Guard, City of Port Angeles and Crown Zellerbach spent over $900,000 building piecemeal protective works in an effort to stem the deterioration of the spit. The Corps of Engineers predicted Ediz Hook might breach, thereby destroying the harbor's breakwater, and by 1978 had spent $5.6 million reconstructing it. Federal Energy Regulatory Commission, 1993, Volume 1, pp. 3-19 to 3-20; Galster, R.W., 1989, pp. 1178-1179, 1182-1185.

[933] Dick Goin, personal communication, unrecorded, January 15, 1994.

[934] Dick Goin, personal communication, unrecorded, January 15, 1994.

Evidence of former bounty did exist in the written accounts of preceding generations. And yet even these earlier attempts to describe a prolific resource were sometimes presented in disbelief. Many pioneers and settlers of the Pacific Northwest had come from regions whose fisheries had long ago deteriorated. They could not comprehend what they were seeing right before their eyes.

In 1853, Ezra Meeker encountered a strange phenomenon on Puget Sound:

> We could see that the disturbance was moving toward us, and that it extended as far as we could see, in the direction we were going. The sound had increased and became as like the roar of a heavy rainfall, or hail storm in water, and we became aware that it was a vast school of fish moving south, while millions were seemingly dancing on the surface of the water and leaping in the air. We could sensibly feel them striking against the boat in such vast numbers as to fairly move it as we lay at ease. The leap in the air was so high as to suggest tipping the boat to catch some as they fell back, and sure enough, here and there one would leap into the boat…. It did seem at times as if the air was literally filled with fish, but we finally got rid of the moving mass, and reached the island shore in safety.

Expecting no one would believe his encounter, Meeker accompanied his journal entry with a newspaper clipping that had described a similar event.[935]

In 1894, Elwha River homesteader Inez Isbell wrote her family of a salmon they caught that was nearly as tall as her three-year old daughter "when we stood it on its tail." The fish provided four meals. [936] That same year, when the sockeye run advanced up the Elwha to Indian Creek and Lake Sutherland, Harold Sisson remembered what happened:

> …. and Dad said it rained three days and three nights and the fish come up in Lake Sutherland so thick that you couldn't drop a pin without touching them…. Roy Wilson had a skiff and he took a pitchfork and just filled that boat. Well shoot, there was fish all around that boat, filled it full 'till he almost sunk it and Dad said to him, "Now what are you going to do with them?"… He said, "I don't

[935] Meeker, E., 1916, pp. 88-89, 95-96.

[936] Emily Thomas, "Interview with Phrania Jacobsen, June 1995" (Cultural Resources Division, Olympic National Park, Port Angeles, WA).

> know." Well, of course his mother could salt some down or something like that. So Dad said to him "You got some shovels here? Get the shovels." In their gardens they dug a trench and just laid the fish in there to fertilize the garden 'cause they couldn't use a boat load of them; you know they could a half a dozen or so."[937]

In 1894, James Swan described the "enormous quantities" of anchovy that visited the north peninsula every summer and autumn. The bays and inlets were "crowded" with the fish whose "numbers are almost incredible." And from Port Townsend, Swan wrote how "the ocean fish, in their season, crowd in great masses into the bay and around the wharves." Cod, salmon, rockfish, herring, smelt and anchovies "are in such dense masses or schools that at times the water seems literally packed with them."[938] A few years later, north peninsula settlers awoke to find windrows of salmon piled along the Strait, killed by an apparent epidemic. Throughout the day residents of Port Angeles loaded farm wagons with the newfound fertilizer deposited on the north side of Ediz Hook and the harbor beach. They spread the carcasses over fields and around fruit trees. They didn't know what else to do.[939]

Over time such events became rare. The cumulative effects of human activity reduced the hordes of fish to a smaller magnitude. Everyone was in some way responsible for the grand loss: logging, saw mills and pulp and paper companies; fish and marine canneries; commercial and sports fishers; countless stream-side manufacturers that dumped wastes; hydroelectric, irrigation and municipal interests; and the sprawl of

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[937] Transcription of Interview with Harold Sisson, November 13, 1990, Lower Elwha Road, Washington (Cultural Resources Division, Olympic National Park, Port Angeles, WA).

[938] Swan, J.G., "Notes on the fisheries and the fishery industries of Puget Sound," in *Bulletin of the United States Fish Commission*, Volume XIII, 1893 (1894), pp. 376-379.

[939] *Port Angeles Evening News*, November 28, 1953.

populations that drained and straightened river valleys into farms, towns and cities.

By the time Dick Goin's Iowan family had reached the north peninsula in 1937, much of the damage was done. But even he experienced amazement. "There were giants in those days," he said about his early times on the Elwha, recalling adventures when "two men" were needed "to land one of these things," fish that weighed well over 50 pounds. The biggest salmon, the chinook kings in excess of 70 and 100 pounds, were uncatchable once they retreated into the deep pools. Goin described them as "incredible scrappers," "jumpers" whose hallmark was a somersault display above water. But within a half century of his arrival, life within the waters of the Pacific Northwest no longer produced such an awesome display. And into the base of the Elwha dam the chinook "would jump, and jump and jump and jump, and throw themselves." They would "fly right at it. And they would just keep banging themselves and fall back in" to the water.[940]

Across the northern hemisphere, as the fisheries disappeared each generation of human users established new markers of familiarity and custom. They created different moors based on different natural resource conditions. In the Northeast United States, for example, by the nineteenth century only old timers remembered abundance. "I am seventy-three years old," Nathaniel Smith of Newport, Rhode Island testified in 1871. "Fish used to be very plenty, so that any one could get as many as he wanted; they were plenty until the trapping was commenced. That was about 1828 or 1830." Before that time, one person "could catch scup enough forty years ago to load a boat in a short time. I have seen the water all full of them under my boat. Everyone could catch as many sea-

[940] Dick Goin, presentation to Elwha River Science Symposium, September 17, 2011 (digital recording, Philip R.S. Johnson).

bass or tantog as he wanted."[941] In 1798, a dam built on the Connecticut River blocked salmon migrations. "When, in 1872, a solitary Salmon made its appearance," a federal fisheries expert noted, "the Saybrook fishermen did not know what it was."[942] In Plattsburgh, New York, a resident reported that his grandfather had seen salmon "in such abundance as to completely fill the river, rendering their capture by the cart-load an easy matter." No more salmon were caught in the stream after the spring of 1824.[943]

In this and other once plentiful salmon regions, the disappearance of the fish had led to a loss of expectation and need. There were no fish meals on the table, no sport and no commerce. As a result, society separated further from its environment. After enough time had passed, even the ability to remember or recognize the resource vanished. At this point, a people or community or region were absolutely severed from the resource—as if the salmon had never existed.[944]

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[941] Spencer Fullerton Baird, *Report on the Condition of the Sea Fisheries of the South Coast of New England in 1871 and 1872* (Washington, D.C.: Government Printing Office, 1873), pp. 19-20 (Testimony in Regard to the Present Condition of the Fisheries, Taken in 1871).

[942] Goode, G.B., 1884, p. 469.

[943] *Report of the Commissioner of Fisheries, 1872 and 1873* (United States Commission of Fish and Fisheries, Part II, 1874), p. 624.

[944] The concept of needs and disappearance as applied to humans and natural resources inspired by author's interpretation of the phenomenological work of Samuel Todes. (Samuel Todes, *The Human Body as Material Subject of the World* (New York: Garland Publishing, 1990 [Dissertation in philosophy, Harvard University, 1963]). In both the northeast and northwest corners of the United States, the history of salmon exploitation reveals a common thread of emotion, one that evinces a repeating sense of pending loss and doom. The feeling perhaps was most pronounced in the first wave of disturbance when the settlers could more directly compare the essence of unspoiled abundance to its counterpart. Unlike today's generation, most of whom are denied the perceptive baselines needed to compare the difference between a flourishing and anemic environment, this country's ancestors directly witnessed and partook in the dismantling of a frontier. Subsequently, they saw firsthand the diminishment of resources that once had awed them. On the importance of historical perspective and data ("the shifting baseline syndrome") to inform present ecosystem comparisons, and the implication to envisioning ecosystem restoration, see: Jackson, J.B.C., Kirby, M.X., Berger, W.H., Bjorndal, K.A., Botsford, L.W., Bourque, B.J., Bradbury, R.H., Cooke, R., Erlandson, J., Estes, J.A., Hughes, T.P., Kidwell, S., Lange, C.B., Lenihan, H.S., Pandolfi, J.M., Peterson, C.H., Steneckl, R.S., Tegner, M.J., Warner, R.R., "Historical overfishing and the recent collapse of coastal ecosystems, *Science* 293,5530(2001):629-638, p. 636.

During the 1870s, when the federal fish commission introduced hatchery salmon into long-empty salmon streams across New England, the region felt as if it had been granted a reprise. Only the older residents knew of the former runs. Many people were confused by the fish, unsure what it was. In Brewer, Maine, smelt fishers dipped 60 young salmon and responded with a sort of tenderness and respect. The salmon "were recognized by an intelligent bystander and their distinctive marks pointed out, when all parties immediately took a deep interest in protecting them," a commissioner reported. "One man, in fishing for suckers in the Kenduskeag, with coarse line and baited hook sunk on the bottom, caught sixteen young salmon in two hours, and carefully returned them to the water again." In Pennsylvania, however, residents near the Bushkill River were alarmed by the appearance of a large "strange" fish in a mill-race. Hooks and lines, bird-shot and a rifle finally killed it, allowing everyone to inspect the curiosity.[945]

Today, the Pacific Northwest has only a vague sense of the magnitude of earlier days. "For dinner," a *The New York Times* travel section reporter wrote in 1993 while anchored off the Sucia Islands in the boundary waters of the Strait of Georgia and upper Puget Sound, "we barbecued fresh Alaska salmon that we had bought for $2 a pound in Bellingham." Her meal came from Alaskan waters, and yet her meanderings through the San Juans and Gulf Islands were surrounded by what had been one of the densest salmon fisheries in the world. Turn of the century migratory runs had fueled Bellingham canneries for a few decades.[946]

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[945] *Report of the Commissioner of Fisheries, 1878* (United States Commission of Fish and Fisheries, 1880), pp. 927, 940.

[946] Hafner, K., "Gunk-holing in the Pacific Northwest," *The New York Times*, August 8, 1993; Balzar, J., "Wild salmon—symbol of Northwest's bounty—face extinction," *The Washington Post*, April 3, 1994.

Few in Port Angeles know of the time when area waters provided immense volumes of foods taken and consumed by all. In the late 1880s a Native called Old Smiley sold salmon door to door for ten cents. In 1904, the City Fish and Ice Market on the Morse wharf advertised itself as a place where one could "secure at all times the best assortment of fish obtainable" including "every species of the finny tribe taken in the ocean waters of this vicinity." In 1953, the *Evening News* Centennial Edition, with the help of historical files, recalled when those who wanted food simply went to nearby streams, all of which had big runs of salmon, and gaffed fish. "The salmon were eaten fresh, smoked or salted, and few homes went without a supply of salmon for the winter." During these bygone times, in the words of a nineteenth century federal fisheries official, people knew "the luxury of partaking of fish taken from home waters."[947]

In March 1983, Olympic National Park Superintendent Roger Contor introduced Dick Goin to a room of fisheries biologists attending a wild fisheries conference in Port Angeles at Peninsula College. "He has spent a lifetime here," Contor said, "and has a notebook that would be worth a million dollars to know everything that's in it."[948] After hearing Goin's talk, a reporter wrote the next day that "any jury would have sent the destroyers of the great fish runs that used to be in almost every stream of the peninsula to the same fate as their victims." Goin took his audience on a journey through the 1940s, 1950s and 1960s. He recalled his family's and the community's dependence on salmon for subsistence. He described an astonishing world of fish on the Hoh, Sol Duc, Pysht,

[947] Russell, J., 1971, p. 443; *Tribune-Times*, February 2, 1906; *Port Angeles Evening News*, November 28, 1953; Spangler, A.M., in *Bulletin of the United States Fish Commission, Volume 13, for 1893*, 1894, p. 23.

[948] Roger Contor, The Olympic Wild Fish Conference Proceedings, Port Angeles, WA, 1983 (cassette tape and digital recording, Philip R.S. Johnson).

Lyre, Bogachiel, Dungeness and other peninsula rivers. He lamented their decline, presenting a roll call of lost runs and destroyed streams. And yet Goin singled out the Elwha River as an opportunity for restoration. No one talked, everyone listened and an alarming feeling of loss filled the room as Goin described his vanquished river companions. He gave a vivid depiction of the richly flourishing environment that he had known, and the hard fall that followed.[949]

> Ladies and Gentlemen, I would like to tell you something of the wild fish of the Olympic Peninsula, and of the rivers that are their homes, and share a few memories of the lifetime that I've spent fishing for them and watching them.
>
> One thing that makes the Olympic Peninsula unique is that because of its isolation we were the last to enjoy the so-called fruits of progress which culminated mostly in the destruction of the streams and their historic runs.
>
> As I grew up here, and I first knew these rivers as a boy of six, in 1937, I was privileged to see at least something of the former magnitude and variety of the runs of anadromous fishery. And I think that is the best way to start to tell you about it: the magnitude, the immense volume, and how what a very short time ago that it really was. And to stress to you that because it was such a short time ago and the degradation has been so great, that I hope to project that I really feel that time is short if we are going to save the wild fish.
>
> I remember in 1939 on the Elwha of the humpie runs, and I'll use the old terms here and there because we didn't know pink salmon then, they were humpies. And everyone was poor. So we went to the river for our winter salmon to can. We didn't have to gaff them, we didn't have to net them, the river was beyond count—even in those years, keeping in mind we're speaking of nearly 30 years after the dam in the Elwha. They were merely in such abundance that you could throw them out on the beach, kick them out, whatever.
>
> I remember in the back sloughs at the mouth of the Elwha—and these were spring fed. As a small boy my dad gaffed with the Indians there, again for winter fish. They gaffed at night with lanterns hung in the trees. And as was accustomed in those days they took just what they needed for smoking and or canning. As the tide receded the bottom would literally turn grey with cohos—and by the way, there were no cohos in those days. The mature were always hookbills. They were never called anything else. All chinook were springs no matter what time of year

[949] Dick Goin, The Olympic Wild Fish Conference Proceedings, Port Angeles, WA, 1983 (cassette tape and digital recording, Philip R.S. Johnson); *The Daily World*, March 27, 1983.

they came. But the bottom would turn grey. And when they had their 100 fish, or whatever, then we would go home—there was no refrigeration—and can them.

And I remember the size. You've probably read much about the famous Elwha chinook. And of course, in the years leading up to the Elwha facility in an effort to save it, why much baloney was written about the enormous size. But believe me it wasn't all baloney. They were literally giants in the waters in those days. As a boy of about 13 living on one of the stump ranches that were so common in this country, I was expected to handle unruly hogs and cattle, carry hundred pound sacks of feed. But I found a king one day in about 1940-1941, a victim of the dynamite that was used a lot in those days, a bright male that I could not lift free off the ground.

As a ragged wet kid, I tagged Ernie Brannon, the man most responsible for saving the Elwha chinook, many hours on the river. And I saw Ernie, a brute of a man that he was, dragged into the river a good many times by giant bucks as he gaffed them. They literally were giants, and fish of over 50 pounds were very common. We fished them in the river in those days. When I was in high school we fished them with hardware, and they were probably the greatest sportfish that we had. They were bright, and 40 pounds didn't raise an eyebrow. And a good many times, if you had three, it took three trips to pack it back up through the brush to your old broken down car.

In those days the Elwha was—prior to the really rather minor flood control that took place in 1947-48 but which made great changes in the Elwha. Prior to that, it was a relatively slow, deep river. It had 12 relatively major log jams from the bridge to the mouth. And there was no following those huge fish. There was only one that dared, he's long dead now, but the only one that had guts enough to jump in that flow and swim down after them. The rest of us just stood and moaned as our gear was took apart. Fifty and 60 pounders hooked were very common and occasionally landed.

We fished the native salmon in the harbor. We didn't go outside in those years—there was no need. We used small cedar boats. As a lad, the herring that were everywhere, and on occasion our reel was a coffee can with the line wound around it and we played them by stripping with a cane pole, and rode after them one oar at a time. It was really a test of skill. Those are all gone now. And in the fall the salmon came into the log booms in great force. The early cohos which were everywhere and in the Elwha, an extinct run now by the way, of the natives. They came into the harbor green and bright and fed, in around the logs. In fact, that was a sign of fall.

The seasons were known not by the calendar but by the fish. Spring was here when the spring salmon were in the Dungeness. Summer was here when the kings were in the Elwha. When the hookbills came to the harbor it was fall. And when the steelhead were in the Lyre we knew it was winter.

And we fished the blackmouth and the hookbills as they came into the harbor in great force behind the many acres of bait that came in there and wintered and spawned. And then later came the run of the giant blackmouth in Port Angeles harbor from November through February. And we rode in small boats, sometimes in blinding snowstorms where you couldn't even see. These were huge fish. Very often any fish you had, or the total fish you had of a day would all be over 20 pounds. I've seen at least four that were weighed in at over 40 pounds in the dead of winter. I have no idea where these huge fish were going, but they're gone now.

The spring salmon on the Dungeness, as I said, the first sign of spring. They're mostly gone. There was a good fishery off the mouth. We trolled spoons and plugs right around the river mouth and the point of the graveyard. And the water was from six to 20 feet deep. You don't have to imagine very much what a spring salmon did in that sort of an environment when you hooked him.

And the run into Dungeness was great. It was still very good even well into the '60s. And in the '40s as we were fishing summer steelhead and Dolly Vardens the bright spring salmon were actually a pest. They were the best biters of all the springs here, of all the salmon. And we would simply be run out of certain holes that collected them because we could not get our eggs through there and they would constantly bite.

We had the native stocks that came by here going to a thousand rivers and we knew the distinctive runs. We knew the large run that came to Freshwater in June—probably Skagit River, we never knew. But even as late as in the '50s, I remember one boat that weighed two fish over 60 pounds apiece out of that run. It came very fast, it went by very fast—very few fish under 35 pounds. And the earlier days at Pillar Point when the thing we called the snubnose, and some people called Frasers—our shortest thickest salmon, small, very bright, incredibly deep with little black heads—disappeared almost overnight but came in incredible abundance when every boat would limit before they'd really got off the tidal flats. Incredible runs. All these things were so recent and they disappeared so fast.

I remember Sekiu in days gone by, of the enormous dawn bite. And it would be absolutely beyond counting the number of rods bent in that fleet as the kings hit at daylight.

But it wasn't just confined to a few rivers. Every river had its run. I remember the Pysht and the cohos in the fall that came into the estuarine waiting for fall water. And we hunted deer in the mornings on the hills and then made a break for the log dump. And a long gaff hook was kept there just for the fishermen because it was about 15 feet down to the water. As we fished hardware, they rolled everywhere in the estuary, and then, after the first rains, up into the river.

I remember the cohos on the Quileute as they gathered and mixed with what we

called in those days the tar babies. The name was because they were quite mature and they moved in around 15 October and they were quite gray. And they exist in good numbers to this day—every year when I'm hunting elk in one place or another—on the Bogachiel, on the South Calawah, last year on the North Calawah, on the Coal Crick, on the East and West Dickey. I lay my rifle aside and I watch them in mid-November, still digging. It is a run that held, one of the few native runs that has held very well. It seems not too much exploited. Large fish and even individuals well into December in good shape.

I remember the Hoh and fishing the springs as soon as the snow water would allow. They were so much like the Elwha. They only knew one thing when you hooked them and that was to go back to the sea where they came from even if they were 20 miles up, which didn't do you too much good. And even today, or I should say even as recently as last fall, I go to the Hoh and to the South Hoh each year and I can still see those giant bucks in there. Some of them after they're dead I've measure them at 52, 54 inches. Enormous fish. I saw them last fall as I do every year as I'm fishing cutthroats. And that is what the wild fish should look like.

But there were beautiful wild fish much closer to home. There are so many that are gone and many of you people probably never knew them. Morse Creek, a little stream just east of town. Every boy in the '40s knew of the giant spring salmon in there. No explaining why. A little stream that is only to a limited extent snow-fed and blocked by a falls only about ten miles up entertained a race never too numerous of huge spring Chinook that entered in April and May. Every boy knew of them and where they spawned in the canyon in August as we fished summer steelhead. There were fish in there, an occasional fish even that came close to 60 pounds in that little stream. There may still be a few individuals left. The last I knew of was about six years ago.

And the cohos in Morse Creek. All our streams were good coho streams. Morse Creek was one of the very best. In the vicinity of Harlow's, from there to the canyon there were 3 and 400 to the hole and they gathered in October and November. And they were big cohos. There were a good many times as I played a steelhead down through them a giant buck would grab him crossways—as I've seen king salmon grab a trout stealing eggs—and shake him. They were huge. And dogs, as we called the chums in those days. They were never known by anything else.

And the Lyre. On the Straits the chum salmon was not in great abundance. It appeared at every river, but didn't seem to go very far, and mostly was a creature of the back sloughs and the lower tributaries. But the Lyre was a notable exception. It contained the greatest chum run on the Olympic Peninsula—I think. It was absolutely beyond belief. And this run in my days in the '40s when I first came to know the Lyre was unbelievable. It was known as the river you could not fish in December because each hole was absolutely full from top to bottom of

chums. Each eddy where there was a minor whirlpool was two to four inches deep in eggs. There were hundreds of gulls come up the river and they would fish it down from the eggs swirling in the current. Every steelhead had eggs welling up in its throat. The only winter steelhead that habitually that I knew of that fed. And the stink. But it was a lively river. And they were a strong race. The Lyre has our steepest gradient. It falls 600 feet in only seven miles. And they made it over many of the falls totally unlike the slow, calm water-loving chums of most of the other rivers. They were powerful and very large—many individuals of an honest 20 pounds.

And I remember the die off. If you've never seen a river—a live river—you've really missed something. Because it isn't a calm, gentle place. It's a mad house when the run is on. It's an absolute mad house. The salmon, the bucks fighting in the riffles, the trout moving in for eggs. The mergansers on the eggs. The thousands of sea gulls coming for their bounty. The raccoons. The otters. The bears we watched fish on every stream in the fall. The skunks that were an absolute menace on every river—that we had to look out for fishing late in the evening. They're all gone now, because the runs are gone. The run benefitted everything, and the river came to life only when the salmon were in.

But most of all I remember the steelheads. It's hard to put one above the other. The Sol Duc was always one of the greatest. And the memories of the great steelhead all up and down. Up into the park which are largely gone now. And the giant bucks that we lost and the few that we got at various places in the old holes on the river side on the Shuwah, at the Goodman, the water gage. Every fishermen knew these holes, and knew of the huge steelheads. Some of the finest on the whole peninsula.

We knew of the steelhead on the Bogachiel before any planting there. A race of great, deep fish, very bright, that moved through the muddy water. And we hiked up into the park while it was still muddy, and they were snow white up in there. And after not too many trips we didn't bring any more out, they were just too damn big and clumsy to carry. And I saw that great race decimated by the Bogachiel complex because of the demand for more fish, the pounds, the numbers, that most of us call for these days instead of the quality.

And the Hoh, counterpart to the Elwha. A great race of deep, bright fish, and thankfully which still exist to this day in good part. We fished them all. But the minor rivers all had steelhead. The Pysht: great runs of a short, thick small fish—very deep, very bright—came in incredible numbers. The people that fished at the head of the estuary, a party in those days would many times walk out with 20. And that was legal. And they came in vast numbers. And this was, remember in the great logging of the Pysht that ended in 1945, and the total destruction of the Pysht, majestic Deep Creek areas.

They still came. It took us to kill them off, finally. And the Pysht, while it is

healing very well now, the runs are almost nothing anymore. Particularly of the native. Though they still exist, the late run in March, which comes in the last part of February. And is still a good example of what did exist there.

I could go on, river by river, for a long time.

The Elwha was one of the greatest—I… It's very hard for me to convey to you how hard that river died. The still … 40 years, and 50 years after the dam … of the incredible numbers of its native runs … of the days steelheading there, and the great day as late as in the mid-50s when two of us beached and released 30 bright native steelheads. That's not a dead river at all. And the Elwha persists to this day. But it's growing very weak.

I think I would just like to take this last minute to talk of the Elwha. It was once the greatest river on the Olympic Peninsula. Its geography, its fertility dictated that. It had the greatest runs. It entertained in far greater numbers the pink than any river and it had the hardiest stocks because it most severely tested them, starting four miles above the mouth with a series of canyons, falls and cataracts beyond belief. But it also rewarded them with the most beautiful gravel which still remains in the upper river.

I would like to take just a minute to make a plea for the Elwha. It's on its last legs. It is still possible to save the part of the wild fish that are in there, and we are taking at the present time the most serious look that's ever been taken at passage over the dam, anadromy for the upper river. These fish have waited 70 years to go home. Is it time?[950]

Chapter 28 A Mother River

In 1979, Roger Contor became superintendent of Olympic National Park. He had worked for the National Park Service for 25 years, serving as the first Superintendent of North Cascades National Park from 1968 to 1970. With a background in wildlife biology and having handled difficult assignments such as the North Cascades, Contor was suited to

[950] Dick Goin, presentation to The Olympic Wild Fish Conference Proceedings, 1983 (cassette tape and digital recording, Philip R.S. Johnson).

wilderness park challenges.[951] While superintendent of Rocky Mountain National Park, in 1976 he had presided over the park's final master plan that called for the minimization and control of human impacts in the park.[952] At Olympic, Contor would put into motion plans to turn the park into a regional management force dedicated to preserving wild ecosystems. He placed a special emphasis on the park's anadromous fisheries by developing programs to coordinate with other agencies and organizations, and by gaining representation in study groups and coordinating bodies. Within a short time there was no confusion about Olympic National Park's natural resource management priorities.

Contor's first internal action was to move research and planning functions from the Ranger Division to a newly created Division of Science and Technology.[953] He ordered the division to make the park "proactive" in fisheries management among tribal, state and federal entities. But as John Aho, the division's first chief, recalled, the groups were reluctant to make room for a newcomer.[954] Undaunted, Contor moved ahead. He laid the groundwork for what would become a bold river use management plan. In its deference to natural preservation, park policy would have obvious implications for the salmon that used park waters and for any group or agency that shared these waters downstream. "We are learning that the life process of an anadromous fish is sensitive and can be upset through not understanding the process," the report explained. It made the

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[951] David Louter, *Contested Terrain: North Cascades National Park Service Complex, Washington. An Administrative History* (Seattle, WA: National Park Service, 1998). http://www.nps.gov/history/history/online_books/noca/adhi/index.htm [viewed January 29, 2012].

[952] U.S. Department of the Interior, National Park Service, *Final Master Plan, Rocky Mountain National Park / Colorado*, January 1976. http://www.nps.gov/romo/parkmgmt/upload/final_master_plan.pdf [viewed January 29, 2012].

[953] Fringer, G., 1990, pp. 111, 123, 135.

[954] John Aho, personal communication, unrecorded, February 1, 1994; May 6, 1994.

case that the reproductive process of salmon was the most important to understand and protect. And that the requirements of salmon "must occur" as "each individual fish commands."[955]

Contor also advanced an external agenda. In a letter to Department of Fisheries Director Rolland A. Schmitten, the Olympic superintendent outlined several of the park's concerns and intentions. He called for better communication and closer management coordination with the department, requested it publish the park's salmon fishing regulations in annual salmon and shellfish regulations, and asked for more enforcement of department rivers. "We are becoming more involved with fishery management inside the park and on the rivers which flow from the park," Contor wrote. He demanded an automatic exchange of scientific and management data. He declared the park's preference for preservation of native fish stocks and "the original diversity and abundance of all aquatic organisms which occurred in park waters before alteration of conditions by modern man."[956]

At the regional level, Contor likewise drove home Olympic's policies and standing. "A sculpin is just as valuable in our view of the ecosystem as is a 40-pound king salmon," he explained to the Pacific Fishery Management Council, state fish and game departments, and the Fish and Wildlife Service in one of the more direct turnarounds in the history of public fisheries management:

> We do permit sport fishery where it does not conflict with preservation of the stock. But our management is equally concerned with fish viewing by visitors, or the use of fish as food for native predators, and preservation of obscure native

[955] Olympic National Park, *Olympic National Park Resources Management Plan and Environmental Assessment* (U.S. Department of the Interior, National Park Service, 1983), Appendix E.

[956] Contor to Schmitten, February 17, 1981 (Fisheries File, Olympic National Park, Port Angeles, WA).

> stocks for possible unknown future scientific purposes…. [T]o us anadromous fish have many more values besides being used for producing progeny for food or sport. Ideally we would like to see the rivers as crowded with surplus anadromous fish as they were a century ago, so that the natural selection processes which shaped the fish into what they are could continue uninterrupted. What would be viewed as waste by other interests would be viewed by us as food for other creatures and nutrients to the river and ocean systems.[957]

Contor's boldest plan was to declare the Elwha a "mother river" upon which the park would focus its efforts to restore anadromy. Olympic would establish certain rivers as "outdoor laboratories" in which scientists could research anadromous species toward Olympic's management objective of representing fish "in their normal abundance, size, and original genetic makeup." The park's rivers were "as close to being wild and natural as any river systems in the lower 48 states," Contor reasoned, and therefore would prove ideal for study. The debilitated condition of many rivers across the country was fast reducing wild fisheries. Olympic's hope was to establish a few of its rivers as "gene banks."[958]

The idea to preserve watersheds as a sanctuary for fisheries was not novel. In 1895, while assisting the federal fisheries commission, Commander J.J. Brice called on the government to declare certain intact watersheds as salmon preserves. The military could be charged to protect salmon rivers such as the Klamath, allowing them to function as a "great national nursery." Livingston Stone had gone even further a few years earlier, in 1892, telling the American Fisheries Society the country should establish a salmon national park. Otherwise, he predicted, the fish would share a similar fate with the

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[957] Contor to Greenley, September 1, 1982 (John Meyer File, Olympic National Park, Port Angeles, WA).

[958] Contor to Greenley, September 1, 1982; U.S. Department of Interior, *1983 Annual Science Report* (National Park Service, Pacific Northwest Region, 1983) (John Meyer File, Olympic National Park, Port Angeles, WA); John Aho, personal communication, unrecorded, February 1, 1994.

buffalo, whose remains were preserved in Yellowstone. "If we procrastinate and put off our rescuing mission too long," Stone warned, "it may be too late to do any good. After the rivers are ruined and the salmon are gone they can not be reclaimed."[959]

Nearly a century later, with the majority of its watershed situated within park boundaries, the Elwha was to be the keystone river in Olympic's effort to defend wild salmon. In 1983 Olympic announced its intention to protect and restore the peninsula's wild fisheries at a conference cosponsored with Peninsula College, in Port Angeles. It was an unprecedented event. Public, academic, tribal, state, federal and Canadian fisheries experts and resource managers convened to discuss wild fish. The symposium provided a forum for research findings, management strategies and agency philosophies. It promoted the exchange of ideas and critical discussion. "To characterize management of wild fish stocks as controversial would be a considerable understatement, especially on Washington's Olympic Peninsula," park scientists explained. "However, one thing upon which we agree is that these valuable resources have been taken for granted for too long, and through neglect have been, in some cases, managed and mismanaged almost to extinction."[960]

Most of the conference presentations affirmed and reinforced tenets of Olympic's fisheries management that the park had developed and advocated since 1980. Contor and Olympic wildlife biologist Doug Houston co-authored a paper addressing the park's

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[959] Brice, J.J., "Establishment of stations for the propagation of salmon on the Pacific coast," *Report of Commissioner of Fish and Fisheries for the Year Ending June 30, 1893* (1895), p. 391; Cited in *Bulletin of the United States Fish Commission, Volume XII, 1892* (1894), pp. 15, 19, 19; Spangler, A.M., in *Bulletin of the United States Fish Commission, Volume 13, for 1893*, 1894, p. 30.

[960] Walton, J.M. and Houston, D.B. editors, *Proceedings of the Olympic Wild Fish Conference, March 23-25, 1983* (Port Angeles, WA: Fisheries Technology Program, Peninsula College and Olympic National Park, 1984), p. iii.

concern over commercial and sport fisheries harvest outside park boundaries, recreational fishing permitted in park waters, and management by other federal and state agencies and several Indian tribes. They described the situation as "a morass of conflicting biological, legal, economic, and social issues" that ultimately impacted Olympic's fishery. "The loss of anadromous fish from the Elwha represents a major change in the fauna of one of the most important park rivers," they wrote, declaring that Olympic would explore the possibility of restoring anadromous fish to the upper river.[961]

In 1983, a National Park Service program devoted to funding significant resource problems ranked anadromous fish runs in Olympic as its number two priority in the nation. It provided nearly $450,000 to study the Elwha. The park's first fisheries biologist, Don Cole, led the way with experiments to reintroduce summer-run steelhead and juvenile coho salmon above Lake Mills. "For the first time in probably 72 years, adult steelhead trout are swimming in the clear, rushing waters above the dams on the Elwha river," the *Seattle Post-Intelligencer* reported in September. Park scientists continued further studies in conjunction with the Fish and Wildlife Service and Lower Elwha Klallam Tribe.[962]

Dick Goin had first shown Contor the Elwha River. It became a tradition in decades to follow. New superintendents would walk the Elwha with him. If there had been a winning strategy to promote the Elwha restoration, it was Contor's invitation to Goin to speak at the wild fisheries conference. He identified the Elwha as a river to

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[961] Houston, D.B. and Contor, R.J., "Anadromous fish in Olympic National Park: status and management considerations," in *Proceedings of the Olympic Wild Fish Conference, March 23-25, 1983*, 1984, pp. 104, 97, 107.

[962] *The Daily News*, August 3, 1983; *Seattle Post-Intelligencer*, September 7, 1983; *The Daily News*, January 5, 1984; *Seattle Post-Intelligencer*, May 1985; May 14, 1986.

restore, as a river of value. “Dick has been a driving force,” Contor introduced in tribute. “He’s one of three or four people who kicked the park in the fanny and said, ‘Why don’t you start considering the fishery as part of the park?’ And we did.”[963]

Even though mostly scientists attended the three-day conference, Goin’s plea for the fish was forceful in large part because it bridged two separate worlds that many had assumed were solidly connected. Technical jargon and data reports, for all their applied value, were little match for the wisdom of a man who understood the interaction of environment and humans not from classrooms and experiments. His guides had been nature itself from over a half century of river-walking. Contor understood this. He told the conference that Goin was “a master of master fishermen and probably the keenest observer I’ve ever met in my life.” As John Aho remembered years later, “Dick’s speech was memorable. He touched people’s values.”[964]

Olympic National Park’s determination to restore the Elwha came at an uncertain time for the river. A strange thing was happening. Nearly a decade earlier, in 1968, the Federal Power Commission’s attempt to clear up a 50-year-old regulatory oversight likely triggered the reconsideration of the river’s future. The Commission had requested lower Elwha Dam owner Crown Zellerbach to submit a license application to operate the dam. The builder of the first Elwha Dam, the Olympic Power Company, had never obtained approval for its construction plans from the Corps of Engineers as required under the Rivers and Harbors Act of 1899. Created by the 1920 Federal Water Power

[963] Roger Contor, The Olympic Wild Fish Conference Proceedings, Port Angeles, WA, 1983 (cassette tape and digital recording, Philip R.S. Johnson).

[964] Roger Contor, The Olympic Wild Fish Conference Proceedings, Port Angeles, WA, 1983 (cassette tape and digital recording, Philip R.S. Johnson); John Aho, personal communication, unrecorded, February 1, 1994.

Act, the Commission had the authority to grant 50-year licenses to dams operating on navigable streams. Because the Commission considered the Elwha River a navigable stream, it believed the Elwha Dam had been operating without federal permission since 1913.[965]

The fate of the Elwha River dams was now in the hands of federal agencies because the Federal Power Commission's organic act required that the judgments of the Departments of Interior and Agriculture should be weighed for projects located within those federal areas. The Commission also had to find that proposed projects included a consideration of other beneficial public uses beyond water power development, including recreational purposes. Together, these provisions provided a variety of government and public actors a means to evaluate the Elwha dams. Whoever valued the Elwha River would have a chance to explain why.[966]

Crown Zellerbach saw no reason to change the status quo. The Elwha dams were economically valuable to the mill because they supplied electricity at a cost well below industrial market prices. The company argued that not only was the dam legal, but also in conformity with environmental standards. The dam had been constructed "in accordance with all laws then in existence." Moreover, there was "very little evidence of the effect of

[965] Acting U. S. Comptroller General to Dingell, February 16, 1990, p. 10 (Elwha File, Olympic National Park, Port Angeles, WA). The Federal Power Commission, renamed Federal Energy Regulatory Commission or FERC in 1977. In 1978, the commission would also issue notice of a relicensing application for the Glines Canyon project, expired in 1976.

[966] Additional amendments to the act in 1986 would offer more leverage for critiquing the dams through intervention status during FERC reviews. The amendments required the Commission "to give equal consideration to the purposes of energy conservation, the protection, mitigation of damage to, and enhancement of, fish and wildlife (including related spawning grounds and habitat), the protection of recreational opportunities, and the preservation of other aspects of environmental quality." As such, the Commission's call for a license and relicensing application from Crown Zellerbach Corporation for the Elwha dams would trigger a revisiting of the purpose and objective of hydroelectric power production on the river. See: Bean, M.J. and Rowland, M.J., 1997.

the dam's construction on fish and wildlife in and around the Elwha." As far as the owners of the dam were concerned, the passage of time had "stabilized" the river's biota, leaving it "in balance." The Commission nonetheless recommended the company ascertain the opinion of state and federal fisheries agencies. New opportunities to revisit old grievances were stirring. As each year passed, the line of affected parties lengthened.[967]

The Washington Department of Fisheries found itself at the front of the line. It had wanted a new Elwha hatchery ever since undertaking experimental studies at the dams in the 1950s. And it had wanted Zellerbach to help pay for the facility. Unsuccessful, the department had tried again in early 1960s, asking the company to build rearing ponds on the lower river as part of its "Marine Farming Program." At this time, fish culture had was enjoying a renaissance. The invention of the Oregon moist pellet to feed young fish had helped to increase the survival rates of young hatchery fish. The department envisioned a network of massive "fish farms" across the state that used control gates and holding pens to contain huge volumes of water and corral artificial plantings. On the Olympic Peninsula, the state proposed facilities at Dickey Lake and Neah, Dungeness and Sequim Bays. But the plan never proceeded. Hatchery production continued to rely on remote facilities.[968]

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[967] Crown Zellerbach Corporation Amended Application for License, FERC Elwha Power Plant, Project No. 2683, Elwha, Washington, "Exhibit S," 1979 (Elwha File, Olympic National Park, Port Angeles, WA).

[968] Milo Moore to A. Lars Nelson, August 13, 1959 ("Elwha River, 1954-1959" file. Washington State Archives, Olympia, WA); Lichatowich, J.A. and McIntyre, J.D., 1987; Larkin, P.A., 1979, p. 104; McHugh, J.L., in *A Century of Fisheries in North America*, 1970, pp. 43, 46; Netboy, A., 1973, p. 336; Milo Moore, James F. Wilson, Glen A. Davison, *Comprehensive Development Program of Natural Salmon Rearing Areas*, Conducted under contract for the Washington State Department of Fisheries, 1964? (Suzzallo & Allen Libraries, University of Washington Libraries, Seattle, WA), pp. 20-21, 30-31, 42-45, 58; *Port Angeles Evening News*, February 5, 1963; James River II, Inc., *Response to August 15, 1987 Request for Additional Information, Volume 2* (Hosey & Associates, May 27, 1988), p. VII-4.

The Department of Fisheries now suggested that Crown Zellerbach finance a habitat survey, fish passage analysis and investigation into flow regimes at the Elwha dam. After the studies, the state proposed hatchery production on the lower river for spring and summer chinook.[969] Zellerbach conceded, agreeing to contribute $145,140 toward construction of a salmon rearing facility and 23.6 percent of its annual operating costs. The company also committed to improving flow regulations at the lower dam. The fisheries department, in turn, agreed not to intervene to oppose the company's application procedures with the Commission.[970] The new rearing channel started operations in 1976. The department was satisfied.[971]

Although the Elwha dams were within the jurisdiction of state agencies, their environmental impact was felt throughout the entire river basin that lay mostly within Olympic National Park. For centuries ten runs of native anadromous salmon and trout had used the basin for spawning and rearing. The completion of the Elwha Dam had prevented migrating salmon and trout from using 70 miles of mainstem and tributary habitat, or 93 percent of the watershed. The Glines hydroelectric facility also fell inside

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[969] Thor C. Tollefson to Jack D. White, July 31, 1969 (Elwha File, Olympic National Park, Port Angeles, WA); Washington (State) Department of Fisheries, Elwha River Mitigative Fish Facilities, June 30, 1969, p. 16; Washington (State) Department of Fisheries, *Elwha River Fisheries Studies* (Department of Fisheries Management and Research Division, November 1971), pp. 13-14; Washington (State) Department of Fisheries, *Proposal for the Restoration of Elwha River Salmon Runs* (February 7, 1972), pp. 1-5.

[970] McVicker, Jr. to Nadig, June 2, 1972; McVicker, Jr. to Company File, July 5, 1972; Crown Zellerbach to Moos, April 21, 1975 (Dick Goin, personal files, Port Angeles, WA). The Washington State Department of Game attempted to seek compensation for the loss of game fish and game animals, demanding Zellerbach build a steelhead rearing facility and provide nearly 800 acres of land somewhere other than the Elwha River. Negotiations ceased and the department later waged an unsuccessful lawsuit. McVicker, Jr. to Company Files, July 5, 1972 (Dick Goin, personal files, Port Angeles, WA); Washington State Department of Game, *Preliminary Analysis of Game Fish and Wildlife Resources of Elwha River Drainage Affected by Elwha and Glines Dams and Preliminary Proposals for Compensation of Project Related Losses* (1973), pp. 1-2, 8, 14-15.

[971] James River II, Inc., *Response to August 15, 1987 Request for Additional Information, Volume 2* (Hosey & Associates, May 27, 1988), p VII-4.

the border of the park.[972]

Hence, in 1978 when the Commission issued notice of a relicensing application for the Glines Canyon dam project that had expired in 1976, the Department of Interior raised concerns. But Zellerbach's justification for license renewal at Glines was simple: longevity. "The dam and reservoir have become an integral part of the environment and contribute, and will continue to contribute, beneficially in a number of ways to the environment of the community," the company argued. Moreover, its application claimed that the hydropower project had "very little direct or indirect detrimental effect on the ecology of the land, air and water environment" while instead providing "enhancement to the aquatic wildlife and recreational resources in the area."[973]

In response, Interior noted that both projects had significant natural resource implications that affected park management agendas. More than 90 percent of the Glines project lay within Olympic's boundaries. The lower Elwha Dam blocked anadromy to park waters that encompassed 84 percent of the Elwha watershed. Interior argued that historic impacts and losses had not been accounted for even though Zellerbach benefited from the electricity. The dams had "decimated" the river's fish populations.[974]

Interior also believed that hatchery mitigation by the state was insufficient compensation. The National Park Service had moved in an opposite direction from state and other agencies that managed fisheries resources solely for sport or commercial

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[972] National Park Service, 2005.

[973] Crown Zellerbach Corporation Amended Application for License, FERC Elwha Power Plant, Project No. 2683, Elwha, Washington, "Exhibit W," 1979 (Elwha File, Olympic National Park, Port Angeles, WA).

[974] Olympic National Park, *Wilderness Recommendation, Olympic National Park, Washington, April 1974* (U.S. Department of the Interior, National Park Service, 1974); Assistant Secretary to Lindsay, September 19, 1980 (Elwha File, Olympic National Park, Port Angeles, WA) (quote).

fishing. Contor reinforced this view in a letter to the National Park Service's regional solicitor. "Ecologically, the upper Elwha is now a hollow shell of a formerly productive natural system," he stated. The absence of salmon and trout in the upper Elwha had deprived its ecosystem of nutrients required by terrestrial species. State efforts to rebuild "just commercially important species" missed the larger implications of full ecosystem restoration.[975]

As parent agency of the Bureau of Indian Affairs, Interior found the Elwha dams problematic for additional reasons. In 1976, when the Commission had issued public notice of the Elwha power project's license application, the Lower Elwha Klallam Tribe and Interior filed motions to intervene, thereby becoming official participants in the process in 1986 and 1976, respectively. The dams interfered with treaty fishing rights by blocking anadromous fish runs, adversely affecting water quality and partially or completely destroying spawning grounds. The lower dam also presented a possible safety issue, resulting in the Tribe's inability to receive federal housing assistance until a levee was built.[976]

By 1976, the Elwha Indians had reclaimed their standing as a fishing community in the eyes of the state and federal government. It had not been an easy process. Organized as the Lower Elwha Tribal Community in 1968, the Elwha Natives were

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[975] Contor to Regional Director, August 20, 1980 (Elwha File, Olympic National Park, Port Angeles, WA); Contor to Regional Solicitor, Pacific Northwest Region, March 31, 1981 (Dick Goin, personal files, Port Angeles, WA).

[976] National Park Service, "Timeline of the Elwha 1940 to 1992." http://www.nps.gov/olym/historyculture/timeline-of-the-elwha-1940-to-1992.htm [viewed January 31, 2012]; Federal Power Commission, Notice For Application for Major License for Constructed Project, January 16, 1976 (Elwha File, "FERC No. 2683 Correspondence 1968-1984." Olympic National Park, Port Angeles, WA); Federal Power Commission, Initial Decision Finding Licensing Jurisdiction Over Elwha Dam, December 11, 1978 (Elwha File, Olympic National Park, Port Angeles, WA).

situated on lands along the eastern lower river purchased by the government in 1934. They had waited over 30 years for reservation status. In 1974, Elwha Klallam fishing treaty rights had also been reconfirmed in a court case, *United States v. Washington*. This event represented the culmination of over 100 years of effort among Native groups of the Pacific Northwest who had signed treaties in the mid-1800s, only to see their rights eroded or denied.[977]

Events on the Columbia had helped to trigger the affirmation of the nineteenth century treaties. The loss of Celilo Falls traditional fishing grounds to the Dalles Dam in 1957, coupled with the physical and legal confrontations between state authorities and fishing tribes led to a series of legal actions. Courts would have to interpret the nature of government treaty contract and obligations. They ruled on the complex intricacies of allocating a resource whose fundamental existence had changed substantially over the intervening years. As one treaty scholar remarked, the government had to determine "how an old treaty, statute, or court decision should be applied in times bearing little resemblance to the era in which the words of law were originally written."[978]

In 1973, 14 tribes represented by Justice and Interior Department attorneys faced off against Washington State conservation agencies and an assortment of commercial and recreational fisheries interest groups.[979] A federal district court reaffirmed the treaties,

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[977] Cohen, F.G., 1986, pp. 3-4; James River II, Inc., *Response to August 15, 1987 Request for Additional Information, Volume 2* (Hosey & Associates, May 27, 1988), p VII-4; Fishing Rights of the Lower Elwha Tribe, May 26, 1976 ("Klallam Administration Correspondence, 1974-1976" file. Washington State Archives, Olympia, WA); The Lower Elwha Tribal Community Development Block Grant Program, Preapplication Narrative Statement, 1976 ("Klallam Administration Correspondence, 1974-1976" file. Washington State Archives, Olympia, WA).

[978] Cohen, F.G., 1986, p. 70; Lane and Lane Associates, 1981, pp. 99-100; Charles F. Wilkinson, *American Indians, Time, and the Law* (New Haven, CT: Yale University Press, 1987), p. 4.

[979] Cohen, F.G., 1986, pp. 6-7.

interpreting the right of Indians to take fish "in common with" non-Indian citizens to mean "sharing equally." The treaty tribes were thus entitled to an opportunity to catch 50 percent of the harvestable fish that were destined to pass through their usual and accustomed fishing grounds and stations. The court also ruled that tribes were entitled to regulate and manage their share of the fishery. This lead to the increasing participation of tribal fisheries biologists and technicians in both fisheries resource management and the construction of tribal hatcheries.[980] In 1976, the Bureau of Indian Affairs financed the construction of the Lower Elwha Fish Hatchery. The Lower Elwha Klallam Tribe now owned and operated the facility to rear chum, coho, steelhead and chinook salmon.[981]

The 1980s saw a series of events unfold as more individuals and groups weighed in on why the Elwha was a valuable river. Writer Bruce Brown published *Mountain in the Clouds, A Search for the Wild Salmon* in 1982, that included an homage to the Elwha River. In 1986, the Lower Elwha Klallam Tribe, the U.S. National Marine Fisheries Service, Seattle Audubon Society, Friends of the Earth, Olympic Park Associates and the Sierra Club were granted intervenor status. The Tribe and its allied conservation groups were among the first to envision and call for dam removal and ecosystem restoration.[982] Other groups would likewise pressure the National Park Service to declare that the dams should be removed. During summer 1987, for example, Earth First! visited Port Angeles

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[980] Cohen, F.G., 1986, pp. 11-13, 163-164, 168-169.

[981] Fishing Rights of the Lower Elwha Tribe, May 26, 1976 ("Klallam Administration Correspondence, 1974-1976" file. Washington State Archives, Olympia, WA); The Lower Elwha Tribal Community Development Block Grant Program, Preapplication Narrative Statement, 1976 ("Klallam Administration Correspondence, 1974-1976" file. Washington State Archives, Olympia, WA).

[982] Brown, B., 1982, pp. 61-108; Wilkinson, C., "The Olympic Peninsula's Elwha River. Prisoner of history, harbinger of hope," in Mary Peck, *Away Out Over Everything* (Stanford, CA: Stanford University Press, 2004), p. 76; See generally: Jeff Crane, *Finding the River. An Environmental History of the Elwha* (Corvallis, OR: Oregon State University Press, 2011), pp. 133-167; McNulty, T., 2009, pp. 146-148.

to paint a crack on the face of Glines Dam and to raffle tickets to "blow up" the dam with a mock dynamite plunger. Some conservation groups suggested the new owners of the pulp mill and dam, Daishowa and James River, refit the mill with energy-saving devices and negotiate a deal to purchase discount power from the Bonneville Power Administration. This removed the need for having dams on the Elwha River while allowing the company to continue operating in Port Angeles. "We don't need the Elwha River dams to maintain jobs at the Daishowa America mill, to keep the lights on in Port Angeles or the Northwest, or to protect the river from a man-made wall of mud," a member of one group declared.[983]

Acrimony set in as opposing groups made their case for the future of the Elwha. Jurisdictional entanglement developed as federal agencies vied for control of the process. Since 1986, the Department of Interior had asserted that the Commission lacked jurisdiction to license dams within national parks. In February 1990, the General Accounting Office, an investigative arm of Congress, concurred. It concluded that the Commission had neither the authority to issue a new license for the Glines Canyon project nor the power to issue the dam annual licenses, as it had done since 1976 during the pending application process. Prior to this ruling, in 1980, Interior had proposed that Zellerbach investigate new fish passage technologies and consider razing both structures and building a new, larger dam downstream should the dams prove structurally unsafe.[984] But within months of the accounting office's decision, the Park Service, Fish and

[983] *Peninsula Daily News*, June 29, 1987; August 11, 1987; September 3, 1987; February 16, 1988; *The Seattle Times*, July 16, 1988; *Peninsula Daily News*, April 4, 1991; See generally: Crane, J., 2011, pp. 133-167.

[984] Assistant Secretary to Lindsay, September 19, 1980 (Elwha File, Olympic National Park, Port Angeles, WA).

Wildlife Service and Bureau of Indian Affairs changed course under a unified Interior call for the restoration of all anadromous fish stocks on the Elwha River. They argued that seven years of cooperative research conducted with the Lower Elwha Klallam Tribe and National Marine Fisheries Service of the U.S. Department of Commerce had demonstrated that full restoration could occur by dismantling the dams.[985]

Olympic National Park was now on the offensive. Superintendent Maureen Finnerty compared Olympic's giant wild chinook to the wild buffalo of Yellowstone and firmly voiced the park's belief that the Elwha dams had to go. They had killed the watershed's salmon and damaged its web of life. "And for what," she asked in the *New York Times*, "—a dam that provides a small amount of power for a pulp mill."[986] Editorials in the Seattle press took up the cause. "The two aging dams don't belong in such a pristine setting," the *Seattle Times* wrote. "Their ultimate removal shouldn't be a question of if—but of how and when."[987] The following year both the Commission's draft environmental impact statement and the General Accounting Office concluded that dam removal would provide the best chance of ecosystem and fisheries restoration.[988]

While there was growing agreement about how best to restore the Elwha River, confusion deepened over the process that determined the fate of the dams. By 1992 ten

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[985] U.S. Department of Interior, National Park Service, *News Release*, June 15, 1990, "National Park Service Calls For Restoration of all Native Fish Species to The Elwha River."

[986] U.S. Department of Interior, National Park Service, *News Release*, June 15, 1990, "National Park Service Calls For Restoration of all Native Fish Species to The Elwha River"; *The New York Times*, July 15, 1990.

[987] *The Seattle Times*, April 25, 1990.

[988] National Park Service, "Timeline of the Elwha 1940 to 1992." http://www.nps.gov/olym/historyculture/timeline-of-the-elwha-1940-to-1992.htm [viewed January 31, 2012].

additional conservation organizations had filed motions for intervention, as well as ITT Rayonier and the City of Port Angeles. The Department of Justice on behalf of Interior and Commerce filed Petitions for Review with the U.S. Ninth Circuit Court of Appeals for court review of Commission orders exerting licensing jurisdiction. The Department of Energy also joined the fray to support the Commission, recommending dismissal of the petition filed with Ninth Circuit. The accounting office concluded that who should pay for dam removal was undecided, although the dam owner could be required to bear the cost if the dams were unlicensed.[989]

The concerns of Washington Representative Al Swift seemed to be coming true. In 1990, he had predicted a long legal battle if opposing parties did not pursue a negotiated settlement. Acting as an early go-between for both sides, Swift had proposed Congress authorize an independent study to determine a course of action for the Elwha. "You could have a real legal circus going on while the fish are gasping, and lose power to Daishowa as well," he had warned.[990] The interminable process especially bothered Dick Goin. "They're all fiddling while Rome burns," he told the *High Country News* in 1991, indicting both agencies and environmentalists. "People don't realize we're losing something that took 15,000 years to evolve."[991]

Most likely to avoid a pending clash among federal, state, tribal, industrial and conservation interests, President George H.W. Bush signed the Elwha River Ecosystem

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[989] National Park Service, "Timeline of the Elwha 1940 to 1992." http://www.nps.gov/olym/historyculture/timeline-of-the-elwha-1940-to-1992.htm [viewed January 31, 2012].

[990] *Seattle Post-Intelligencer*, June 19, 1990; *The Daily World Aberdeen*, June 20, 1990.

[991] *High Country News*, April 22, 1991.

and Fisheries Restoration Act as Public Law 102-495 in October 1992. The Act stayed the Commission's licensing process and authorized the Secretary of the Interior to acquire the Elwha power projects and remove the dams if he determined that their removal was necessary to meet the goal of full restoration of the river's ecosystem and native anadromous fisheries. Once Interior completed a report substantiating that dam removal was necessary, then acquisition of the projects would hinge on whether Congress chose to appropriate necessary funds.[992]

Private interests against dam removal were mostly supportive of the public law. The mill and dam owners seemed receptive to having the government arrange for a power subsidy from Bonneville and buy the dams. This guaranteed the mills continued cheap electricity, removed the owners from safety liability should the lower dam fail and eliminated the potential need to pay for dam removal costs and fisheries mitigation. Daishowa's $70 million plant modernization, $40 million recycling plant and 320 employees earning $16 million in salaries, wages and benefits all seemed to have a future. At the same time, Interior Secretary Bruce Babbitt favored the idea of becoming the department's first chief to dismantle rather than construct a hydroelectric dam.[993]

First unfavorable to the idea of restoring the Elwha River, the City of Port Angeles had managed to include water quality provisions in the legislation. It mandated that water of no less volume and quality continue to be made available to the two mills, Port Angeles and the Dry Creek Water Association, which provided water to nearby residents. Community and county development leaders, as well as forest products

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[992] *Elwha River Ecosystem and Fisheries Restoration Act,* Public Law 102-495, 1992 (106 Stat. 3173); Olympic National Park, 1994, p. xii.

[993] *Seattle Post-Intelligencer,* April 28, 1993.

companies had earlier consolidated against proposals to remove the dams. They believed the restoration could undermine the city's interests and need to build a new water treatment plant. When a *Seattle Post-Intelligencer* editorial had called the plan to supply Daishowa with Columbia power and restore the river "a true win-win situation" Port Angeles Mayor Joan Sargent told the paper it had failed to mention "the city's concerns for the 20,000 people who receive their drinking water from the Elwha River or the two mills that receive their industrial water supply from the Elwha."[994]

In 1994, the Department of Interior published and sent its *Elwha Report* to Congress. The Secretary concluded that implementing dam removal would return the Elwha River and its ecosystem to a natural, self-regulating state. It also supported the Lower Elwha Klallam Tribe's cultural, spiritual and economic ways of life. Federal trust responsibility to treaty rights of the Elwha Klallam and three other tribes were upheld. Increased recreation, tourism and sport fishing were expected after fish restoration. Dam removal would also eliminate the hazard potential existing for downstream residents in the event of a major earthquake. The Daishowa mill received replacement power from the Bonneville Power Administration and water quality for the City of Port Angeles and other industrial users was assured.[995] The following year, Interior finalized a programmatic Environmental Impact Statement and formally decided to remove the dams, contingent upon Congressional funding.[996]

It seemed like the collective hopes of many visionaries finally were realized on

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[994] *Peninsula Daily News*, August 16, 1990; September 14, 1990; March 20, 1991; April 19, 1991; October 7, 1992; *Seattle Post-Intelligencer*, April 10, 1991; April 22, 1991.

[995] Olympic National Park, 1994.

[996] National Park Service, 1995.

the Elwha River. "The new way of seeing and imagining rivers, and restoring them, has taken hold on the Elwha," Charles Wilkinson, a scholar in Indian and public lands law, later reflected.[997] On the Elwha, society had figured out how to incorporate a range of values into its collective decision-making processes. It had put forward a new survival plan for the river and its region. For those who had long been excluded, who had been forced to endure or perish, the new way forward for the Elwha was paramount. "We are salmon people," Lower Elwha Klallam Tribe chairman Dennis Sullivan explained. "You take away the salmon, which has happened since the dams…. and you are removing part of our culture, our way of living, our survival."[998]

So too would others draw value from the Elwha River. For the flora and fauna within Olympic National Park, a restored ecosystem renewed life. The power projects had blocked fish to at least 70 miles of habitat, of which five miles were inundated by reservoirs. This had prevented the deposition of fish carcasses that had supported the food web of more than 22 species of birds and mammals.[999] And for those who had come to the Elwha in times of need, returning fish runs might once more provide a local source of food. As Dick Goin explained in 1994, his drive to defend the Elwha came from his debt to it accrued during the Great Depression when his family fed on the river's salmon. "The way I see it, the salmon helped me. Now I'm helping the salmon."[1000]

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[997] Wilkinson, C., in *Away Out Over Everything*, 2004, p. 76.

[998] Wilkinson, C., in *Away Out Over Everything*, 2004, p. 72.

[999] U.S. Department of Interior, National Park Service, *News Release*, June 15, 1990, "National Park Service Calls For Restoration of all Native Fish Species to The Elwha River." See also: National Park Service, 2005.

[1000] *Chicago Tribune*, February 28, 1994; The phrase "Elwha: Value of a River" was suggested as a title for this project by H. Paul Friesema, Professor Emeritus, Department of Political Science, Northwestern University, Evanston, IL.

Chapter 29 Requiem

By the 1990s, the Elwha River offered hope for rebirth and revival in a region experiencing loss and despair. But for the most part there was widespread lament on the north Olympic Peninsula and in the Pacific Northwest as the cumulative effects of decades of intensive resource use had taken their toll. Traditional resource economies would break down. Social and cultural disorientation followed. It was a decade of reckoning.

Things started poorly in 1991 when a journal of the American Fisheries Society published "Pacific Salmon at the Crossroads." The scientific investigation had found the region's fisheries were in devastating condition. Of the nearly 400 salmon, steelhead and sea-run cutthroat trout stocks known to have existed, about 25 percent were extinct. Another 214 were at risk of extinction. The authors further noted that the study was not inclusive—the damages could be even worse. The entire list had not been tallied and the record of extinctions predating modern inventories of salmon populations was unknown. On the Columbia River, about 95 percent of the historic natural production had been lost and population counts at some dams were the lowest observed in recorded history.[1001]

Anger and bewilderment followed within the fisheries profession and more broadly across society. There had been the expectation that the region's regulatory apparatus had been doing a better job of minimizing the risk of a resource collapse. The Northwest Power Act, passed by Congress in 1980, had put anadromous fish recovery on equal footing with power generation. The act created the Northwest Power Planning

[1001] Nehlsen, W., Williams, J.E., Lichatowich, J.A., "Pacific Salmon at the crossroads: stocks at risk from California, Oregon, Idaho, and Washington," *Fisheries* 16,2(1991):5-21; Lichatowich, J., Nehlsen, W., Williams, J., "Pacific salmon: resource at risk," *Current* 12(2)1993:26-28; *Peninsula Daily News*, June 7, 1991.

Council to formulate a Columbia River Basin Fish and Wildlife Plan, which in 1982 contained more than 220 fish mitigation measures. The council had looked to hatcheries and trucking or barging juvenile fish around dams as two key methods to double the river's salmon runs. It spent over $1 billion during the next decade to implement the plan.[1002]

But among experts debate had continued over the use of artificial propagation as a management response. Throughout the 1970s new problems with the technology had emerged, dampening enthusiasm that had prevailed in the previous decade. A few biologists had begun to call for a scientific distinction between wild and hatchery fish. They criticized dominant fisheries management principles that had adhered to the philosophy of "maximum sustained yield." This regime allowed the largest average catch that could be taken continuously from a stock under existing environmental conditions. It relied on hatchery supplementations to boost harvest levels. Reminiscent of the canneries glory days on the Sacramento and Columbia Rivers, the belief was that the more fish artificially produced, the more fish were available to catch.[1003]

Scientists now worried that hatcheries were aiding the demise of the wild fisheries in a number of ways, including overharvest, increased habitat competition and genetic dilution and manipulation. Hatchery fish mixed with wild fish had led to increases in overall harvest rates that led to high loss of wild stocks. Large hatchery plantings

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[1002] Radigan, K., "Dam it all," *Trout* (Summer 1991), pp. 14-15.

[1003] Lichatowich, J.A. and McIntyre, J.D., 1987; Larkin, P.A., 1979, pp. 104-106; Larkin, P.A., 1974, pp. 1433-1456; Nielsen, L.A., "The evolution of fisheries management philosophy," *Marine Fisheries Review* 38,12(1976):15-22, pp. 19-22; Martin, J.T., "Social value of wild fish," in *Proceedings of the Olympic Wild Fish Conference, March 23-25, 1983*, 1984, p. 298; See generally: Larkin, P.A., 1978; Houston, D.B. and Contor, R.J., in *Proceedings of the Olympic Wild Fish Conference, March 23-25, 1983*, 1984, p. 102.

probably had skewed wild fish habitat by overloading the carrying capacity of streams, which in turn increased competition for limited foraging, resting and rearing areas. Hatchery fish may have displaced wild fish stock run timings that relied on precise downstream and upstream departures in order to effectively share estuarine and river habitat. The selective taking of "desirable" fish for eggs probably decreased the genetic diversity of native stocks. Stock transfers from one river to another might have polluted the genetic makeup of wild stocks when returning hatchery adults spawned in the wild. And finally, hatchery fish had introduced more diseases and pathogens to streams.[1004]

The risks could be catastrophic. If wild salmon stocks went extinct or survived with minimal genetic variation, their irreparable loss was foregone. Hatcheries could never serve as a substitute for the genetic value of wild fish and the diversity of ecosystems. Such fears had serious implications for the 1973 Endangered Species Act, which viewed genetic variations as important natural resources.[1005] One salmon advocate described the Columbia management plan as ecologically damaging and economically foolish. "Fish-management agencies have an addiction to hatchery fish," Bill Bakke criticized in 1994. "But they're a technological solution to a complex biological problem that has granted permission for wholesale destruction of our watersheds, and all of it is unnecessary." According to Bakke, a single spring chinook returning to Columbia's Irrigon Hatchery cost $10,000, and chinook reaching Oregon's Grand Ronde Hatchery

[1004] Lichatowich, J.A. and McIntyre, J.D., 1987; Larkin, P.A., 1979, pp. 104-106; Larkin, P.A., 1974, pp. 1433-1456; Nielsen, L.A., "The evolution of fisheries management philosophy," *Marine Fisheries Review* 38,12(1976):15-22, pp. 19-22; Martin, J.T., in *Proceedings of the Olympic Wild Fish Conference, March 23-25, 1983*, 1984, p. 298; See generally: Larkin, P.A., 1978; Houston, D.B. and Contor, R.J., in *Proceedings of the Olympic Wild Fish Conference, March 23-25, 1983*, 1984, p. 102.

[1005] Martin, J.T., in *Proceedings of the Olympic Wild Fish Conference, March 23-25, 1983*, 1984, p. 298.

cost over $875.[1006]

Conservation groups threatened to use the Endangered Species Act as a legal means to force federal agencies to address the problem. While the region's recent northern spotted owl (*Strix occidentalis caurina*) controversy had involved the threat of lawsuits to prohibit logging in large sections of forest to protect the species, the idea of prohibiting human activities within entire watersheds was unprecedented.[1007] The ramifications were impossible to calculate. "I will support paying reasonable costs for saving the salmon but I will not sign a blank check to save each and every salmon stock," Washington Senator Slade Gorton declared. Idaho Governor Cecil Andrus instead criticized federal agencies for facilitating the loss of salmon. "If they succeed much longer, there won't be any salmon left," he said. "The only one you will see will be in the encyclopedia and history books. The caption on the picture will read, 'This is what a salmon used to look like—courtesy of the Bonneville Power Administration and the Army Corps of Engineers.'" During 1990-1991, only two Snake River sockeye salmon were known to have reached the species' last spawning area at Redfish Lake in Idaho. "The clock is ticking," Andrus reminded his colleagues in 1992. "And this year one sockeye made it back."[1008]

Washington officials began to travel to the Olympic Peninsula to warn that closures would soon all but shut down commercial and recreational fishing. "If anglers

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[1006] Quoted in Maxwell, J., "How to save a salmon," *Audubon* (July-August, 1994), p. 30; Radigan, K., 1991, pp. 14-15.

[1007] See generally: Yaffee, S.L, 1994.

[1008] *Seattle Post-Intelligencer*, June 20, 1991; *Peninsula Daily News*, June 9, 1991; June 3, 1991; December 3, 1992.

thought 1991 was a restrictive year for conservation purposes, they haven't seen anything yet," spokesman Tony Floor warned in January 1992. State and federal agencies in Oregon and Washington had started to implement severe measures, hoping to avert legal measures if and when conservation groups started lawsuits. "We're paying the price now, and we have to pay that price," fisheries secretary Joe Blum told the Sequim-Dungeness Valley Chamber of Commerce, foreboding at least six more years of annual closures and advising communities with a stake in the fishing business to adapt to new economic woes.[1009]

Anguish flooded the peninsula as the region reacted. Stringent catch limits were unwelcome to resort and charter operators working the peninsula shores from to Sekiu to Pillar Point. "Hell yes, it hits us hard," a resort owner complained. "We're talking thousands of dollars. It's going to cost me a lot—heartburn and unhappiness. What can you do? The stores, the motels, it affects everybody in town." In an almost perverse response, fishermen caught every bit of salmon they could. Hundreds of vacationers arrived in Sekiu and Port Angeles hoping to make the most of the curtailed season.[1010]

As the crisis continued Port Angeles started to lose its identity. "Salmon fishing remains as much a part of the Peninsula character and culture as logging," the *Daily News* wrote in May 1993. "But like logging, the future for fishing doesn't look as good as the old days." According to some business owners, the combined effect of a declining timber industry and salmon fishing bans was, Christina Camara wrote the following year, "another nail in the coffin." There was a sense of despair. "If you think last year's two

[1009] *Peninsula Daily News*, January 30, 1992; May 10, 1992.

[1010] *Peninsula Daily News*, August 13, 1992; *Forks Forum*, August 19, 1992.

month closure was bad," Floor told the *Daily News* in spring 1994, "you better brace yourself." That year the Pacific Fishery Management Council closed sport salmon fishing in the Strait from May 1 to October 31. "This is where they slice the throat," Clallam Bay Chamber of Commerce president Newsom Baker remarked after he closed his grocery store because of tightened restrictions and shortened seasons. Jim Blore, a Port Angeles charter boat skipper, similarly blamed "them," or the fishery council, for his miseries. "We're lost souls now. They're taking away all the reasons to live here."[1011]

Area newspapers grew reflective and offered readers an overview of why things were so bad. Population growth, development, overfishing, logging, agriculture and irrigation, dams, fluctuating natural oceanic conditions, El Nino and climatic events were invoked. Old timers shared their memories of better days. Eighty-year old Earl Stone remembered fishing Port Angeles harbor from Hollywood Beach, winning Salmon Derby prizes, and long fishing seasons at LaPush, Neah Bay and Sekiu. Off Ediz Hook the only thing preventing a quick limit of salmon was other species of fish that ate the bait first. "The guys used to line up like seagulls on the logs out there, catching blackmouth, every one of them." A Sekiu resort owner described the decline in business over the years, as charter boats ventured "farther and farther and farther" into the Strait to find fish. It was as if the region were performing its own postmortem and conducting its own requiem.[1012]

Perhaps the most symbolic death was the undignified end of the storied Port Angeles salmon derby. In 1993, the city's Salmon Club moved the 55-year old derby

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[1011] *Peninsula Daily News*, May 4, 1993; March 23, 1994; quoted in March 17, 1994; April 10, 1994; *Seattle Post-Intelligencer*, April 6, 1994; *Peninsula Daily News*, April 14, 1994.

[1012] *Peninsula Daily News*, April 20, 1993; May 11, 1993; May 18, 1993; quoted in April 27, 1993; Maxwell, J., "How to save a salmon," *Audubon* (July-August, 1994), p. 32. d

from Labor Day weekend to late July to avoid fishing closures. It canceled the event the next year. Mayor Joan Sargent, pointing out that the city's biggest income came from sales tax, estimated Port Angeles would lose up to $250,000 because of the salmon fishing closure and $2.2 million in tax revenues. In 1995, organizers terminated the derby competition, noting many in the community were uninterested and did not even know what it was. The final Derby Days festival included a Salmon Survival Run, token parade, art vendors offering chain saw sculpture artwork from displaced timber industry workers and a salmon broil. "Derby Days apparently went out with a whimper rather than a roar," the *Daily News* reported the next evening.[1013] "Port Angeles' identity as a logging and fishing town has slipped away with logging and fishing," a merchant commented on the day of the farewell.[1014]

Amid the complaining and devastation, some north Peninsula residents came to terms with the grief and accepted the prognosis. "I have fished the Strait and commercially fished the ocean since 1918 but I would be willing to give up fishing in order to save them," Dowell Hilt of Port Angeles wrote the *Daily News*. "Something really drastic must be done! Put all fish on the endangered list—all bottom fish and salmon. That is the only way to control everyone."[1015] Jim Lichatowich, who lived near the Dungeness River, saw the issue as a necessary correction to social behavior. "We threw the party and heavily consumed natural resources without thought of what we were doing," he said. "Now it's time to clean up the mess. It's a price for having the party."

[1013] *Peninsula Daily News*, August 16, 1995; August 22, 1995; August 27, 1995; August 28, 1995.

[1014] *Peninsula Daily News*, August 27, 1995.

[1015] *Peninsula Daily News*, July 20, 1992.

So, too, did Dick Goin understand the necessity of what was happening. “I welcome it. It’s like a bad tooth. The sooner you take care of it, the sooner it’s going to get better.”[1016]

Even the national press had taken note of the region’s demise. “With a growing sense of shame, if not surrender, the Pacific Northwest is watching its wild salmon dwindle into extinction,” a reporter for *The Washington Post* wrote in 1994.[1017] This assessment stood in stark contrast to a 1960 *National Geographic* profile of the region as postcard example of industrial and natural bounty. “I was growing accustomed to surprises in the Pacific Northwest,” a travel reporter had written, “where nature’s last frontiers stand alongside those of science and industry.” The magazine’s feature of Washington State included a two-page photographic spread of Ediz Hook, Port Angeles and the Olympics to impress the point. “In this view,” the caption described, “log booms cluster beside Ediz Hook, a sandbar sea wall jutting into the Strait of Juan de Fuca. Crown Zellerbach’s mill at lower right produces 500 tons of newsprint a day. Klahane Ridge towers above the city.”[1018]

The harbor was in many respects viewed as the ideal example. Industry had carried Port Angeles through the Great Depression and growth and expansion followed. “Operating within easy rowing distance from the large pulp and paper mills on Port Angeles bay,” the *Evening News* wrote in 1940, “it is but natural that the Port Angeles Salmon Derby numbers among its interested and active participants hundreds of pulp and paper mill workers and their families.” Crown Zellerbach, Fibreboard and Rayonier

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[1016] *Peninsula Daily News*, April 16, 1996; March 17, 1994.

[1017] *The Washington Post*, April 3, 1994.

[1018] Severy, M., “Northwest wonderland: Washington State,” *National Geographic* 117,4(April 1960):445-514, pp. 445, 450-451.

employed 1,470 persons in the pulp mills and surrounding forests of Port Angeles, a city of about 9,400 people, and most of the workers could "boast of both an automobile and a boat."

> It is reasonably safe to credit the coming of the pulp mills with the increased interest in boat building and salmon fishing…. As a group they likely are by far the largest purchasers of boats, fishing gear and other sporting gear. And from experience in catching huge salmon almost within the shadows of mills in which they work, these men will tell you that the pulp and paper industry and the fun and business of salmon fishing can operate side-by-side successfully.[1019]

Postwar industrialized countries had developed a taste for consumables supplied by the pulp and paper industry. Crown Zellerbach's newsprint and telephone directory paper was a valuable commodity. But Rayonier's acetate pulp product was exceptionally versatile and functional. By using high pressure, temperature and a variety of chemicals the mill turned trees into bails of acetate. It was a raw material used to manufacture cigarette filters, photographic film, and yarns; high-grade paper and melamine plastics; and viscose pulp for cellophane, cellulose sponges, and rayon fabrics and threads. Other products ranged from gowns to yacht sails to truck tires; plastic articles such as instrument boards and panels in airplanes, trains, buses and boats, as well as toothbrush handles, screw driver handles and cosmetic boxes. Day in and day out three shifts manufactured hundreds of tons of pulp each day, three types and ten different grades, trying to sate a continuous demand.

In addition to creating hundreds of desired products, the Port Angeles mills created chemical wastes. By their very nature, pulp mills were intense polluters in both quantity and toxicity of emissions. But the *National Geographic* article was silent about

[1019] *Port Angeles Evening News,* August 24, 1940.

these problems. While its images conveyed the impression that Washington's "wonderland" could comfortably embrace all manners of living, Port Angeles was heading toward hard times. As early as 1932 the mills had plied their wastes directly into the harbor. The constant stream of pollution appeared to offend no one. It was mostly out of sight and as the fishing seemed good few complained about boating in city sewage and industrial wastes. As early as 1940 Washington had been trying to reduce pulp and paper industry pollution with a system of waste discharge permits. By 1962, eight mills in Puget Sound and the Strait of Juan de Fuca were releasing over 190 million gallons of waste water daily, the equivalent wastes of about 12.4 million people or over four times the state's population. Combined, state industries tallied a 95 percent permit compliance rate. But the pulp and paper industry was only 41 percent.[1020]

Within a decade, the newly established Environmental Protection Agency listed Port Angeles harbor as among the most polluted in the country. Administrator William Ruckelshaus endeavored to "single out violators with the greatest visibility in order to get the message across" that the agency was serious about cleaning up pollution. It targeted U.S. Steel, the cities of Detroit and Cleveland, and ITT Rayonier of Port Angeles.[1021] The agency asked the attorney general to take legal action against the company under the Rivers and Harbors Act of 1899. It was the only pulp mill in Puget Sound not meeting state discharge permit requirements. At the same time, the state Department of Ecology

[1020] U.S. Department of the Interior, "Conference: Pollution of the Navigable Waters of Puget Sound, the Strait of Juan de fuca and Their Tributaries and Estuaries, Proceedings, Volume 2." Second Session, Seattle, Washington, September 6-7 and October 6, 1967 (Washington, D.C.: U.S. Department of the Interior, Federal Water Pollution Control Administration, 1967a), pp. 402-413; Netboy, A., 1973, pp. 355-356.

[1021] Cited in Rosenbaum, W.A., 1973, p. 124; Netboy, A., 1973, pp. 356-357.

demanded the facility "recover" the majority of its sulphite waste liquors by burning instead of releasing them into the water. And the Environmental Defense Fund asked the Bonneville Power Administration to stop delivering power to the facility, arguing that its water wastes violated its service contract with the agency.[1022]

Many in Port Angeles were skeptical of state and federal attempts to address the city's pollution problems. "Conservationists see themselves as kindly people, saving inhabitants of this country and the world from themselves," the *Evening News* editorialized in 1971. "But they are thoughtlessly depriving thousands upon thousands of food (jobs), warmth (oil), and shelter (wood products)."[1023] For its part, ITT Rayonier did not think there were any serious issues to address. "The only problem our wastes pose is an esthetic one and we are well into a program to eliminate this problem," the company's president argued.[1024]

Federal concern over Port Angeles's harbor dated back to 1961, when as a last resort Washington's governor appealed to the U.S. Department of Health, Education and Welfare for assistance. The state wished to institute measures for the control of the pollution of interstate or navigable waters under the 1956 Federal Water Pollution Control Act. The act allowed the government to intervene in state affairs at the invitation of governors by initiating conferences to discuss matters of interstate pollution. Federal water pollution policy at this time consisted of feeble measures designed to encourage states to develop their own programs. The result was ineffective and cumbersome

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[1022] *Port Angeles Daily News*, January 26, 1971; January 28, 1971; January 31, 1971.

[1023] *Port Angeles Evening News*, February 19, 1971.

[1024] *Port Angeles Daily News*, January 26, 1971; January 28, 1971; January 31, 1971.

regulations that were mostly unenforceable. That the state asked for a conference to discuss the industrial pollution of Puget Sound and Strait of Juan de Fuca indicated the problem was severe.[1025]

Government officials had actually recognized the problem of pulp mill discharges soon after the first mills began operating in the region. In 1921 the Washington Fisheries Commission warned industrial wastes were a growing problem that, if left unchecked, would leave the state's fisheries to suffer a fate similar to the industrialization of the east coast. "The time to stop it is now—before the damage has been done, and before the practice of discharging industrial wastes into the water has become so established as to be beyond control," the *Pacific Fisherman* declared in 1926. The statement came in response to protests lodged by the Olympia Oyster Growers' Association against pulp and paper mill emissions into state waters. Commercial fishermen were also upset, reasoning that if the sulfite waste liquors killed oysters on the tidal flats, wastes from new mills such as at Anacortes would have a similar effect on other marine life.[1026]

In response, Oregon and Washington fish and game commissions and health boards undertook studies to analyze the question of damage to fish life by sewage and industrial wastes. Washington's fisheries department secured an amendment to the fisheries code in 1927 requiring the submittal of plans and specifications for the disposal of industrial wastes of any new projected plants to the state Director of Health and Supervisor of Fisheries for approval. The measure was based in part on department of

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[1025] Rosenbaum, W.A., 1973, pp. 127-128, 136-140.

[1026] *Thirty-Second and Thirty-Third Annual Reports of the State Fish Commissioner*, 1921-1923 (Washington State Fisheries Commission, 1923), p. 12; *Pacific Fisherman* 24,10(September 1926), pp. 14-15; *Pacific Fisherman* 24,12(November 1926), pp. 10-11.

health investigations prompted by construction of the Rainier Pulp and Paper mill on the end of Oakland Bay at Shelton that threatened to release approximately 200,000 gallons of undiluted sulphite liquor daily onto oyster beds. Using data from studies of Wisconsin and New York mills in conjunction with waste samples taken from Port Angeles and Anacortes mill blow pits, researchers concluded that the Shelton mill's discharges created potential dangers to shellfish and fish life.[1027]

The studies confirmed what some experts already believed. John Cobb's 1917 report on the Pacific salmon fisheries pointed to an increase of mills and factories as especially menacing to salmon rivers. "The emptying of sewage into streams ought to be made a crime," he wrote. "It is an exceedingly crude method of dealing with it, and, instead of disposing of the filth, merely transfers it from one place to another, making the water unfit for use at points farther downstream and spreading diseases and death amongst, not only the finny, but also human, users of it." Fishermen had always complained about nearly every aspect of timber industry operations along salmon and steelhead waters. From cutting trees to processing wood, the net result was damage to the fish and their habitat. "Everything—gurry, sawdust, and every description of filth and rubbish—is thrown into the water," a Port Madison, Washington citizen wrote Spencer Baird of the U.S. Fish Commission in 1886. "The mill-owners have let the sawdust run into the sound ever since they built their mills; some only a part, but others all of it. I am living in a saw-mill town, and the mill-owners have thrown most of the sawdust into the water, and the consequence is that the bay has filled in about 10 feet since I came

[1027] *Thirty-Sixth and Thirty-Seventh Annual Reports of the State Fish Commissioner*, 1925-1927 (Washington State Fisheries Commission, 1927), pp. 29-30, 37-38, 51-57.

here."[1028]

The government continued its studies. In the late 1940s, at Everett, where the Snohomish River emptied into Port Gardner, pulp mill outpourings constituted more of a hazard to the fisheries than any other form of pollution. While a general decline in fish catches was attributable to many causes, high amounts of waste liquors and cellulose fibers in the river estuary and bay led state agencies to study the effects of high and low concentrations of waste materials on aquatic organisms. Investigators performed tests on salmon at a research station at Deception Pass. They found that industrial wastes were fatal to both young and adult salmon. Additionally, marine food organisms had less tolerance to sulfite waste liquors than salmon. At spots where salmon fed conditions might resemble "a biological 'desert' wherein sustenance for the young salmon in their estuarine phase is inadequate or even totally absent."[1029]

Studies in the 1950s noted that mills using the sulfite pulping process annually dumped five billion gallons of waste liquors into Washington waters, creating 2,500 gallons of liquor for every ton of pulp produced. In 1961, the state pollution commission concluded that the pulp and paper industry was a notable cause of the waste discharge problems afflicting Puget Sound-Strait of Juan de Fuca waters. The problems only worsened. Now operating for several decades, Bellingham, Anacortes, Everett and Port Angeles mills were now owned by the nation's most powerful timber companies—Georgia-Pacific, Scott Paper, Weyerhaeuser, Simpson Lee and Rayonier. The state

[1028] Hammond, J.P., "Fish in Puget Sound," in *Bulletin of the United States Fish Commission, Volume VI,* 1886 (1887), p. 196; Cobb, J.N., 1916, p. 95.

[1029] Washington (State) Department of Fisheries, "Toxic Effects of Sulfite Waste Liquor on Young Salmon," Research Bulletin Number 1, 1953, pp. 3-11, 103-105.

therefore turned to the federal public health service for help.[1030]

The Federal Water Pollution Control Administration's findings were sobering. Much of Port Angeles harbor was lined with about 50 years' worth of industrial sludge. And its soupy mix of effluents tapered east to Dungeness Spit. Until 1964 the city's three largest mills had produced sulphite pulp, when Crown Zellerbach switched over to newsprint production. Each day Crown Zellerbach, Fibreboard, Pen-Ply, Rayonier and the city of Port Angeles emitted over 13,000 tons of waste composed of about 80 percent sulfite waste liquors into the harbor and Strait. Of this total amount, Rayonier generated nearly 90 percent. Additionally, the mills were daily discharging 57 tons of suspended solids, with smaller contributions from the city's municipal system.[1031]

The spatial extent of the problem was sizeable. Some of the material reached surface waters, "chunks of floating sludge, buoyed to the surface by gases of decomposition and smelling of H_2S." But most of it, about 280,000 cubic yards of the material from 1 to 16.5 inches thick, layered the eastern part of the harbor surrounding Rayonier. It also layered the west and southern parts where Zellerbach had formerly discharged waste before oppositely rerouting it directly into the Strait parallel to the spit's western shoreline. Dilution was minimal because weak anticlockwise water currents could neither remove the sludge nor adequately attenuate wastes within the harbor's

[1030] U.S. Department of the Interior, "Conference: Pollution of the Navigable Waters of Puget Sound, the Strait of Juan de fuca and Their Tributaries and Estuaries, Proceedings, Volume 2." Second Session, Seattle, Washington, September 6-7 and October 6, 1967 (Washington, D.C.: U.S. Department of the Interior, Federal Water Pollution Control Administration, 1967a), pp. 402-413; Netboy, A., 1973, pp. 356-357; U.S. Department of the Interior, "Pollutional Effects of Pulp and Paper Mill Wastes in Puget Sound" (U.S. Department of the Interior, Federal Water Pollution Control Administration, 1967b), pp. i-iii.

[1031] U.S. Department of the Interior, "Pollutional Effects of Pulp and Paper Mill Wastes in Puget Sound" (U.S. Department of the Interior, Federal Water Pollution Control Administration, 1967b), pp. 387, 407-412, 395-402.

dispersal zone, confining its waters by the settlement of sludge and high levels of circulating waste. "In conclusion," the 1967 federal report found, "local hydraulics makes the Port Angeles Harbor-Dungeness Spit eddy system unsuitable for the disposal of untreated wastes from the Fibreboard and Rayonier mill operations."[1032]

The evidence pointed to the need for change. The Elwha and Dungeness Rivers as well as dozens of smaller streams tributary to the Strait straddled or fed into Port Angeles harbor. These sheltered waters were important marine areas as well as resting and feeding spots for migrating fish heading to the Pacific or to inland waters. Industrial and municipal wastes could create toxic conditions to fish, benthic fauna and immature forms of fish and shellfish.[1033] Moreover, the waters were also experiencing severe violations of sewage coliform concentrations that represented a public health hazard along a two-mile section of city waterfront. Additional study found that the city's seven sewage outfall pipes located at the end of major streets along the bay had left the waters highly contaminated. It was unsafe for fish and humans.[1034] In response, the government called on the City of Port Angeles to collect, treat, and discharge its wastes. It further called on the mills to lower their concentrations of source sulfite waste liquor through primary treatment of solids-bearing wastes, reduction of liquor discharges and the diffusion of

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[1032] U.S. Department of the Interior, "Pollutional Effects of Pulp and Paper Mill Wastes in Puget Sound" (U.S. Department of the Interior, Federal Water Pollution Control Administration, 1967b), pp. 421-424; Don J. Easterbrook, *Surface Processes and Landforms* (New York: Macmillan Publishing Company, 1993), pp. 431, 433.

[1033] U.S. Department of the Interior, "Pollutional Effects of Pulp and Paper Mill Wastes in Puget Sound" (U.S. Department of the Interior, Federal Water Pollution Control Administration, 1967b), pp. 425-464.

[1034] U.S. Department of the Interior, "Pollutional Effects of Pulp and Paper Mill Wastes in Puget Sound" (U.S. Department of the Interior, Federal Water Pollution Control Administration, 1967b); Cornell, Howland, Hayes & Merryfield, "An Engineering Report on a Preliminary Investigation of a Sewage Treatment System, City of Port Angeles, Washington," July 1966, pp. 6, C-1.

liquid wastes.[1035]

Local press and industry saw things differently. In 1961, Rayonier had begun its own studies. Skin divers collected evidence that the harbor was brimming with sea life. "From piling barnacles to denizens of the deep, the waters off Port Angeles abound with marine life," the *Evening News* reported, echoing Rayonier's scientists. "The abundance of marine life testifies to the purity of the water," the company's expert said, pointing to the "profusion of aquatic life" that otherwise would not have been there.[1036] In 1966 Rayonier's research group published a report concluding only a small volume of harbor water was polluted. It pointed to "large numbers of fish" and a "diversity of vertebrate and invertebrate organisms" attesting to the harbor's health. The study concluded that sport fishing and industry were compatible activities in the harbor. Efforts to install abatement facilities were unjustified.[1037] Reacting to the government's suggestion that Rayonier burn its liquor wastes rather than emit them into the harbor, Port Angeles Chamber of Commerce president James E. Phillips said he preferred the status quo rather than "the possibility of trading a very minor, questionable problem for a possibly very real and serious problem, that of air pollution." He pointed to other mill towns where air pollution was intolerable. "We in Port Angeles don't mind our water, and we like our air.

[1035] U.S. Department of the Interior, "Conference: Pollution of the Navigable Waters of Puget Sound, the Strait of Juan de fuca and Their Tributaries and Estuaries, Proceedings, Volume 1." Second Session, Seattle, Washington, September 6-7 and October 6, 1967 (Washington, D.C.: U.S. Department of the Interior, Federal Water Pollution Control Administration, 1967a), pp. 102-105.

[1036] *Port Angeles Evening News*, October 27, 1961.

[1037] Stein, J.E. and Denison, J.G., "Port Angeles Water Quality Monitoring Program," ITT Rayonier Inc., Olympic Research Division, Rayonier Olympic Research Division Report, December 1, 1966, pp. 1-12.

Please do not lower the quality of either one."[1038]

ITT Rayonier's counter evidence did not compel state and federal agencies to change their course. In 1971, the company agreed to build a $30 million waste treatment program. It installed equipment to recover 85 percent of the liquors otherwise discharged into the bay, build a clarifier to remove suspended solids from wastes and wash waters, and construct a 1.5 mile pipe line into the Strait. "It's a good time to recall the observation of ITT Rayonier President Charles Anderson," the Port Angeles *Chronicle* observed after the facilities were completed, "when he said that without the vast resources of ITT it's certain that Rayonier would have had to shut down." Since 1963 the world market for pulp orders had kept the Port Angeles division constantly oversold. ITT wood products subsidiaries had recently merged with PenPly in Port Angeles, built a new mill at Jesup, Georgia and started construction of another in Quebec.[1039]

But company executives were reserved about the plan. Their scientists had predicted the new technology would simply move poisonous substances away from water and into the air. They did not want this new problem. "It's difficult to achieve a balance between improving both water and air conditions," resident manager John Gray warned.[1040] In 1974, plant manager Ron Rogstad reiterated ITT Rayonier's position, noting that while recovery boilers reduced the mill's oil consumption and generated steam for heating and power, the company was building the system only under

[1038] U.S. Department of the Interior, "Conference: Pollution of the Navigable Waters of Puget Sound, the Strait of Juan de fuca and Their Tributaries and Estuaries, Proceedings, Volume 1." Second Session, Seattle, Washington, September 6-7 and October 6, 1967 (Washington, D.C.: U.S. Department of the Interior, Federal Water Pollution Control Administration, 1967a), pp. 164-165, 169-170.

[1039] *Chronicle*, October 25, 1972; *Daily News*, October 6, 1972.

[1040] *Port Angeles Daily News*, January 26, 1971; January 28, 1971; *Chronicle*, April 1, 1971; quote in *Chronicle*, October 25, 1972.

government orders. “We are not so sure that the recovery boiler we are now building—as required by our present permit—is a good idea,” Rogstad admitted, referring to similar apparatus recently installed at other companies that proved nasty air pollution ensued.[1041] He also said that the new system introduced more chemicals into the environment, including hundreds of tons of ammonia, phosphoric acid and lime. “[W]e are reaching the point,” he concluded, “where the treatment systems themselves create additional pollution and become counter-productive,” referring to “unavoidable” air quality problems “more annoying and difficult to correct, and in some cases … more harmful than the original water problem.”[1042]

By late 1975 the new system was running—an 11-story waste recovery boiler with a 300-foot smokestack. Port Angeles bay would now recolor “from deep orange black to blue-green,” the local paper wrote. An early problem was that some of the solids sent into the boiler were unburnable. The mill had little choice but to haul the contaminated materials to dumping sites, although for a while research scientists tried to sell secondary treatment wastes as animal feed. ITT Rayonier had purchased an abandoned nine-acre gravel pit within city limits in late 1971, and later bought more land behind the city.[1043]

Over the next two years the mill attempted to correct obvious glitches. The state

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[1041] *Chronicle*, July 3, 1974.

[1042] *Chronicle*, December 10, 1975.

[1043] *Daily News*, October 31, 1972; October 10, 1975; December 17, 1975; June 11, 1981; ITT Rayonier, Inc., Port Angeles Division, *Engineering Report, Solid Waste Handling and Disposal Plan* (February 25, 1975).

allowed extensions and variance approvals for adjustments while facility engineers worked to decrease discharge levels of sulfur dioxide and particulate matter. They installed a $500,000 filter system to try to reduce the city's noticeable "foggy days." As Rogstad explained to the *Daily News*, Port Angeles residents "probably will not be able to smell anything because the mill's new smoke stack will carry emissions to 300 feet."[1044]

But it was not so. In September 1981 "a cloud of foul-smelling gas that hovered over the city" stripped paint off dozens of houses and sent people to the hospital where emergency staff blocked air vents. "It hit me Friday night about 5 p.m.," senior citizen Laura Kellogg told the newspaper. "I couldn't breathe and started vomiting. My face swelled; my nose swelled." Downtown restaurant customers were nauseated by the hydrogen sulfide gases and white houses turned yellow. "It's ironic in a way," ITT Rayonier spokesman Jay Fredericksen said. "We put in a $30 million water pollution control system and we created an air problem with it."[1045] The outcome revealed the insufficiencies of regulating industrial emissions without comprehensively considering the spectrum of impacts.

ITT Rayonier was not the only mill in Port Angeles that released air emissions. Nor was the condition a new problem. The town had been smoky and smelly for decades. But with the addition of such a heavy load, the combined emissions of the city's three mills at times overpowered the airshed's ability to remove the materials. Poor meteorological dispersal conditions combined with onshore and valley flow breezes

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[1044] *Daily News*, October 10, 1975; quote in October 27, 1975; quote in December 17, 1975; June 18, 1976.

[1045] *Daily News*, September 20, 1981.

moved smoke plumes directly into and over neighborhoods. Many homes and the city's school were located at elevations even to or higher than the tops of the stacks. On calm nights, as the town quieted into a constant din of mill noise the skies filled with emissions. When westerly winds were strong enough to push the smoke eastward, it blanketed the Gale's addition residential area, shoreline bluffs and the prairies north of Sequim. In 1993, the Environmental Protection Agency's toxics release inventory ranked ITT Rayonier's Port Angeles mill as the state's worst industrial polluter. The facility had reported 3.6 million pounds of air and water emissions.[1046]

A few years earlier, in 1990, Olympic National Park's superintendent raised concerns with the state about the impact of Port Angeles's air pollution on the park's natural resources and its protection mandates.[1047] Of 29 national parks studied in the early 1980s, Olympic had the highest sulfur dioxide annual average. And yet the park's coastal and rain forest areas had among the cleanest ecosystems in North America—Pacific Ocean air masses were for the most part not adverse contributors to local air quality. The park had found that its lichens and mosses—which serve as air quality indicator species, stabilize fragile soils, pioneer plant succession and provide habitat for invertebrates—were at extreme risk for damage from sulfur dioxide and other pollutants. Additional studies analyzing contaminants in plant and animal tissues showed further evidence of

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[1046] *Peninsula Daily News*, March 28, 1995; June 27, 1996; Washington State Department of Ecology, *Washington State Toxic Release Inventory Summary Report, 1993* (Olympia, WA).

[1047] Under the 1977 Clean Air Act, Olympic National Park was designated a Class I area and the Secretary of Interior had an affirmative responsibility to protect air-quality related values in parks of this sort. In 1976 the United Nations designated the park as an International Biosphere Reserve, and a World Heritage Site in 1981. In 1989 Congress designated 95 percent of the park as Wilderness, including a majority of the Elwha watershed. The National Park Service therefore undertook studies to gage the effect of air pollution on park resources, including the potential impacts of leaching nutrients from the soil, acidification of water, structural or functional damage to vegetation, and impairment of visibility.

biologic effects in the park. A 1988 study had found that certain lichens in the park contained elevated levels of anthropogenic metals and sulfur. The closer the collection site was to Port Angeles, the higher the elemental concentration of sulfur, potassium, zinc and boron.[1048]

In Port Angeles, the potential public health implications of the air pollution were hard to ignore. Between 1991 and 1996 an unadvertised citizen complaint line listed in the white pages as "Clean Air Hotline" had received thousands of unsolicited calls. They came from hundreds of unique addresses. The complaints included watery and burning eyes, sore throats, dizziness, nausea, headaches, runny noses, irritated lungs, gagging, wheezing, coughing and fatigue. Between 1991 and 1992 the line logged over 1,900 complaints from about 600 addresses.[1049] A 1995 state health survey of the city's school children found an increased frequency of cough and bronchitis, as well as higher adverse respiratory conditions in neighborhoods where unusual odors were reported.[1050] In 1996, the *Peninsula Daily News* reported that Port Angeles bladder cancer rates were higher than the state average. Urologists and pathologists could not explain the reason behind the high rate. They suspected a link between smoking and exposure to chemicals in the pulp and paper industry. A federal report later determined that ITT Rayonier facility boilers had levels of dioxins and furans that exceeded risk-based concentrations for

[1048] Superintendent Maureen Finnerty to Tom Elwell, Washington Department of Ecology, January 19, 1990 (Science File, Olympic National Park, Port Angeles, WA).

[1049] Barbara Osborne, personal communication, unrecorded, 1995-1997; U.S. Department of Health and Human Services Public Health Service, 2004, pp. 16, A-6.

[1050] Washington State Department of Health, *Phase I Port Angeles Health Study* (Olympia, WA, October 1995); Washington State Department of Health, *Phase II Port Angeles Health Study* (Olympia, WA, April 1996).

ambient air by three orders of magnitude.[1051]

Notwithstanding the public health misfortunes that attracted attention during the 1990s, the region's economic troubles relating to the timber industry had started two decades earlier. Since 1970 the wood products industry that for so long had anchored some Pacific Northwest communities had begun a steady decline. In Port Angeles, between 1970 and 1988 industry's production dropped from 42 to 20 percent of the community's income.[1052] In Washington, timber operations became more capital intensive as expensive and sophisticated machinery and fewer human hands produced the same output. Resource dependent communities dwindled as technological changes—including larger mills, logging machinery and timber exported with little or no processing—eliminated jobs.[1053]

On the Olympic Peninsula, in the early 1970s Crown Zellerbach closed the Port Angeles Fibreboard facility and its Clallam Bay timber division. In 1986, James River Corporation purchased Crown Zellerbach's mills, including the Port Angeles facility and its Elwha dams. Two years later James River sold the mill to Daishowa, subsidiary of Daishowa International, a Japanese pulp and paper giant that had started purchasing mills in western Canada and United States. To the city's relief, the company announced plans

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[1051] Washington State Department of Ecology, 1993; RUST, Inc., *Environmental Impact Assessment on Daishowa America Port Angeles Mill, Daishowa Paper Mill Expansion, Phases I and II*, Volume 1, November 1988, p. III-R-5; *Peninsula Daily News*, November 11, 1996; U.S. Department of Health and Human Services Public Health Service, Agency for Toxic Substances and Disease Registry, *Public Health Assessment. Rayonier Incorporated, Port Angeles Mill, Port Angeles, Clallam County, Washington. EPA Facility ID: WAD000490169, May 13, 2004*, pp. 7-8.

[1052] RUST, Inc., *Environmental Impact Assessment on Daishowa America Port Angeles Mill, Daishowa Paper Mill Expansion, Phases I and II*, Volume 1, November 1988, p. II-B-1.

[1053] John C. Ryan, "Northwest Employment Depends Less on Timber and Mining," Northwest Environment Watch, New Indicator, November 30, 1994; *Peninsula Daily News*, March 7, 1997.

to increase production 1,200 tons per day by 1993, boosting employment from about 360 to 560 persons. But ITT Rayonier closed two mills in Hoquiam in 1992 and made Rayonier an independent company in 1993. Weak markets for its specialty pulp led to sporadic closures and layoffs at the Port Angeles facility.[1054]

As the decade closed, the city and county experienced hardship and confusion as it began to face the demise of its remaining fisheries and timber economies. In 1997 Rayonier permanently shuttered its Port Angeles mill. The company dismantled the entire site at Ennis Creek and destroyed the recovery boiler and smokestack the following year. The community had to cope with the loss of 365 jobs. "You saw a lot of ups and downs," one family member of a former employee reflected ten years later. "I saw a lot of it with the wives. I saw a lot of it with the kids. There were a lot of divorces."[1055] In 2007, the KPly plywood facility also closed. Originally called Pen-Ply, the plant had started operations on the downtown waterfront in 1941 and reopened briefly in 2010.[1056]

Within the span of a generation thousands of traditional resource-based jobs had disappeared. And health officials reported a dramatic rise in domestic-violence rates, alcohol-related crimes and welfare.[1057] For many, society on the north Olympic Peninsula had collapsed.

[1054] *Peninsula Daily News*, October 22, 1996; November 4, 1996; March 7, 1997.

[1055] *Peninsula Daily News*, October 22, 1996; November 4, 1996; March 7, 1997; February 25, 2007.

[1056] Peninsula Daily News, December 20, 2011. http://www.peninsuladailynews.com/article/20111221/news/312219994/it-8217-s-over-for-penply-port-of-port-angeles-to-tear-down-70-year [Viewed March 11, 2013]. See also: "Ecology seeks comments on proposed K Ply interim cleanup plan." http://www.ecy.wa.gov/news/2012/345.html [Viewed March 11, 2013].

[1057] *Peninsula Daily News*, August 27, 1995; April 7, 1996; March 7, 1997.

Chapter 30 Aura of Permanence

On June 1, 2011, the federal Bureau of Reclamation formally began decommissioning the Elwha and Glines hydroelectric projects. An engineer threw the switch in the morning, forever terminating the dams. Elwha River water was no longer moving turbine blades. "The Glines Canyon and Elwha dams have lost their reason for being," the local paper reported, at 8:20 a.m. and 9:19 a.m., respectively. They were now lifeless structures—their electrical currents permanently disabled. Dam deconstruction and removal started in September. There was an invitation-only "party" of dignitaries with token shovels, along with city-wide celebration events and fanfare. The canyons then filled with the noise of demolition explosions, jack hammering and materials disposal for many months to follow. The Elwha Dam was completely dismantled by the following year (see Figure 30.1).[1058]

But on the day the turbines turned off—the day when the facilities became purposeless—the canyon once owned by Thomas Aldwell was quiet. A government pickup truck was parked at the dam house; another car was in the turn-around. The road deck across the dam was empty. On the opposite side of the river two hikers with climbing gear surveyed the forest edge, presumably to find a route down to the canyon floor. The reservoir was calm; waterfowl walked its bank. The only noise came from the heavy roar of water over the spillways. There was perhaps a certain dignity and final peace to the moment. "It's the end of an era on the Elwha," power plant supervisor Kevin

[1058] *Peninsula Daily News*, June 2, 2011. http://peninsuladailynews.com/article/20110602/NEWS/306029988; May 29, 2011. http://peninsuladailynews.com/article/20110529/news/305299983; June 1, 2011. http://peninsuladailynews.com/article/20110601/NEWS/110609999; June 1, 2011. http://peninsuladailynews.com/article/20110601/NEWS/306019985; September 14, 2011. http://www.peninsuladailynews.com/article/20110914/NEWS/309149981/celebrate-elwha-here-are-the-elwha-river-dam-removal-events-this [viewed February 25, 2012].

Yancy said just after he disconnected the Elwha's transmission line from the regional electricity grid. "Elwha P.H. [power house] Shut Down—Final," the dam's maintenance log entry read.[1059]

Robert Elofson, director of river restoration for the Lower Elwha Klallam tribe, instead called the event a "return of another era." He was present during the decommissioning and saw it as a long-awaited step toward rebuilding the river's fisheries.[1060] Indeed, the Elwha River story was now poised to reach a place long thought impossible to attain. It offered the possibility of removing the aura of permanence surrounding the dams, of prevailing over the status quo.[1061]

But the long wait had seemed especially frustrating over the past 15 years. Since 1994, when the Department of Interior's *Elwha Report* had called for dam removal, the delays and setbacks seemed endless. Each year that passed saw the further weakening of already tenuous salmon runs. By the summer of 1996 repeating waves of disease had cut down many of the river's fish. Poor water flows from dam operations and tepid water temperatures exacerbated by warm weather brought on the outbreaks. Salmon suffocated as their gills became coated in mucous; their skin deteriorated. Tribal, state and federal fisheries managers scrambled to help. They hastily drilled wells to run cold water into

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[1059] *Peninsula Daily News*, June 2, 2011. http://peninsuladailynews.com/article/20110602/NEWS/306029988; May 29, 2011. http://peninsuladailynews.com/article/20110529/news/305299983; June 1, 2011. http://peninsuladailynews.com/article/20110601/NEWS/110609999; June 1, 2011. http://peninsuladailynews.com/article/20110601/NEWS/306019985 [Viewed February 25, 2012].

[1060] *Peninsula Daily News*, June 2, 2011. http://peninsuladailynews.com/article/20110602/NEWS/306029988 [Viewed February 25, 2012].

[1061] The term "aura of permanence" as used to describe large, capital-intensive and politically-driven projects, and as a factor that can affect the decision process is attributed to Garry Brewer, Professor Emeritus, Yale School of Management (in May 2006).

hatcheries and penned fish into deep, cooler holes. They spent hundreds of thousands of dollars to improve resting habitat at creeks near the mouth of the river, create more main river pools and support hatcheries with supplemental water.[1062] This had been a long-standing problem, with outbreaks in 1992 and between 1981 and 1987. "I've come across dead fish stacked like cordwood on the bottom," said one biologist who had snorkeled in the moribund river during such conditions.[1063]

It felt like established patterns of behavior guiding industrial operations in Port Angeles might destroy the Elwha fish runs before the dams were removed. There had long been a sense of futility on the lower Elwha River. Many people believed the dams would never be held truly accountable for their impacts to the salmon. The structures seemed interminable, ever-lasting and permanent. During the disease outbreaks that were decimating the Elwha salmon, for example, in 1989 the city council of Port Angeles had renewed Daishowa and ITT Rayonier's water pipeline contract at the same original 1929 cost. Five environmental groups and the Lower Elwha Indian tribe filed a lawsuit claiming the city needed to conduct a state environmental impact assessment. The daily removal of 65 million gallons from the river had contributed to low water levels and increased water temperatures leading to the fish kills. City officials claimed they were exempt from the study requirements because their contract renewal "was simply to maintain the status quo." The county judge dismissed the lawsuit on a technicality.[1064]

[1062] *The Seattle Times*, August 29, 1992; see for example: *Peninsula Daily News*, January 5, 1994; June 9, 1996.

[1063] *Chronicle*, November 20, 1985; *Daily News*, September 3, 1987; Gantenbein, D., "Let the river run," *National Parks* (January/February 1997):22-25, p. 23.

[1064] *Peninsula Daily News*, January 19, 1990; May 17, 1990; quote in May 20, 1990.

Forty years earlier, Clallam County deputy prosecuting attorney Howard Doherty sensed similar frustration in his community. Some Port Angeles residents complained that the system of regulations was predetermined in favor of the Elwha dams and their owners. In 1949, Doherty had requested the state's position, noting the frequent complaints he received and voicing his willingness to commence action on behalf of the public. He referred to a recent complaint, a letter to the *Evening News* in which "an indignant citizen poses a very fair question" about whether society had lost control of its governance, about how justice was framed and executed on the north Peninsula.[1065]

R.A. Porsch was the author of the timeless letter. He asked how it could be the owners of the Elwha dam could destroy so many fish with no punishment. "Two men dynamite a stream for fish and kill a few," he wrote. "They get 30 days in jail, $50 fine and plenty of adverse publicity. Another man kills millions of fish every year and not a word is said or published. Is that justice weighed on the same scale," he wondered. "A farmer wants to irrigate his land but before doing this he must have a water right showing that it does not affect the propagation of any wild life and especially fish," Porsch continued. "But another can lower or raise a whole river in less than fifteen minutes and he does not need any permit." On September 28, "one of the branches of the lower Elwha river was about a foot deep and was alive with spawning salmon." On the next day "the river was lowered so much that this stream was absolutely dry." Porsch wanted to know the fate of the "millions of fertile eggs" that had been in the river. "Is it just that one man can control a river which belongs to all of us, kill millions of fish each year and not even one word is whispered about it," he concluded. "And if you or I ever even gaffed one

[1065] Howard V. Doherty to Ed Benn, October 6, 1949 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

salmon we would be convicted."[1066]

Porsch's letter criticized his local and state leaders for failing to reconcile private and public uses of the Elwha River. He believed that his community had lost control over the river to a process granting unrestricted freedoms to private interests. Two Port Angeles men reinforced his point a few years later, in 1956, when they sent packages of dead fingerlings to the Department of Fisheries. The Elwha dam had abruptly raised and lowered the river, leaving stranded salmon everywhere. "There were lots of dead fish, Mr. Bell," W.H. Gwynn wrote. "You will receive these fish from time to time." Willard Cargo voiced similar frustrations. "I wonder who is responsible for this destruction of small fish?"[1067]

Politics also delayed the removal of the Elwha Dams. The 1992 public law that had served to avoid protracted legal disputes over the river's fate nonetheless introduced a new risk. Even though the mills and park were in accord over the negotiated settlement, the motivations of new stakeholders now had a say in the outcome. "What it comes down to," Olympic National Park Elwha project coordinator Brian Winter noted in 1993, "is we will give Congress our figures, and after that it's a political decision."[1068] In 1995, the Department of Interior finalized a programmatic environmental impact statement and formally decided to remove the dams in February 1996. Interior's preferred alternative that relied on the river to naturally erode and remove most of the accumulated sediment

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[1066] *Port Angeles Evening News*, October 6, 1949.

[1067] W.H. Gwynn to Milo Bell, September 4, 1956; Milo C. Bell to W.H. Gwynn, September 5, 1956; Willard K. Cargo to Milo Bell, September 1956; Milo C. Bell to Willard K. Cargo, September 11, 1956 (Box 1010-102, "Elwha River" file. Washington State Archives, Olympia, WA).

[1068] *Wall Street Journal*, August 5, 1993.

cost about $111 million. This estimate increased over time as the scope of the project expanded.[1069]

The outcome of the Elwha Dam process now lay largely in the hands of the Senate Appropriations Subcommittee that controlled a purse capable of funding the project. Chairman Slade Gorton, coincidentally, had formerly served as Washington state attorney in the 1970s. He had been unsuccessful in the state's efforts to block the federal court ruling that reestablished tribal fishing treaty rights. Many viewed Senator Gorton as antagonistic to dam removal. In 1995, the subcommittee endorsed a statement opposing the Interior's plan. It instead called on all interested parties from the north Peninsula to find a "more fiscally responsible and achievable solution."[1070]

In early 1994, a small group called Rescue Elwha Area Lakes (REAL) formed in Port Angeles with the purpose of saving the Elwha River dams. It was led by a few Clallam County men who had been writing in support of the Elwha Dams to Port Angeles and Seattle newspapers for several years.[1071] "When and if the Friends of the Earth and people like them succeed in convincing our government numbskulls into removing the Elwha dams," Donald Rudolph asked the readers of the *Daily News* in 1991, "do you think that it will be the end of them for a while?"[1072] In January 1994, REAL met at

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[1069] Olympic National Park,1994, pp. xi-xviii; National Park Service, "EIS-Questions and Answers enclosure, Elwha River Ecosystem Restoration Implementation," (U.S. Department of the Interior, 1996).

[1070] *Peninsula Daily News*, August 14, 1995; *High County News*, March 2, 1998. http://www.hcn.org/issues/125/3994 [viewed February 27, 2012].

[1071] See for example: *Peninsula Daily News*, April 11, 1990 (B.L. Adamire letter to editor, "Elwha dam decision absurd"; *Peninsula Daily News*, July 1, 1990 (B.L. Adamire letter to editor, "Lake Aldwell a wildlife haven"; *Seattle Times*, August 3, 1990 (J.M. Chastain letter to editor, "Removal of dams would create an environmental disaster.")

[1072] *Peninsula Daily News*, July 7, 1991.

Aggie's Restaurant in Port Angeles to present its case to about 120 persons. "There's a powerful group in this country that's going to trash this Peninsula as a place to live unless we get excited and do something about it," leader J. Marvin Chastain warned. The meeting, nominally sponsored by United We Stand America to present Republican candidate Laurie Phillips, provided a forum for anti-government ills and pro-dam views.[1073]

The group gained stature, and published a newsletter with area paper *Citizen's News* to explain why dam removal was a poor decision for the north Peninsula. They presented reasons to keep the dams that included the use of Lake Aldwell by trumpeter swans and other wildlife, the environmental danger of releasing silt trapped behind the dams and the belief that state-of-the-art fish passage facilities could instead save the salmon runs. REAL also claimed that Asians, "salmon pirates" and Indians would catch whatever salmon the river produced. Moreover, the group asserted the reason environmental groups wanted to remove the structures on the Elwha was to establish precedents to remove other Pacific Northwest dams.[1074]

Senator Gorton developed an interest in REAL. The group supported his claims that there was local disfavor on the Olympic Peninsula toward dam removal. By late 1995 REAL had distributed a videotape to members of Congress urging them not to support dam removal. According to the *Daily News*, the video claimed to expose the plan of "'virgin Earth cultists' attempting to bring the North Olympic Peninsula back to pre-Columbian times" and explained the government's shoddy resource management record

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[1073] *Peninsula Daily News*, January 26, 1994.

[1074] *Peninsula Daily News*, November 26, 1991; Rescue Elwha Area Lakes (REAL) newsletters, September 16, 1994; December 6, 1994; September 7, 1995; *Seattle Times*, May 19, 1994.

on the peninsula. REAL also submitted its own restoration plan that called for a fish ladder on the lower dam and a trap and haul operation on the upper dam. The group noted that its proposal was cheaper and more effective than Interior's plan.[1075]

Olympic National Park was caught off-guard and had done little to counter the campaign's claims. "There's a lot of false information out there," Winter had told the *Seattle Times* in 1994. "We've done a poor job of getting the word out."[1076] Except when called upon to do so by environmental impact statement requirements, Olympic rarely entered the debate but to repeat what it had been saying all along. "If the dams remain, the runs are going to die out," Winter warned the *Daily News* in 1996. A sense of confusion pervaded Port Angeles. Many residents voiced concern for the flickering salmon, but political uncertainty kept the removal process from moving forward.[1077]

In May 1996, the Elwha Citizens Advisory Committee, an ad-hoc group of 13 members representing various community interests including Daishowa, city and county officials, and a fisheries biologist from Peninsula College submitted their own restoration plan to state congressional delegates. The group emphasized the need to protect the mill from litigation and the city from economic troubles. While it called for the immediate federal purchase of the dams, it recommended a slowly phased restoration that might lead to dam removal only if funds were forthcoming. The committee's recommendations appeared to appease local community and industry officials more than offer realistic

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[1075] *Peninsula Daily News*, March 17, 1995; Rescue Elwha Area Lakes (REAL) newsletter, September 7, 1995; *Peninsula Daily News*, September 29, 1995; October 4, 1995; *Citizen's News*, May 3, 1996; Robert Crittenden, "A Sane and Economic Plan to Restore Salmon to the Elwha," (draft plan), January 19, 1996, pp. 1-21.

[1076] *Seattle Times*, May 19, 1994.

[1077] *Peninsula Daily News*, June 7, 1996; February 19, 1996.

restoration measures. The mills supported the plan likely because it reinforced the deal already made with the Department of Interior to purchase the dams and arrange for replacement electricity.[1078] The government offer was too important to be derailed by REAL. As later recalled by Orville Campbell, former resident engineer for James River, "it was the best deal we could get… and probably the only deal we could get."[1079]

The competing local plan may have been the undoing of REAL. Chastain strongly criticized the effort and implied the committee had resorted to back room decision making. "I'm categorically against removing the dams," he told the *Daily News*. "This is a left-handed way of getting citizen approval. However you sugarcoat it, it's still the same story."[1080] Regardless, annual Congressional appropriations toward dam purchase slowly accrued. REAL members wrote a few more letters and then faded away. In a parting shot, Chastain called Olympic National Park's plan a "great environmental destruction in the name of restoring the ecosystem."[1081] Meantime, Senator Gorton unsuccessfully attempted to make the removal of the Elwha dams conditional upon legislation that prevented the removal of any dams on the Columbia or Snake Rivers without congressional approval. By early 2000, federal funds were available to purchase

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[1078] Elwha Citizens' Advisory Committee (Recommendations of), "The Elwha River and Our Community's Future," April 30, 1996.

[1079] *Peninsula Daily News*, September 13, 2011. http://www.peninsuladailynews.com/article/20110913/NEWS/309139992/the-elwha-dams-part-3-historical-series-8212-fisheries-dams [viewed February 25, 2012].

[1080] *Peninsula Daily News*, February 19, 1996; May 7, 1996; May 8, 1996; *Seattle Post-Intelligencer*, July 31, 1996; *Peninsula Daily News*, May 9, 1996; *Citizen's News*, May 3, 1996.

[1081] *Peninsula Daily News*, May 9, 1996; September 13, 2011. http://www.peninsuladailynews.com/article/20110913/NEWS/309139992/the-elwha-dams-part-3-historical-series-8212-fisheries-dams [viewed February 25, 2012].

the Elwha and Glines projects. In March of that year, the Bureau of Reclamation commenced operation of the dams.[1082]

The impossible suddenly seemed possible: removal of the Elwha River dams. But the planning process continued as the Park Service negotiated with the City of Port Angeles and the Lower Elwha Klallam Tribe to develop mitigation strategies and memorandums of understanding relating to water treatment and a hatchery. Interior also prepared a supplementation environmental impact statement to account for the federal listing of bull trout (*Salvelinus confluentus*) and chinook salmon as threatened species under the Endangered Species Act. As each year passed, national environmental policy experts continued to wonder whether the dams would go. "Needless to say, there is no room for overconfidence here," Charles Wilkinson wrote in 2004, warning of opponents of the decommissioning. "This would be an historic breakthrough, and breakthroughs always threaten vested interests" including defenders of the status quo at major dams on the Snake, Colorado and other rivers. "They know that taking out the Elwha dams will, like nothing else yet, symbolize the installation of a new way of looking at western rivers."[1083]

Is the Elwha River dam removal a harbinger or facilitator of future large-scale dam removal efforts? The question can be approached in different ways. First, the region's economy is heavily dependent upon dams. Starting in the 1930s, government planners rapidly transformed the Pacific Northwest into a network of flood control,

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[1082] National Park Service, "Timeline of the Elwha 1992 to present." http://www.nps.gov/olym/historyculture/timeline-of-the-elwha-1992-to-present.htm [viewed February 25, 2012; *High County News*, March 2, 1998 http://www.hcn.org/issues/125/3994 [viewed February 27, 2012].

[1083] Wilkinson, C., in *Away Out Over Everything*, 2004, p. 77.

irrigation and hydroelectric projects that still exist. About 60 percent of the region's electricity currently comes from federal and non-federal hydroelectric power.[1084] Should dam removal efforts in the Pacific Northwest threaten to undermine the region's economic stability, powerful forces would likely push back as aggressively as historical forces advocated for the construction of the dams. The negotiations leading up to the decision to remove the Elwha River dams were successful, in part, because the dam's electricity was replaceable from the Bonneville Power Authority on the Columbia River. In addition, important competing factors such as agricultural irrigation were not relevant. In recent years, efforts to remove dams on the mainstem Snake River, tributary to the Columbia, have failed, at least for now. But dam removals under consideration on the Klamath River in Oregon and California may not.[1085]

Another aspect to the question relates to what kinds of dams have already been removed, and why did the removals occur. Although dams are typically perceived as everlasting physical objects, there is no real record of how many have disappeared over time in the United States. The actual number of dams constructed in early America is unknown, as is the total number of dams ever built. Moreover, the historical "decay rate" of dams is unknown, as is the current number of dams still in place. While many structures remain, many others presumably perished. It is likely that owners or natural forces demolished numerous small dams. An analysis of Corps of Engineers data

[1084] Bonneville Power Administration, "NW hydro, power generation." http://www.bpa.gov/power/pl/columbia/2-gener.htm [viewed February 28, 2012].

[1085] *Idaho Statesman*, August 3, 2011. http://www.idahostatesman.com/2011/08/03/v-print/1748255/feds-still-on-losing-side-of-salmon.html [viewed February 27, 2012]; *San Jose Mercury News*, February 27, 2012 http://www.mercurynews.com/breaking-news/ci_20055248 [viewed February 27, 2012]; See also: "Savage Rapids Dam Gone," *The Osprey* 65(January 2010), pp. 9-10.

conducted in the early 1990s estimated that over 2 million dams remained in place across the country.[1086] The National Inventory of Dams classifies about 75,000 of these as dams of "environmental consequence."[1087] The construction of these dams largely occurred starting in the 1930s and peaked in the 1960s. Few dams have been added since the mid-1980s.[1088] The Elwha dams are similar to only 3 percent of these dams, or those whose primary purpose is to generate electricity (Table 30.1).[1089]

Available records dating to 1912 suggest that when dams have been removed in the country, the primary reasons for removal were environmental, safety and economic. In 1999, American Rivers, Friends of the Earth and Trout Unlimited identified more than 465 dams that had been removed in the United States since 1912, with 100 more committed or in process. States with the most recorded removals included Wisconsin, California, Ohio, Pennsylvania and Tennessee. Where information was available, most removed dams were small with an average height of about 21 feet and average length of 224 feet. Four dams were 120 feet or taller, with the tallest at 160 feet.[1090]

[1086] Graf, W.L., "Landscapes, commodities, and ecosystems: the relationship between policy and science for American rivers," in National Research Council, *Sustaining Our Water Resources* (Washington, D.C.: National Academy Press, 1993a).

[1087] These are structures greater than 6 and 25 feet high with more than 50 and 15 acre-feet of storage, respectively, as well as structures of any size that pose a significant downstream threat to human lives or property.

[1088] Graf, W.L., "Dam nation: a geographic census of American dams and their large-scale hydrologic impacts," *Water Resources Research* 35,4(1999):1305-1311; ASCE Task Committee on Guidelines for Retirement of Dams and Hydroelectric Facilities, *Guidelines for Retirement of Dams and Hydroelectric Facilities* (New York: American Society of Civil Engineers, 1997), pp. 1-3.

[1089] The Heinz Center, *Dam Removal, Science and Decision Making* (Washington, D.C.: The H. John Heinz III Center for Science, Economics and the Environment, 1992), p. 35.

[1090] American Rivers, Friends of the Earth, Trout Unlimited, *Dam Removal Success Stories, Restoring Rivers Through Selective Removal of Dams That Don't Make Sense* (1999). http://www.americanrivers.org/site/PageServer?pagename=AMR_press_damremovalpublic [viewed May 2006].

Additional research has found that dam removal considerations can include a variety factors that provide indicators of decision making, such as physical characteristics of watersheds, streams and reservoirs; chemical characteristics of water and sediments; ecological characteristics; economic considerations; and social concerns and values. The Elwha dam removal includes overlapping factors that include downstream sediment systems, floodplain geomorphology, aquatic and riparian ecosystems, fish and terrestrial animals, safety and security, and cultural values. These overlapping factors make it broadly comparable to other dam removal decisions in the country (Table 30.2).[1091]

With respect to size and scale, the Elwha River restoration is unique. It comprises the largest dam removal effort in the country to date. While numerous small dams have been removed, the highest dam ever slated for dismantlement in the United States is the Glines dam (210 feet) on the Elwha River (see Figure 30.2).

American society has begun to reconsider its long-held view of dams as a permanent landscape fixture. During the next few decades, several hundred dam owners will have to seek new operating licenses from the federal government. The engineering life of many of these projects has been reached or will soon expire. Moreover, a large footprint of unsafe and unproductive structures lies across many of the nation's watersheds. It is unlikely that status quo conditions at all of these will be maintained merely for the sake of their longevity. The removal of the Elwha River dams may be pointed to as an example of what is possible.[1092]

[1091] The Heinz Center, 2002. These data, however, do not quantify the percentage of dams removed in the U.S. according to decision indicator, making more sophisticated comparisons difficult.

[1092] With respect to the subset of dams whose federal licenses are expiring within the next few decades, pooled data and more rigorous analysis are needed. This could include a nested analysis of the possible extinction of existing dams in salmonid regions, as well as a demographic assessment of dams and their

But will the experience on the Elwha River meaningfully inform decision-making processes on other rivers beyond its symbolic significance? Two considerations may point to the answer yes. First, the 1992 Elwha Restoration Act that negotiated a path forward for removal of the Elwha dams considered a variety of cultural, social and economic interests. This process essentially replaced the concept of "winners" and "losers" with the provision of "quid pro quo." The idea of quid pro quo, or something for something, attempts to balance equitably what is taken away with what is given. It is a counterbalancing effort or a "fair exchange."[1093] For example, the pulp and paper industry and City of Port Angeles saw value in keeping the dams. They provided cheap electricity and their removal could have compromised the quality of water feeding the city's municipal and industrial consumers. The negotiated settlement provided alternative means to address these needs. The dams were terminated, but what they had provided and their method of removal ensured a continuity of service.[1094]

This approach stands in contrast to the sequence of termination and creation that took place when the Olympic Power Company built the lower Elwha River dam. In that era, technological innovations that had enabled hydroelectric development did not adequately counterbalance important competing needs, such as the fisheries and those dependent upon that natural resource. Thomas Aldwell and many in his community

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human environment to inform the social and cultural aspects of potential dam removal decisions. See generally: American Rivers, Friends of the Earth, Trout Unlimited, 1999; Coggins, G.C., Wilkinson, C.F., Leshy, J.D., 2002; The Heinz Center, 2002.

[1093] Brewer, G.D., "On the theory and practice of innovation," *Technology In Society* 2(1980):337-363, p. 337.

[1094] *Elwha River Ecosystem and Fisheries Restoration Act*, Public Law 102-495, 1992 (106 Stat. 3173). Similar stakeholder negotiations took place with other parties, including the Lower Elwha Klallam Tribe and residents in the lower Elwha River valley and estuary; Brewer, G.D., 1980, p. 337; Garry D. Brewer and Peter DeLeon, *The Foundations of Policy Analysis* (Homewood, IL: Dorsey Press, 1981), p. 386.

believed that a "wild stream crashing down to the Strait" could be destroyed in order to create "peace and power and civilization." They believed the Elwha River with dams better served social and economic needs on the north Olympic Peninsula than without dams. Likewise, the *Port Angeles Evening News* appealed to utilitarian value when calling on citizens to approve the industrial water pipeline bond in 1929. Each vote, the editor wrote, carried everyone to prosperity.[1095]

By this measure, the historical Elwha River experience was crafted as a net gain for the north Peninsula and much of the country. Timber product manufacturing sustained Port Angeles' economy for decades and provided the world market with highly refined and valuable pulp products. These "winners," however, stood in stark contrast to "losers" such as the Elwha Klallam, commercial and sport fishers, Olympic National Park, the river basin and marine ecosystems, and environmental and public health outcomes. While near-term gains were realized from the exploitation, there were also near-term costs as well as impacts that continue and will remain. These include a legacy of environmental contamination, socioeconomic harm, human disease and fisheries extinction and degradation.[1096]

Some of these impacts might have been mitigated at the time the Elwha dam was built, but others either did not have technological solutions or could not have been foreseen. Further, as Crown Zellerbach argued during its permit relicensing, "the dam might not have been economically feasible" had conditions to mitigate environmental impacts been imposed. In other words, the project may have been feasible only if society

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[1095] Aldwell, T.T., 1950, p. 80; *Port Angeles Evening News*, July 26, 1929.

[1096] Brewer, G.D., "Termination: hard choices-harder questions," *Public Administration Review* 38,4(1978):338-344, p. 12.

and the environment shouldered the burden of its damaging effects instead of the Olympic Power Company and its investors. There were clear winners and losers. And the Elwha River fisheries ecosystem and its human dependents were largely terminated so that an industrial system in Port Angeles could be created.[1097]

The second reason the Elwha dam removal experience may substantively inform future dam removals is because its governmental policymaking process addressed risk-promoting side effects. These events, or risk tradeoffs, occur when efforts to reduce one form of risk may bring about other unanticipated or undesirable outcomes. The problem can be challenging when one government agency implements projects that result in countervailing risks to another agency's or department's interests. [1098] This type of inter-agency conflict can lead to risk dilemmas where environmental and human systems overlap. Historically, for example, the construction of federal dams in the 1920s compromised efforts by the Washington State Fisheries Commission to minimize fisheries habitat degradation. In this example, the needs of industry, municipal and agricultural users countervailed the needs of fish, and later federal entities with preservation and wilderness protection mandates. More recently, Washington State's

[1097] Crown Zellerbach Corporation Amended Application for License, FERC Elwha Power Plant, Project No. 2683, Elwha, Washington, "Exhibit S," 1979 (Elwha File, Olympic National Park, Port Angeles, WA).

[1098] The consideration of risk tradeoffs in several fields of study has advanced since the early 1990s. Active fields include public and environmental health, economics and law. Risk tradeoff analysis refers to the analysis of a regulation to understand its primary risk reduction effect and the chance that secondary effects, or adverse outcomes, will result. The term is also referred to as countervailing or ancillary risk. See generally: John D. Graham and Jonathan Baert Wiener, editors, *Risk versus Risk* (Cambridge, MA: Harvard University Press, 1995); Lester B. Lave, *The Strategy of Social Regulation* (Washington, D.C.: Brookings Institution, 1981); Lawless, E.W., Jones, M.V., Jones, R.M., in *Risk Evaluation and Management*, 1986; W. Kip Viscusi, *Fatal Tradeoffs: Public and Private Responsibilities for Risk* (New York: Oxford University Press, 1992); Viscusi, W.K., "Risk-risk analysis," *Journal of Risk and Uncertainty* 8(1994):5-17.

efforts to reduce pulp mill effluent discharges into Port Angeles harbor by burning the materials led to the exacerbation of air quality problems in the city.

These types of outcomes are not uncommon events and continue to challenge policymaking in many fields and disciplines. They tend to occur when agencies succumb to a narrow focus or view, engage in fragmented decision making, do not consider risk holistically, ignore affected populations and favor or bias new untested technologies.[1099] William Ruckelshaus once suggested that the capacity of government to develop a formal process that could assess and manage risks across agencies sharing jurisdiction over hazards would be a "miraculous" accomplishment.[1100]

But during the Elwha River restoration planning, many potential risk trade-offs were not ignored. One reason is because the National Environmental Policy Act compels agencies to consider the environmental impacts of their actions. The Elwha restoration process was supported by several cooperating agencies and entities including the Corps of Engineers, Bureau of Indian Affairs, Bureau of Reclamation, Fish and Wildlife Service and Lower Elwha Klallam Tribe.[1101] Additional credit stems from the Elwha Restoration

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[1099] See generally: Stephen Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* (Cambridge, MA: Harvard University Press, 1993); Graham, J.D. and Wiener, J.B., 1995; Rascoff, S.J. and Revesz, R.L., "The biases of risk tradeoff analysis: towards parity in environmental and health-and-safety regulation," *University of Chicago Law Review* 69(2002):1763-1836; Wexler, J.D., "Risk in the balance," *Connecticut Law Review* 30(1997-1998):225-256.

[1100] Ruckelshaus, W.D., "Science, risk, and public policy," *Science* 221,4615(1983):1026-1028, p. 1028; for current examples and context, see generally: Brewer, G.D., "The challenges of interdisciplinarity," *Policy Sciences* 32(1999):327-337; Jo Ivey Boufford and Phillip R. Lee, *Health Policies for the 21st Century: Challenges and Recommendations for the U.S. Department of Health and Human Services* (New York: Milbank Memorial Fund, 2001); National Research Council, *Issues in Risk Assessment* (Washington, D.C.: National Academy Press, 1993b; National Research Council, 1994; National Research Council, 1996a; National Research Council, 1996b; John Wargo, *Our Children's Toxic Legacy: How Science and Law Fail to Protect Us from Pesticides* (New Haven: Yale University Press, 1996); John Wargo, *Green Intelligence. Creating Environments that Protect Human Health* (New Haven, CT: Yale University Press, 2011).

[1101] National Park Service, 1995; National Park Service, 2005.

Act that, for all practical purposes, required the Department of Interior to pay attention to "possible adverse impacts of dam removal." Following this direction, National Park Service representatives met with the City of Port Angeles, Dry Creek Water Association, Elwha Place Homeowners Association and the Lower Elwha Klallam Tribe to discuss protective measures, mitigation facilities and responsibilities before dam deconstruction started.[1102]

For these reasons, the decision-making process leading up to the Elwha River ecosystem restoration may provide more than symbolism to future large-scale dam removal efforts in the country. It has demonstrated how the removal of hydroelectric dams can be carried out with the practical mitigation of adverse consequences. And it offers an example of how forces of longevity, permanence and the status quo can be redirected creatively, not destructively. This is a significant public policy accomplishment. As policy scientist Garry Brewer has observed, "disturbing the status quo is seldom easily or painlessly done."[1103] The Elwha River now offers hope and an example to future decision makers tasked to confront fundamental problems of survival. Such problems may require major shifts in conventional policy, the need to adapt and devise new modes of problem solving, and the courage to consider terminating untouchable programs or policies.

Events on the Elwha River now represent a new opportunity and new expectation.

[1102] *Elwha River Ecosystem and Fisheries Restoration Act*, Public Law 102-495, 1992 (106 Stat. 3173); National Park Service, "Timeline of the Elwha 1992 to present." http://www.nps.gov/olym/historyculture/timeline-of-the-elwha-1992-to-present.htm [viewed March 3, 2012].

[1103] Brewer, G.D. and deLeon, P., 1983, p. 386; Brewer, G.D., 1978, p. 340; Brewer, G.D., 1980, p. 340 (quote).

"It's the beginning of the beginning of another phase," Olympic National Park Superintendent Karen Gustin said at the decommissioning of the dams in 2011.[1104] But how will society know whether the Elwha River restoration is successful. How will success be defined?[1105] It might seem reasonable that all involved parties could be entitled to measure and jointly declare restoration "success" or "failure." Stakeholders, however, may hold different or even competing restoration expectations that prevent any uniform definition or declaration short of more general definitions. Additionally, outside interests not participating in the restoration but affected by it could hold different views about success and failure. Nonetheless, some of the potential problems and opportunities can be envisioned within a framework of success and failure (Table 30.3).

Such a framework includes short-, intermediate and long-term time scales that spell out conditions of success or failure, and that also consider potential problems or opportunities at each stage. For example, while the successful and on-time removal of the dams represents a short-term success, possible failures include delays that jeopardize the restoration plan and outcomes. Should this occur, problems could include original stakeholders attempting to renegotiate terms, new stakeholders demanding participation, and cost overruns threatening project outcomes. Over the longer time scale, success and failure could likewise present opportunities and problems. For example, if salmon stocks rebound in greater numbers and more rapidly than anticipated, increased allocation of the fish would benefit the ecosystem and user groups. But if stocks do not rebound, allocation constrictions might create tensions among user groups and discourage the

[1104] *Peninsula Daily News*, June 2, 2011. http://peninsuladailynews.com/article/20110602/NEWS/306029988 [viewed February 25, 2012].

[1105] Brewer, G.D., 1978, p. 340.

possibility of other dam removals.

Unfortunately, the Elwha Restoration Act did not require or provide resources for project evaluation. In response, the National Park Service has had to develop collaborative research partnerships with other scientific entities and funding sources to try to study what effects dam removal will have on the river's ecosystem. In 2008, the journal *Northwest Science* devoted a special issue to the publication of state, federal, tribal and university studies of the Elwha River restoration effort, including baseline investigations.[1106] The major agencies conducting research include Olympic National Park, the Geological Survey and the U.S. National Oceanic and Atmospheric Administration.[1107]

Will the Elwha salmon restore themselves? This is the "big" question. It is one that previous problem-solving implementations in the region have also asked. Throughout the past few decades, the Pacific Northwest has addressed continuing salmon species declines by forming large cooperative efforts. Joint management attempts have included court-ordered treaty tribes and state co-management agreements, as well as federal efforts such as the Northwest Power Planning Council. In 1996, Congress amended the Magnuson Fishery Conservation and Management Act to give the Pacific Fishery Management Council authority to develop fishery plans and regulations within the region. Since, 2000, the federal Pacific Coastal Salmon Recovery Fund has

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[1106] Winter, B.D. and Crain, P., "Making the case for ecosystem restoration by dam removal in the Elwha River, Washington," *Northwest Science* 82(2008):13-28, p. 25; "Dam Removal and Ecosystem Restoration in the Elwha River Watershed, Washington," *Northwest Science Special Issue* 82(2008).

[1107] See: "Elwha River Restoration." http://www.nps.gov/olym/naturescience/elwha-ecosystem-restoration.htm; "USGS Science to Support the Elwha River Restoration Project." http://walrus.wr.usgs.gov/elwha/; "Restoring the Elwha River." http://www.nwfsc.noaa.gov/features/elwha_river/elwha-restoration.cfm [Viewed February 25, 2013].

distributed hundreds of millions of dollars to Washington, Oregon, California and Alaska to fund habitat restoration.[1108] Until recently there have been few rigorous attempts to evaluate the effectiveness of these kinds of broad interventions. The inability of policymakers to prioritize evaluative needs as a means of improving problem-solving effort has not gone unnoticed. In the Pacific Northwest, studies that have been undertaken concluded that some large-scale technological interventions have actually contributed to the salmon decline.[1109]

What could make the Elwha restoration different from typical management approaches is its reliance on an essentially pristine watershed within Olympic National Park. The plan emphasizes natural processes that minimize the role of technological intervention. In 1995, the Elwha restoration environmental impact statement prepared by the Department of Interior acknowledged that hatcheries could possibly impact naturally derived genetic diversity and foster outbreaks of disease. National Park Service managers believed that replacing wild stocks with costly, artificially-produced fish was inadequate.[1110]

[1108] *Magnuson-Stevens Fishery Conservation and Management Act*, Public Law 94-265, October 11, 1996; National Oceanic and Atmospheric Administration, *2005 Report to Congress, Pacific Coastal Salmon Recovery Fund FY 2000–2004* (Seattle, WA: U.S. Department of Commerce, National Marine Fisheries Service, Northwest Region, 2005).

[1109] Berry, J., Brewer, G.D., Gordon, J.C., Patton, D.R., 1998; Kai N. Lee, *Compass and Gyroscope: Integrating Science and Politics for the Environment* (Washington, D.C., Island Press, 1993); Lichatowich, J.A., 1999; National Research Council, 1996b; Wissmar, R.C. and Bisson, P.A., "Strategies for restoring rivers: problems and opportunities," in *Strategies for Restoring River Ecosystems: Sources of Variability and Uncertainty in Natural and Managed Systems*, Robert C. Wissmar and Peter A. Bisson, editors (Bethesda, MD: American Fisheries Society, 2003); Philip Roni, editor, *Monitoring Stream and Watershed Restoration* (Bethesda, MD: American Fisheries Society, 2005).

[1110] National Park Service, 1995, pp. 161-163. For contemporary discussions about salmon and fisheries restoration see for example: National Research Council, *Sustaining Marine Fisheries* (Washington, D.C.: National Academy Press, 1999); National Research Council, *Atlantic Salmon in Maine* (Washington, D.C.: National Academy Press, 2004); National Research Council, *Developing a Research and Restoration Plan*

But the agency did see a necessary role for fish culture and committed to build a new hatchery for the Lower Elwha Klallam Tribe. The facility, finished in 2011, will use as brood stock remnant populations of chinook, coho, pink and chum salmon and steelhead that remained in both the upper and lower river. These fish will reseed and "imprint" the river where, eventually, returning adults will spawn naturally. For stocks like sockeye, spring chinook and pink, either extinct or present in very small numbers, the restoration plan considers using substitute stocks of fish physically and genetically close to Elwha River fish in the hatchery. As the wild population takes over, hatchery outplanting will reduce or end. The facility also was built to provide the tribe with an ongoing supply of steelhead fish to harvest until wild stocks rebuild.[1111]

The plan to build a new hatchery on the Elwha River as part of the restoration effort was a controversial topic as soon as dam removal became a reality. A central question has arisen: Is it appropriate to use any form of aquaculture on the Elwha River—during the restoration or at any time in the future? In 2012, four conservation groups filed suit against Olympic National Park, two other agencies and officials at the Lower Elwha Klallam Tribe for violating the Endangered Species Act. Specifically the tribe's use of nonnative steelhead hatchery could harm wild steelhead in the Elwha River.[1112] A year

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for Arctic-Yukon-Juskokwim (Western Alaska) Salmon (Washington, D.C.: National Academy Press, 2005a).

[1111] Olympic National Park, *Elwha River Ecosystem Restoration Implementation, Draft Environmental Impact Statement* (U.S. Department of the Interior, National Park Service, April 1996), pp. 59-62; "A Tribe Opts For Hatcheries to Bring Fish to the Elwha," KUOW, EarthFix, August 17, 2011. http://earthfix.info/water/article/un-damming-the-elwha-part-iii/ [Viewed February 24, 2013].

[1112] *Peninsula Daily News*, February 9, 2012. http://www.peninsuladailynews.com/article/20120210/NEWS/120209988/suit-filed-to-block-hatchery-salmon-in-elwha-river [Viewed February 24, 2013]. See also: *Seattle Times*, August 24, 2011. http://seattletimes.nwsource.com/html/localnews/2016005701_hatchery25m.html [Viewed March 4, 2012]; *Seattle Times*, February 28, 2012.

later, a federal judge dismissed part of the lawsuit after the tribe ended its stocking of the steelhead. But the central question remains and likely will persist into the future.[1113]

What is clear to nearly everyone is that the Elwha restoration represents a chance to bring back salmon. Also clear is that the opportunity rests upon the culmination of many events leading up to the present, a series of hard-fought gains (Figure 30.3). Moreover, it is clear that such opportunities are rare in a region whose salmon have suffered a long decline. In 1996—the year the Department of Interior completed its final implementation Environmental Impact Statement for the Elwha River—the National Academies published a stern report. It concluded that human development and natural resource use in the Pacific Northwest had led to widespread impacts and "formidable disruptions to the life cycles of anadromous salmon." It noted that these changes were "rapid by biological time scales." Across Washington, Oregon, Idaho and California, Pacific salmon had disappeared from about 40 percent of their historical breeding ranges over the last century. Adding in threatened or endangered populations increased the range size where loss has occurred to about two-thirds of this four-state area. Along the Pacific Northwest coast, total natural occurring salmon runs had been reduced to about one-third of their former numbers. In the region's largest basin, the Columbia, naturally produced salmon had declined to about one-eighth their former abundance. The authors concluded that "unless the momentum of human exploitation and transformation of the land waters

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http://seattletimes.nwsource.com/html/fieldnotes/2017619265_no_chambers_creek_hatchery_fish_planted_in_elwha_river_in_2012.html [Viewed March 4, 2012].

[1113] *Peninsula Daily News*, February 18, 2013. http://www.peninsuladailynews.com/article/20130219/NEWS/302199990/elwha-tribe-vows-not-to-unleash-nonnative-hatchery-fish [Viewed February 24, 2013].

changes drastically," the impacts would likely continue into the future.[1114]

In contrast to this grim scenario, in 2005 the Park Service's final environmental impact statement concluded that removing the Elwha River dams offered the single best chance to restore wild salmon runs anywhere in the Pacific Northwest.[1115] It offered a new arc of momentum. "I come from a time when we didn't give a damn about the fish," Dick Goin once reflected on the decision to remove the Elwha dams. "I'm just glad we've got a chance to correct it. Many of our blunders we can't correct."[1116] What now makes the Elwha River unique is not the current condition of its salmon—typical of many rivers across the Northwest—but its future prospects and the consensus of many different groups to see this future come true.

In September 2011, Olympic National Park Chief Fisheries Biologist Sam Brenkman introduced Dick Goin to hundreds of persons attending the Elwha River Science Symposium in Port Angeles at Peninsula College. Eighteen years earlier, Superintendent Contor had introduced Goin to scientists attending the wild fisheries conference at the college. Dick Goin again had the chance to talk about the Elwha's past and advocate for its future. Before he spoke, the crowd stood to applaud him. And when

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[1114] National Research Council, 1996b, pp. 2, 72 (quotes), 90. The report also acknowledged the uncertain and yet important role of natural variability that influences the abundance of salmonids in time and space. For example, natural environmental changes (e.g., disturbances such as droughts, wildfires, flow conditions, debris flows and extreme temperatures) in freshwater conditions can affect productivity (negatively and positively). In addition, short and long-term changes in ocean climate—including effects on temperature and currents—can affect salmon during their time at sea (which comprises the majority of their life cycle). The report argues that the "complexity of salmon life cycles and the communities in which they live should engender caution" in proposed solutions as well as interpretation of population status, "… especially in light of our limited understanding of salmon ecosystems." (National Research Council, 1996b, pp. 5, 35-45, 166-180, 360-361, quote on p. 38).

[1115] Olympic National Park, 1994; National Park Service, 2005.

[1116] *Chicago Tribune*, February 28, 1994.

he finished, they stood again. “Friday morning at the symposium was, basically, Dick Goin day,” outdoor writer, peninsula resident and fly fisherman Doug Rose recounted. The event prompted Rose to recall the countless number of dam removal meetings he had attended, where “Dick was always the strongest, most eloquent and authoritative voice for freeing the river and bringing back the salmon.” It seemed that many had come to pay their respects to Goin, to thank him for his service. Rose called him “the living force behind dam removal on the Elwha for decades,” and Lower Elwha Klallam habitat biologist Mike McHenry told the local newspaper “Dick is a guy who spoke for the salmon when the salmon had no voice.” On behalf of the tribe, McHenry presented Goin with a gift of a cedar carving.[1117]

Goin spoke for nearly 40 minutes about the Elwha River of his younger days. He described the intimate familiarity the fishermen had with its holes and riffles, the variety and abundance of life it supported, and the parade of activity and noise when the salmon runs came. Then he described how many millions of fish the dams had killed—“beyond comprehension”—whenever the engineers shut the gates to store water. He noted how the “destruction” had only recently stopped with the decommissioning of the dams, when the turbines finally stopped, meaning the dam operators no longer ramped the reservoirs and dewatered the lower river. And, in closing, he reminded his audience of how different the Elwha River of his memories was from today. “It is a quiet river now—” he closed, “no fish, no hordes of birds, no bears. There are no male kings, no huge redds by great Elwha

[1117] *Peninsula Daily News*, September 16, 2011. http://www.peninsuladailynews.com/article/20110916/news/309169978/hundreds-turn-out-for-elwha-river-science-talks-at-peninsula-college [viewed March 4, 2012]; Doug Rose, September 17, 2011. http://dougroseflyfishing.com/blog/?p=428 [viewed March 4, 2012]. Doug Rose, September 27, 2011. http://dougroseflyfishing.com/blog/?p=444 [viewed March 4, 2012].

females, no enormous hatches of aquatic insects, no quiet pools for the salmon to find rest. I guess that's it. That's why I've waited."[1118] Hearing these words, the audience undoubtedly took comfort in knowing that physical dam removal had just started on the Elwha. The time had finally come for salmon and life to return to the entire Elwha River.

Table 30.1 Primary purposes of American dams

Primary purpose[1, 2]	number of dams	percent
Recreation	26,817	36%
Fire and farm ponds	12,532	17%
Flood control	10,971	15%
Water supply	7,293	10%
Irrigation	7,223	10%
Tailings and waste	6,756	9%
Hydroelectric	2,259	3%
Navigation	226	<1%
Undetermined	1,110	1%

[1] Source: The Heinz Center, 2002, p. 35 and ASCE Task Committee on Guidelines for Retirement of Dams and Hydroelectric Facilities, 1997, pp. 1-3.
[2] As limited to U.S. Corps of Engineers definition of dams

[1118] Dick Goin presentation to Elwha River Science Symposium, September 17, 2011 (digital recording, Philip R.S. Johnson). Goin's observations of how the loss of salmon runs affected the larger ecosystem mirrors general scientific findings at larger ecosystem scales in the region. Because salmon contribute to a diversity of aquatic and terrestrial life in most of the Northwest's water bodies, scientists believe the loss of salmon points to the ill health of the region's entire natural community of life of which they are a part (Stouder, D.J., Bisson, P.A., Naiman, R.J., "Where are we? Resources at the brink," in *Pacific Salmon & Their Ecosystems, Status and Future Options*, Deanna J. Stouder, Peter A. Bisson, Robert J. Naiman, editors (New York: Chapman & Hall, 1997), pp. 375-387; Stockner, J.G. and Ashley, K.I., "Salmon nutrients: closing the circle," in *Nutrients in Salmonid Ecosystems: Sustaining Production and Biodiversity*, 2003, pp. 3-16.

Table 30.2 Key indicators for United States dam removal decisions vs. Elwha dams (may not be inclusive)

Key indicators for dam removal decisions[1]	**Elwha dams**
Physical	
River network segmentation	
Watershed fragmentation	
Downstream hydrology	
Downstream sediment system	✓
Downstream channel geomorphology	
Floodplain geomorphology	✓
Reservoir geomorphology	✓
Upstream geomorphology	
Chemical	
Water quality	
Sediment quality	
Air quality	
Ecological	
Aquatic ecosystems	✓
Riparian ecosystems	✓
Fishes	✓
Birds	✓
Terrestrial animals	✓
Economic	
Dam-Site economics	
Economic values, river reach	
Regional economic values	
Social	
Safety and security	✓
Aesthetics and cultural values	✓
Non-majority considerations	

[1] Source: The Heinz Center, 2002, p. 7.

Table 30.3 Elwha and Glines Canyon Dams removal aftermath considerations

Short-term	***problems***	***opportunities***
success		
Physical dam removal proceeds as planned, flood control and water quality objectives achieved		Restoration timeline met or shortened
Hatchery "jump start" of selected weakened stocks works		Restoration timeline met or shortened
Original stakeholders maintain commitments; new stakeholders demand inclusion		Increased contribution and participation
failure		
Physical dam removal and other physical objectives does not proceed as planned	Sediment load unmanageable; downstream water quality adversely affected Cost overruns – Congress does not step in with additional funds	
Hatchery "jump start" does not work	Weakened stocks lost	
Uncontrollable natural factors result in extra-low returns	Restoration plan and terms in jeopardy	
Uncontrollable external human factors, e.g., illegal harvest	Restoration plan and terms in jeopardy	
Stakeholders do not hold to original commitment, attempt to renegotiate terms	Restoration plan and terms in jeopardy	
New stakeholders demand inclusion	Restoration plan and terms in jeopardy	
Intermediate to long-term	***problems***	***opportunities***
success		
Stocks rebound	Breakdown in allocation among stakeholders, others Some stakeholders wish to maintain hatcheries/others do not	Allocation proceeds to satisfaction of all
Some stocks rebound	Breakdown in allocation among stakeholders, others Some stakeholders wish to revert to hatcheries/others do not	Allocation proceeds to satisfaction of all
General	Increased pressure on Columbia Basin hydro system and subsequent stress on Columbia salmon stocks	"Success story" influences additional dam/removal restoration efforts, lessons learned applied to other efforts
failure		
Stocks do not rebound	Breakdown in allocation among stakeholders, others Some stakeholders wish to revert to hatcheries while others do not	Use of disuse of hatcheries proceeds to satisfaction of all
Some stocks do not rebound	Breakdown in allocation among stakeholders, others Some stakeholders wish to revert to hatcheries while others do not	Use of disuse of hatcheries proceeds to satisfaction of all
General	Failure discourages other dam removal/restoration efforts	

Figure 30.1 Elwha Dam removal, 2011-2012



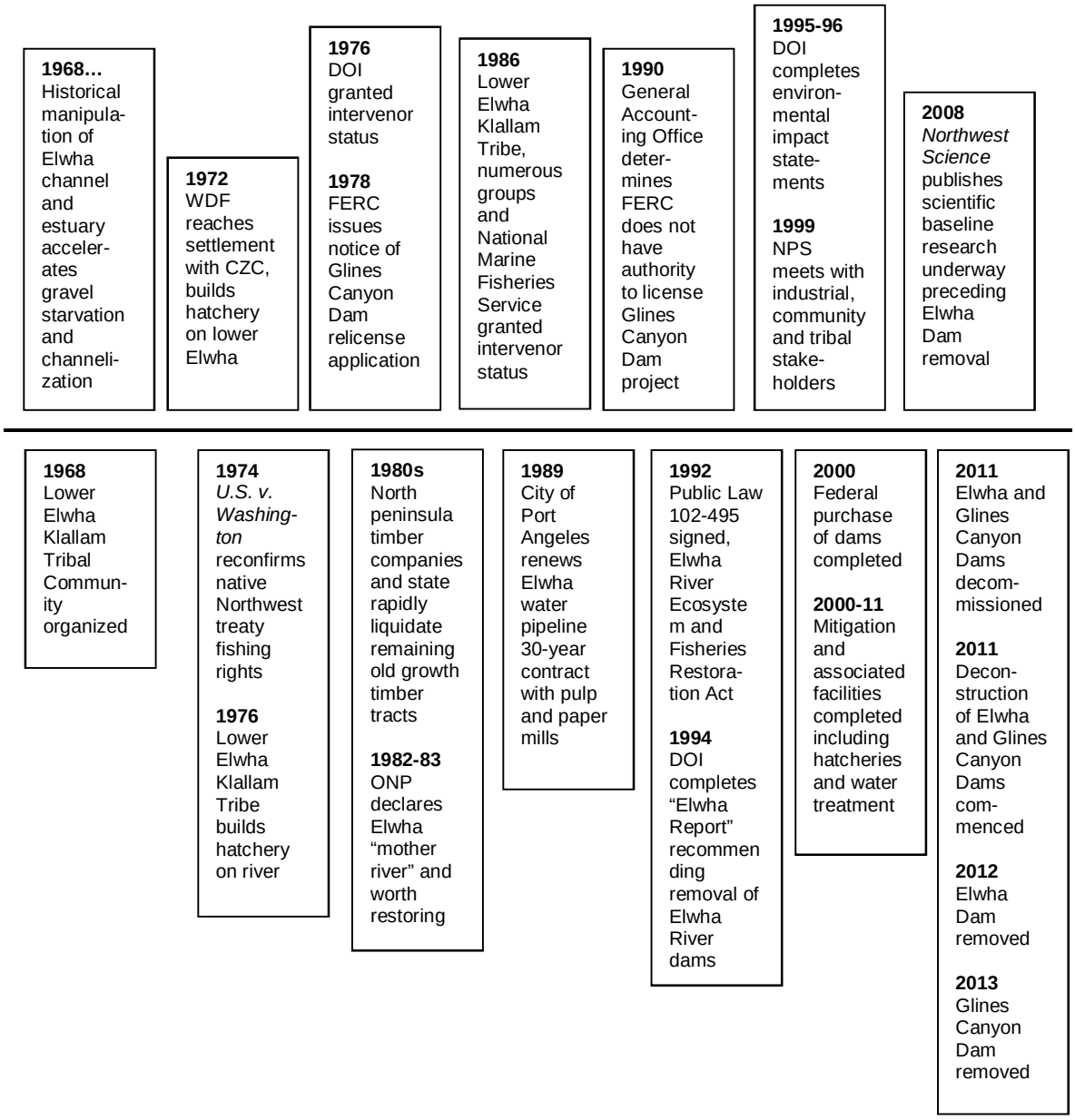
Source: "Elwha River Restoration Project." http://video-monitoring.com/construction/olympic/js.htm [Viewed 2011-2012].

Figure 30.2 Glines Canyon Dam removal, 2011-2012



Source: "Elwha River Restoration Project." http://video-monitoring.com/construction/olympic/js.htm [Viewed 2011-2012].

Figure 30.3 Timeline of notable events relating to Elwha River restoration, 1968-present



Part 9. Framing Effective Risk Management

Chapter 31 Six Principles: Messengers of Risk

The broad goal of this Elwha River story was to explore why some societies dependent upon natural resources succeed while others fail. Specifically, the story examined factors that have influenced the cultural and economic survival of social systems over time on the north Olympic Peninsula in Washington State. These included treatment of how societies attempt to regulate or guide their exploitative behavior, the interplay of groups competing for resources, considerations of equity and fair play among different users, the application of technology and science to resource management and the role of legal institutions and laws in adjudicating access and control to resources. Seven story parts profiled different perspectives and standpoints, assessing how and why the river was valued and used, and by whom. Main characters included Native groups, immigrant settlers, industrial and commercial interests, governmental entities, regulatory officials and individual advocates.

This story's analytical structure was guided by concepts relating to the disciplinary study of risk. "Risks," as defined by scholars Baruch Fischhoff and John Kadvany, "involve threats to outcomes that we value."[1119] As such, each story part offered an assessment of strategies employed by user groups to cope with threats, defend values and effect desired results. The strategies can be construed as survival techniques, or efforts to manage risks. Generally, the underlying experience of societies on the north Olympic Peninsula over the past 150 years is likely not dissimilar to other societies in other times and places. Human cultures competed with each other to control the

[1119] Fischhoff, B. and Kadvany, J., 2011, p. 22.

environment, put natural resources to use and build economies to sustain their societies. The management of risk by these societies is viewed, in the main, as a timeless priority.

If there is specific explanatory power to derive from the Elwha River story, it may be found in the lessons illustrated in each part. Should these lessons have bearing beyond the Elwha River story, they may serve as messengers of risk to other societies, present and future. Collectively, the lessons could be viewed as principles or essential guides for framing effective risk management.

First principle: Align cultural imperatives with ecological imperatives.

Societies that successfully ensured the perpetuity of desired natural resources recognized the interrelation of healthy environmental systems and human economic well-being. These societies employed socio-cultural techniques to guide responsible behavior, limit technological over-exploitation and regulate their treatment of the natural world.

Over time, pre-contact Native groups of the Pacific Northwest that depended largely upon the region's fisheries for their survival had implemented a variety of integrated social and cultural strategies to maintain the economic viability of the resource. They understood that their fate was tied to the health of the environment that supplied them with needed resources. They also understood that while they could not determine the natural flux of productivity across seasons and years, they could control their treatment of and impact on specific factors that affected productivity.

Perhaps most significantly, Native groups coupled their socio-cultural mores with the natural world in order to form an extraordinarily capable regulatory system. Highly

valued species were recognized as coequals to humans, leading to a set of religious and spiritual prescriptions of how to interact with the natural world. Taboo and ceremony served functions akin to law and statute, and myth and custom held constitutional sway. In addition, Native communities and individuals were largely embedded within every aspect of resource procurement and use. Nearly everyone participated, as all had a material stake in the outcome. The manner and method of exploitation was closely monitored, with stiff punishments and opprobrium for misuse of technologies and encroachment of fishing grounds. Moreover, resource flows were modulated across and within societies. Material wealth was accrued, but it was periodically circulated in an elegant socioeconomic process that transformed product into prestige.[1120]

For modern societies largely disconnected from the natural systems upon which they ultimately rely, the implications of this principle are nonetheless relevant. Foremost, communities should foster and support mechanisms to connect their populations with local and regional environmental resource systems wherever practicable. In so doing, increasing individual engagement with and respect for these systems may lead to greater participation in protecting and sustaining resources. First, it would increase the proportion of society that recognizes and understands the value of natural systems.

[1120] Suttles, W., 1987, pp. 45-63, 26-44, 15-25. On the subject of religion, ethics and spiritual treatment of nature, see for example: Booth, A.L. and Jacobs, H.M., "Ties that bind: Native American beliefs as a foundation for environmental consciousness," *Environmental Ethics* 12(Spring 2990):27-43; Charles S. Brown and Ted Toadvine, editors, *Eco-Phenomenology: Back to the Earth Itself* (Albany, NY: State University of New York Press, 2003); Richard L. Fern, *Nature, God and Humanity: Envisioning an Ethics of Nature* (Cambridge: Cambridge University Press, 2002); John A. Grim, editor, *Indigenous Traditions and Ecology* (Cambridge: Harvard University Press, 2001); Aldo Leopold, *A Sand County Almanac, And Sketches Here and There* (New York: Oxford University Press, 1989[1949]); Christopher D. Stone, *Earth and Other Ethics: The Case for Moral Pluralism* (New York: Harper & Row, Publishers, 1988); Taylor, P.W., "The ethics of respect for nature," *Environmental Ethics* 3(Fall1981):197-218; Thomson, I., "Ontology and ethics at the intersection of phenomenology and environmental philosophy," *Inquiry* 47(2004):380-412.

Second, it would foster society's propensity to develop and infuse cultural techniques to help safeguard natural resources from threats. In so doing, it would provide internal and self-realized checks and balances. It would impress upon individuals the adverse consequences of mistreatment to themselves and their communities. Ultimately, it would help to minimize socially destructive behaviors and thereby strengthen respect for and compliance with environmentally protective measures. It would enable populations to function within and help to prescribe their own sphere of risk management, thus fostering a greater degree of control over their own survival and autonomy.[1121]

Second principle: Prepare for the possibility of a breakdown in societal or ecosystem functioning caused by natural or human-derived events.

The advent of experiencing a systemic adverse change, while uncertain and unknowable, represents a possible worst-case scenario that should be imagined and articulated. Preventative and mitigating contingencies should be developed that rest on broadly adaptive and supple strategic responses.

The strong socioeconomic standing of pre-contact Pacific Northwest Native societies had rested upon centuries of successful adaptation. It had developed steady-state strategies to

[1121] On the contemporary role of cultural institutions in defining social priorities relating to the protection of fisheries and ecosystems, see for example: Warren, C.E., "Ecosystem management: theory and practice," in *Salmon Ecosystem Restoration: Myth and Reality. Proceedings of the 1994 Northeast Pacific Chinook and Coho Salmon Workshop*, Mary Louise Keefe, editor (Eugene, OR: American Fisheries Society, 1994), pp. 17- 27; Lackey, R.T., 1997; Lackey, R.T., "Restoring wild salmon to the Pacific Northwest: framing the risk question," *Human and Ecological Risk Assessment* 8,2(2002):223-232; Lichatowich, J., 1999, pp. 222-230; Lichatowich, J., "Ecosystem management: a search for a new story," *Salmon Ecosystem Restoration: Myth and Reality. Proceedings of the 1994 Northeast Pacific Chinook and Coho Salmon Workshop*, Mary Louise Keefe, editor, 1994, pp. 14-16; Lichatowich, J., in *Proceedings of a Symposium: Environmental Ethics and Future Management of Fishery Resources,* 1989, pp. 11-16.

compensate for wide fluctuations in natural productivity. It had also devised cultural mechanisms to ensure equitable resource distribution and responsible natural stewardship. But the entire strategic system was rapidly destroyed within one or two human generations at the hands of EuroAmerican fur traders, immigrant settlers and industrial resource extraction regimes. Alien infectious diseases, the radical disruption of existing property rights and sundering of customary modes of resource access resulted in large-scale death and psychological duress. Much of the fisheries resource was also destroyed, as were terrestrial ecosystems. Cascading second-order impacts accrued, including the intergenerational loss of cultural customs, social cohesion, technical skill and knowledge, and spiritual and material wealth. Some villages and societies that had survived for countless generations were destroyed within decades. Many surviving individuals were scattered and reduced to intense poverty and vulnerability.

While extreme, the catastrophic experience of these Native groups has taken place in other societies whose natural resource systems have collapsed or been compromised. In the case of the Pacific Northwest Natives, some groups demonstrated an ability to reshape economic functioning through experimentation, adjust to rapid cultural dissolution with alternative support systems, hold onto basic values and resources through sheer persistence and endurance, and maintain deep spiritual balance and dignity. Likely these responses reflected the powerful foundations that had built and propelled these societies for many centuries prior to the arrival of newcomers. Historical Native risk management systems had evolved to accommodate a variable and at times harsh environment, and in so doing eventually sustained a thriving culture and economy. While

much of it was destroyed, the core was not eradicated. Many Native groups in the Pacific Northwest have been able to reestablish their societal trajectory.[1122]

Currently, increasing climate variability associated with anthropogenic activities presents a potential systemic threat to the Pacific Northwest salmon fisheries, not to mention other natural and human populations. The region's anadromy is already experiencing large-scale declines and extinctions. Ongoing and future climate change could exacerbate these declines. It is unknown whether the fisheries will be able to adapt. Likely, salmonid populations that currently exist in healthy habitat will have the best chance of adaption and long-term survival. Those utilizing perturbed habitat will not. Given this emerging threat, risk managers should devise methods to mitigate possible adverse outcomes and, where possible, prevent damages with proactive responses. Current habitat restoration efforts should account for the impact these threats could have on expected outcomes. Target objectives should be recalibrated to reflect the likelihood of increased damages. Uncertainty of outcome should not be an excuse to delay developing a strategic response. Management efforts should be implemented now because hindsight measures will be too late.[1123]

[1122] See generally, for example: Olympic Peninsula Intertribal Cultural Advisory Committee, 2002; See also: Suttles, W., 1987, pp. 205-208.

[1123] Francis, R.C. and Mantua, N.J., "Climatic influences on salmon populations in the Northeast Pacific," in *Assessing Extinction Risk for West Coast Salmon,* A.D. MacCall and T.C. Wainwright, editors (U.S. Department of Commerce, NOAA Technical Memo, NMFS-NWFSC-56, 2002). pp. 37-67, 69-72. http://cses.washington.edu/db/pdf/Francis_Mantua_ClimateInfluences23.pdf [viewed March 18, 2012]; Bisson, P., "Salmon and trout in the Pacific Northwest and climate change," (Aquatic and Land Interactions Program, Pacific Northwest Research Station, U.S. Forest Service, Department of Agriculture, no date). http://www.fs.fed.us/ccrc/topics/salmon-trout.shtml [viewed March 18, 2012]; Battin, J.,Wiley, M.W., Ruckelshaus, M.H., Palmer, R.N., Korb, E., Bartz, K.K., Imaki, H., "Projected impacts of climate change on salmon habitat restoration," *Proceedings of the National Academy of Sciences* 104,16(2007):6720-6725. doi:10.1073/pnas.0701685104 [viewed March 18, 2012].

Third principle: Probe for inequities wherever decision making involves addressing competing interests.

A formative question for any decision-making process should be "How will equity be addressed?" This includes, for example, consideration of risk tradeoffs; incorporation and participation of competing perspectives; recognition of different value systems; concern for disproportionate impacts on subgroups (especially vulnerable populations); adjustment for power imbalances in every stage of problem solving (e.g., formulation, definition, analysis, implementation and evaluation); delineation of voluntary and imposed risk; and a coherent treatment of judgment and uncertainty.

Early twentieth century decision makers on the north Olympic Peninsula enjoyed socioeconomic advantages that enabled them to dictate how, when and where natural resource extraction and development occurred. This intergenerational dynamic resulted in a profound externalization of impacts onto subordinate human populations, natural ecosystems, a complex of species groups and even natural physical assemblages (e.g., Elwha River geomorphology and Ediz Hook). There was no formal accounting for total risk or calculation of net benefits and harms within the region's social and natural communities. The striking absence of any meaningful form of deliberative discourse eventually resulted in the manifestation of social and environmental failures.

Contemporary analytical tools within reach of policymakers represent an important, albeit imperfect, means of striving to address questions of equity. At the state and federal level, environmental and health impact statements/assessments can offer the means of facilitating public discourse. When performed well, they can strive to perform

cross-disciplinary analysis and basic risk tradeoff analysis functions. But at many levels of society decision making (e.g., local, state, federal), there is no guarantee that such tools will be used, let alone used competently. Society has yet to develop a proficient and noteworthy mechanism to survey for and eliminate inequities where economic imperatives reveal themselves.[1124]

Fourth principle: Make use of foresight, scrutiny and vigilance to minimize the unintended consequences of technology.

Technological pursuits should be held to high standards of social accountability and assessment before they are implemented at meaningful scales. Their use within and upon societies and ecosystems should not be experimental and uncontrolled. "Horizon threat analysis"—or the scanning of emerging technologies for potential public health and environmental impacts—should be pursued routinely. Problems should be anticipated, worst-case scenarios mapped and contingency planning performed. Technological applications—especially in service of economic pursuit—should be examined and questioned by experts by means of formal and transparent processes. Who is proposing to use the technology? What is their motivation? What is the possibility it will lead to predictable or uncertain adverse direct and indirect consequences? How developed is the science or technique underpinning the technology? The potential for a broad spectrum of impacts should be neither underestimated nor dismissed by policymakers.

[1124] See for example: John Wargo's analysis of the role of government and corporate institutions in the proliferation of chemical pollutants, and its adverse effects on susceptible populations that he characterizes as a "global chemical experiment on public health" that is "wildly out of control." In response, Wargo offers risk management "principles for intelligence gathering" and layperson guidelines for "taking personal control" (Wargo, J., 2009, pp. 284-301).

The rapid economic development of the Pacific Northwest's rivers was aided by the proliferation of new technologies—electrification, fish culture, high-head dam building and transmission, mechanization of fish processing, marine engines and synthetic netting. The introduction and widespread use of these technologies took place mostly by unstructured and unrestrained means. They fostered the hyper-exploitation of natural resources and facilitated the growth of competing economies whose technologies actually worked at cross-purposes. Hamstrung regulators themselves promoted counter technologies as an antidote.[1125] Hatcheries became the preferred management tool to mitigate habitat loss and overfishing. The technology—embraced by politicians and industry as a complete cure-all—was promoted as a substitute for prohibitive and restrictive regulations. But it ultimately failed. Over several decades, it constricted scientific pursuit, reduced complex problems into simplism, inhibited the use of cultural sanctions, masked trade-off outcomes and retarded the progress of fisheries management. Ultimately, the quest to "produce a truly domesticated fish, as domesticated as any chicken" helped contribute to a collapse of regional economies and ecosystems.[1126]

In 2011, *The Seattle Times* reported that Pacific Seafood proposed to nearly double Washington State's saltwater "farmed" fish output. The company hoped to lease

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[1125] On the general topic of historical technological proliferation in the United States, the economic historian Nathan Rosenberg has commented that "Indeed, the sheer diversity in the sources of technological change is one of the most distinctive features of the twentieth century." He argued that American society's reliance on scientific applications was indicative of its cultural heritage and values (Nathan Rosenberg, *Technology and American Economic Growth* (New York: Harper & Row, Publishers, Inc., 1972), pp. 116, 20-22). On the topic of historical technological advance and its implications for 20th century engineering applications, see for example: White, Jr., L., "Cultural climates and technological advance in the Middle Ages," in *Viator Medieval and Renaissance Studies* (Volume 2, 1971), The Center for Medieval and Renaissance Studies, University of California, Los Angeles (Berkeley: University of California Press, 1971), pp. 171-180.

[1126] Peter R. Limburg. *Farming the Waters* (New York: Beaufort Books, Inc., 1980), p. 17.

180 acres of offshore waters in Clallam County near the coast of the Strait of Juan de Fuca just west of the Elwha River estuary and about 20 miles west of Port Angeles. The facility would grow steelhead and Atlantic salmon. For over a decade, the technology of near-shore aquaculture has been controversial in the region because of scientific concern that the practice elsewhere has introduced disease, parasites, interbreeding of genetically adverse non-native escaped fish and habitat competition. Farmed fish also feed on wild fish populations, thus contributing to overfishing. Such operations already exist in the eastern Straits, Puget Sound, British Columbia, North Atlantic and South American waters. In British Columbia, scientists believe that salmon farms have compromised wild sockeye runs in the Fraser River.[1127] Based on these concerns, local officials in neighboring Jefferson County east of Port Angeles have tried to prohibit fish farming operations through a ban. But the state has advised them it would likely not support such efforts, believing the industry should be allowed to operate in Washington's coastal waters.[1128]

Near-shore marine aquaculture facilities currently enjoy political support as a contemporary manifestation of the nation's long-standing experiment in applied fish culture. The National Oceanic and Atmospheric Administration within the Department of

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[1127] *The Seattle Times*, October 20, 2011; Volpe, J.P., Anholt, B.R., Glickman, B.W., "Competition among juvenile Atlantic salmon (*Salmo salar*) and steelhead (*Oncorhynchus mykiss*): relevance to invasion potential in British Columbia," *Canadian Journal of Fisheries and Aquatic Sciences* 58(2001):197-207; Krkošek, M., "Sea lice and salmon in Pacific Canada: ecology and policy," *Frontiers in Ecology and the Environment* 8(2010):201–209; Naylor, R.L., Goldburg, R.J., Primavera, J.H., Kautsky, N., Beveridge, M.C.M., Clay, J., Folke, C., Lubchenco, J., Mooney, H., Troell, M., "Effect of aquaculture on world fish supplies," *Nature* 405(June 29, 2000):1017-1024; Gudjonsson, S. and Scarnecchia, D.L., "'Even the Evil Need a Place to Live': wild salmon, salmon farming, and zoning of the Icelandic coastline," *Fisheries* 34,1(October 2009):477-486.

[1128] *The Seattle Times*, October 20, 2011; Letter from Jeffree Stewart, Washington State Department of Ecology, to Michelle McConnell, Jefferson County Department of Community Development, December 11, 2011. http://www.co.jefferson.wa.us/commdevelopment/PDFS/SMPupdate/ECY%20Approval/12-7-11%20ECY%20letter%20-%20feedback%20on%20finfish.pdf [viewed March 24, 2012].

Commerce has heavily promoted them. The agency sees fish farms as a means of providing the country with more self-sufficient seafood production, rebuilding wild fisheries stocks and mitigating habitat loss. The idea to try to "replenish" or "enhance" natural fisheries using aquaculture sounds familiar because it was the same one introduced by the U.S. Fisheries Commission in the 1870s.[1129] In 2007, Commerce Secretary Carlos Gutierrez declared that farm-raised fish can be raised in an "environmentally sound" way that also "makes sense for our economy." He pointed to the human health benefits of eating fish, the heavy importation of all eaten seafood in the country, and a global aquaculture business that provides nearly half of the world's consumed seafood as reasons to try to double the United States' aquaculture industry.[1130] And yet, that same year, Canadian researchers concluded that industrial near-shore aquaculture off Vancouver Island did not benefit wild fish and instead may "contribute to declines in ocean fisheries and ecosystems." They found that salmon lice from the fish farms had infested wild juvenile pink salmon and "placed them on a trajectory toward rapid local extinction" with mortality rates over 80 percent.[1131]

[1129] National Marine Fisheries Service, *NOAA 10-Year Plan for Marine Aquaculture* (Silver Spring, MD: U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 2007), pp. 7, 13.

[1130] *The New York Times*, March 11, 2007; National Oceanic and Atmospheric Administration, *Summary of the National Marine Aquaculture Summit* (U.S. Department of Commerce), p. 5. http://aquactulure.noaa.gov [viewed March 24 2012].

[1131] Krkosek, M., Ford, J.S., Morton, A., Lele, S., Myers, R.A., Lewis, M.A., "Declining wild salmon populations in relation to parasites from farm salmon," *Science* 318(December 14, 2007):1772-1775.

Fifth principle: Support sustained scientific endeavor to inform the protection of long-term public interests.

Governing entities responsible for ensuring stability and permanence—such as of social institutions or environmental resources—are better served by viewing science as an ongoing and evolving process rather than as a tool of periodic convenience. The philosopher Stephen Toulmin noted that over time scientists develop and modify theories and conceptions in order to "best accommodate the phenomena." But he added that even as scientists develop their methods, their ideas are nonetheless rooted in tradition and history.[1132] *The value of scientific contributions to decision making is maximized when the work of scientists is nourished and maintained, not when constricted by starvation and vagary.*

For well over a century, a small number of state and federal fisheries experts consistently acknowledged the importance of sustained and in-house scientific enquiry to fulfilling their mission to protect natural resources. Time and again they requested and urged internal leadership, legislatures and Congress to provide funding for biologists and dedicated agency scientists. For the most part, their requests were refused or met with only minimal support. Competing priorities, the lure of applied scientific pursuit, poor understanding of scientific process and method, political calculation, privatized promotion of short-term economic interests and interest groups were some of the factors responsible for the relegation of quality science as a decision-making tool within

[1132] Stephen Toulmin, *The Return to Cosmology. Postmodern Science and the Theology of Nature* (Berkeley: University of California Press, 1982), pp. 25-26; Toulmin, S., "The recovery of practical philosophy," *The American Scholar* 57(1988):337-352, p. 344.

agencies. The consequences jeopardized not only the resource, but also undermined agency missions and minimized the benefits to society that would have accrued from more capable governance.

In an uncommon example, however, the National Park Service was able to incorporate sound scientific analysis into its fisheries management policymaking in spite of harsh cultural, socioeconomic and cross-agency pressures, most of which were focused on immediate and short-term interests. The process, however, took decades to accomplish and only after severe damages had occurred to the resource. Early scientists advised the agency that its mission to protect natural resources would only grow more complex over time. They advised that the migrating fisheries would pose perhaps the most challenging set of problems to natural resource management.

Current efforts by Olympic National Park and allied entities demonstrate the wisdom and value of supporting scientific analysis to help evaluate, inform and guide decision-making processes over time. In August 2007, the park's chief fisheries biologist Sam Brenkman lead a team of biologists deep upriver into the Elwha headwaters to conduct the most comprehensive survey of the river's habitat and fisheries ever undertaken. The study set out to characterize the fish in the river before dam removal started as a means of evaluating the fisheries restoration effort to follow. There was so much gear—1,800 pounds of equipment—that they needed pack mules to help with transport. Twenty surveyors in five teams of four snorkeled nearly the entire span of the river, from top to bottom, covering about 40 miles. The only areas they skipped were the two reservoirs and impassable canyon stretches that were life-threatening to swim. The teams recorded fish counts in 21 separate segments, or reach boundaries, spanning 1 to 8

kilometers in length. They repeated the entire study in 2008, adding a habitat survey concurrent with the fish survey. Study methods relied on passive observation rather than obtrusive and lethal sampling techniques. The completed work, published in 2012, presented "a spatially continuous perspective of fishes and their associated habitats." It established "riverscape" baselines of the Elwha fish community and habitat and provided "ecological insights" into the river's functions before salmon populations would begin to rebuild it. Because of this study a methodological template and research foundation now exist for future investigations and analysis.[1133]

Sixth principle: Consider the perspective and knowledge of individuals and communities directly experiencing outcomes of interest.

Human values, beliefs and relationships; observations and intelligence derived from in-field / real-world / indigenous standpoints; and layperson attitudes and perceptions are important factors and determinants of framing and coping with risk. These connections and inputs are necessary to quantify and understand, as much if not more than other phenomena. They are especially important when derived firsthand from impacted areas or situations because there is no substitute for direct and immediate empirical evidence. Management and decision-making processes should acknowledge and consider such perspectives and knowledge.

[1133] Brenkman, S.J., Duda, J.J., Torgersen, C. E., Welty, E., Pess, G.R., Peters, R., McHenry, M.L., "A riverscape perspective of Pacific salmonids and aquatic habitats prior to large-scale dam removal in the Elwha River, Washington, USA," *Fisheries Management and Ecology* 19(2012):36-53, pp. 36-37, quotes on pp. 38, 40, 45; Sam Brenkman, personal communication, email, March 5, 2012.

Because risk involves the possibility of losing something of value, and because people have different values, understanding risk, according to Fischhoff and Kadvany, "is an exercise in value-focused thinking."[1134] Moreover, risk experts Andreas Klinke and Ortwin Renn note that "there is no simple recipe for evaluating and managing risks," in part because of many competing preferences, interests and values, as well as few collective or "universal" moral belief systems. Risks "must be considered as heterogeneous phenomena." And risk managers, as such, must attempt to integrate social diversity and use multidisciplinary approaches while at the same time try to employ routines and protocols.[1135] Where decision makers attempt to cope with the twin risks of environmental and economic collapse, risk is as much a people problem as a natural resources problem.

Physical removal of the Elwha dams will open up many miles of habitat to anadromous fisheries. The endeavor will be a success should the species rebuild and recolonize the river. But this outcome likely will signify the beginning of a more complicated process wherein multiple resource agencies and groups must sort out how to manage and use the fisheries. In this sense, notwithstanding dam removal, historical challenges remain ever-present. Agencies and user groups have always competed for resources, both in times of abundance and scarcity. This suggests that whether or not restoration efforts lead to an increase or decrease in fisheries, conflict could result over

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[1134] Fischhoff, B. and Kadvany, J., 2011, p. 41.

[1135] Klinke, A. and Renn, O., "A new approach to risk evaluation and management: risk-based, precaution-based, and discourse-based strategies," *Risk Analysis* 22,6(2002):1071-1094, pp. 1071-1072, quote on p. 1071. See also: National Research Council, *Decision Making for the Environment. Social and Behavioral Science Research Priorities*, Garry D. Brewer and Paul C. Stern, editors (Washington, D.C.: National Academy Press, 2005b), especially: Appendix B, Robin Gregory and Timothy McDaniels, "Improving environmental decision processes," pp. 175-199 and Appendix D, William Ascher, "Forecasting for environmental decision making: research priorities," pp. 230-245.

the means of restoration—assuming it requires adaptation—and the means of allocation. Whether ideological or attitudinal change has truly occurred among the stakeholders is difficult to determine at this point. But should increasingly specific definitions of success and failure materialize, it could lead to a splintering of expectation and ultimately divergent views of what success and failure have meant on the Elwha River.[1136]

The early stages of the Elwha River restoration have already experienced conflict. In 2012, the Lower Elwha Klallam Tribe's plan to plant nonnative steelhead into an Elwha River tributary has led to criticism from many government fisheries biologists and other groups. Although the tribe has long planted these hatchery fish to support tribal fishermen, scientists believe the fish will put at risk the recovery of native Elwha fish once the upper river is accessible. Fisheries groups have filed a lawsuit, encouraging the tribe to reconsider its plans.[1137] "There is this whole philosophy of the Elwha being a living laboratory, when in reality, it is the home of the Elwha tribe," said Larry Ward, hatchery manager for the tribe.[1138] These complex issues reflect how people understand problems and place value on resources differently. Traditional science does not possess the tools to address these problems. Decision-making processes must instead look to other means to understand and sort out human values. In the words of two policy science

[1136] See for example: Brewer, G.D., "After the fall: resource reconstitution," The Olin Lecture, November 4, 1987, Fairfield University, Fairfield, CT.

[1137] *The Seattle Times*, February 28, 2012. http://o.seattletimes.nwsource.com/html/localnews/2017620006_hatchery29m.html [viewed March 25, 2012].

[1138] *The Seattle Times*, August 24, 2011. http://seattletimes.nwsource.com/html/localnews/2016005701_hatchery25m.html [viewed March 25, 2012].

experts, decision makers must instead also view natural resource problems such as endangered species implementations "as social problems with many dimensions."[1139]

Chapter 32 Envisioning the Future

Anthropologist Edward Spicer once observed that when comparing cultures and peoples "the outstanding fact of constant change nevertheless remains" in spite of the differences in rates of change.[1140] From this view, the story of the Elwha River is likewise a story about change. Across the decades roughly spanning the mid-nineteenth century to present, cultural, legal, scientific and technological changes influenced human relationships with the river and more broadly the basin's ecosystem and environment.

From the story of these human relationships and changes also emerges an account of recurring tensions and pressures—"constant" challenges that continue to present themselves in the face of change. These may be construed as recurring or repeatable problems that will potentially resurface again and again. Based on the Elwha River experience, one may envision at least two central thematic challenges faced by future societies. The first is the impact of disproportionate power upon equity outcomes. The second is how individuals and groups collectively view nature.

[1139] Brewer, G.D. and Clark T.W., "A policy sciences perspective: improving implementation," in *Endangered Species Recovery: Finding the Lessons, Improving the Process*, Tim W. Clark, Richard P. Reading, Alice L. Clarke, editors (Washington, D.C.: Island Press, 1994), pp. 392-395, quote on p. 394; Tim W. Clark, *The Policy Process. A Practical Guide for Natural Resource Professionals* (New Haven: Yale University Press, 2002), pp. 15, 55. See generally the policy sciences discipline as explained and applied in: Brewer, G.D., "Where the twain meet: reconciling science and politics in analysis," *Policy Sciences* 13(1981):269-279; Brewer, G.D., "Policy sciences, the environment, and public health," *Health Promotion* 2,3(1988):227-237; Brewer, G.D. and deLeon, P., 1983; Garry D. Brewer and Paul C. Stern, editors, *Decision Making for the Environment: Social and Behavioral Science Research Priorities*, 2005b; Clark, T.W., Reading, R.P., Clarke, A.L., 1994; Clark, T.W., Stevenson, M.J., Ziegelmayer, K., Rutherford, M.B., 2001.

[1140] Edward H. Spicer, *Human Problems in Technological Change* (New York: Russell Sage Foundation, 1952), p. 18.

Power and Equity

We will, as we say, "get" technology "spiritually in hand." We will master it. The will to mastery becomes all the more urgent the more technology threatens to slip from human control. – Martin Heidegger, 1953[1141]

Change is one thing, progress is another. – Bertrand Russell, 1950[1142]

In his 1963 study of the historical decline of the Alaska Salmon, social scientist Richard Cooley described the contrast between a long and stable preexisting native fishery and a new commercial fishery that quickly "unleashed new economic and competitive motives under radically different social and political institutions." He observed how the salmon wealth was turned into monetary wealth and how during that time "nothing else seemed relevant." Cooley narrated the breakdown that took place, the "general economic and cultural deterioration" that emerged as the Native groups lost control of the natural resource they had managed for ages.[1143]

The story was not unique in North America. During the late nineteenth-century deforestation of Wisconsin's great pine forests, Willard Hurst likewise described how new institutional arrangements facilitated the unraveling of a natural resource by means of readjusting social levers of control. "As in all social history of the law," Hurst concluded, "the allocation of power and the channeling of change are here the essence of the story."[1144] And so, too, Native groups on the Olympic Peninsula of Washington State

[1141] Martin Heidegger, *Basic Writings* (San Francisco: Harper & Row, Publishers, Inc., 1977), pp. 289, 285, quote on p. 289.

[1142] Bertrand Russell, *Unpopular Essays* (New York: Simon and Schuster, 1950), p. 8.

[1143] Richard A. Cooley, *Politics and Conservation. The Decline of the Alaska Salmon* (New York: Harper & Row, Publishers, 1963), p. 22.

[1144] Hurst, J.W., 1964, p. 5.

lost control of a natural resource they had managed for centuries as new markers of power came to dominate the region.

In all three examples, legal, regulatory and private sector institutions facilitated the use of or directly controlled technologies that enabled the rapid exploitation of natural resources. The historian Lynn White has described such technological application as "an empirical attempt to use nature."[1145] Until such technologies were put into use, subsistence-oriented populations had known resource catastrophe in the form of geological change or dramatic natural fluctuation. In general, over time, Native groups of the Pacific Northwest had developed long-term and stable fishing locations and processing sites. These were based on a reliable and regular expectation of fish migrations in certain places and times, notwithstanding the natural variability that occurred. Anthropologist Gordon Hewes described as notable the "relative persistence" of these sites as a "foci of concentrated economic activity" that occurred long enough to pass through "cultural successions."[1146]

But by 1916 the situation in western Washington was dire because of a human-made catastrophe. Native groups were forbidden to catch fish with their own technologies so that an industrial fishery could instead make use of its own technology to exploit the resource. In that year, a federal field agent investigated the arrests of Native fishers on the Elwha and Dungeness Rivers by state personnel. He reported to his superiors the intense risk of starvation threatening Indian families for want of fish. The fish were in the rivers,

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[1145] White, Jr., L., "Cultural climates and technological advance in the Middle Ages," in *Viator Medieval and Renaissance Studies* (Volume 2, 1971), The Center for Medieval and Renaissance Studies, University of California, Los Angeles (Berkeley: University of California Press, 1971), p. 179.

[1146] Hewes, G.W., "The rubric 'fishing and fisheries,'" *American Anthropologist, New Series* 50,2(April-June 1948):238-246, quote on p. 241.

but they were prohibited from catching them "as they have always caught them and the only way they know how to catch them." In his view, state laws had been written to favor the commercial fisheries and exclude subsistence fishers. "I surely will not advise them to sit out on the beach and starve," he concluded, "with the river full of fish that are being protected just to enhance the wealth of a few fish trap managers."[1147]

In this example of change and relationship between two colliding societies, a new regional economic priority had manifested its power through a legal and social dynamic. The interests of the prevailing society now trumped the rights and interests of a now marginalized society. The dominant society possessed different values and therefore viewed risks differently. Hence, the upsides and downsides of risk were redistributed. This lead to risk conflicts in the form of immediate and long-term geographical and social inequities imposed upon both individuals and segments of society. In each case, these risks were imposed upon individuals and populations involuntarily.[1148] Cleary, there were ethical implications. The philosopher Bertrand Russell once observed that change and progress are different concepts. His point was that while change can be measured or quantified, progress was less understandable. "'Change' is scientific, 'progress' is ethical; change is indubitable, whereas progress is a matter of controversy."[1149]

Specifically, it was to the material benefit of the salmon canners and their supporting fleets of fishers to catch, process and export as many fish as possible, so long

[1147] Taylor to Superintendent, November 27, 1916, cited in Lane and Lane Associates, 1981, pp. 33-34.

[1148] Shrader-Frechette, Kristin S., *Risk Analysis and Scientific Method* (Boston: D. Reidel Publishing Company, 1985b), pp. 19-20, 38; Bertrand Russell, 1950, p. 3; Woodard, C. "Reality and social reform: the transition from laissez-faire to the welfare state," *Yale Law Journal* 72(1962):286-328, pp. 286-288.

[1149] Bertrand Russell, 1950, p. 8.

as the fish were there to harvest. There was no real concern for the economic stability or perpetual continuation of prior fisheries-dependent communities. For the salmon canners, resource collapse was distinct from social collapse. They did not live within the risk matrix that prioritized the health and well-being of the fisheries beyond their concern for maximizing profit derived from selling the fish.

To the extent that centralized state-sanctioned regulations affected their operations, the commercial fisheries industry worked within the region's system of governance to enhance its self-interests. The salmon canners situated themselves to function and operate beyond adverse social consequences. And so, within about a half century, the commercially valuable fish were largely extirpated from California, Oregon, Washington, British Columbia and much of Alaska. And in the meantime, those who had formerly used and valued the fisheries to sustain their lives and communities were left to endure or perish. Even today, the adverse legacy of this once mammoth industry still affects the region; yet few know of the industry's former presence and influence.

Looking forward, will societies in the Pacific Northwest and elsewhere that rely on natural resources be able to manage the interplay of power and equity and its risk of causing severe adversity? In 1997, the conservation writer Carl Safina visited the coast of Washington and Oregon to assess the region's history and future. He found that in spite of the damages done there remained "options to restitch the worn and tattered ecosystem, and perhaps quilt together a durable economy." Much of the rest of the world, he reflected, had already lost these options.[1150]

[1150] Carl Safina, *Song for the Blue Ocean. Encounters Along the World's Coasts and Beneath the Seas* (New York: John Macrae Books/Henry Holt and Company, 1997), p. 241.

Where options still exist, there may be hopeful potential in societies where social decision-making processes rely upon robust participation and transparency in all organized forms of human activity—such as community civics, regulatory agencies and academic disciplines, for example. In the Elwha River story, where individuals and groups were unable to play a part in collective discourse—unable to incorporate their concerns and views—the worst kind of damages occurred over time. On the other hand, where agencies or communities did not exclude or marginalize disparate inputs into decision making, some of the worst calamities were avoided or lessened.

"We appear to have unleashed a variety of technologies that threaten not only our immediate health, safety, and well-being, but the continued survival of humanity," social scholar Sheila Jasanoff has written. Over 30 years after philosopher Martin Heidegger turned his attention to the emergence of modern technology—its essence, and its capacity to overpower nature and indenture human beings—it seems there was no turning back. In order to manage such "pervasive risks," Jasanoff advises, societies must preserve "certain basic values" including "the citizen's right to understand and to participate in governmental decision-making."[1151]

[1151] Sheila Jasanoff, 1986, p. 6; David Farrell Krell, (introduction to Chapter 7) in Martin Heidegger, *Basic Writings*, 1977, pp. 284-285.

Viewing Nature

It seems doubtful that a profound shift in ethical consciousness can be achieved unless humans develop a far greater sense of humility, respect, and even awe toward nature. – Stephen Kellert and Herbert Bormann, 1991[1152]

It was big country. Then you'd hit the old train line, it curved, and from there shot into the swamps. You had to pay attention to the mile markers on the tracks, and then use your compass. Lots of hunters never made it out. Hell, you got in those swamps and when the dark hits there's no way out. Next morning you might be only 100 yards from the tracks, or you're a pile of bones next winter with a steel gun on top. – Dick Goin, 1995[1153]

"Viewing nature," or the various methods, means and perspectives of individuals and groups used to make sense of and relate to the natural environment, can vary by time and place. In the Elwha River story, Native groups "viewed" the river differently than hydroelectric dam builders. Sport fishermen saw the river in different terms than commercial fisherman. National Park Service biologists measured the river's value and defined its health in ways different from other government agencies. Many people in Port Angeles believed that Dick Goin viewed the river as close to the perspective of a fish as any human could. There are many permutations to describe these viewing relationships—their differences and similarities—between and among different groups and individuals.

From a risk management perspective, how have successful societies "viewed" nature in order to maintain stable economies and cultures while depending upon natural resources? What seems clear from the Elwha River story is that those humans and groups that used the river in ways that minimized harm often possessed a strong measure of

[1152] Kellert, S.R. and Bormann, F.H., "Closing the circle: weaving strands among ecology, economics, and ethics," in *Ecology, Economics, Ethics. The Broken Circle*, F. Herbert Bormann and Stephen R. Kellert, editors (New Haven: Yale University Press, 1991), p. 210.

[1153] Dick Goin, personal communication (reminiscing the Olympic Peninsula), unrecorded, 1995.

respect and awe for the river on its own terms, be they fishermen, natural resource managers or scientists. They paid attention to the river, observed it, listened to it, and in so doing came to understand its requirements.

"Perhaps the most serious obstacle impeding the evolution of a land ethic," Aldo Leopold wrote in his book *A Sand County Almanac*, "is the fact that our educational and economic system is headed away from, rather than toward, an intense consciousness of land."[1154] Nearly a half-century later, in 2002 the ethicist Richard Fern asked how was his society "to come to terms with nature," "to develop and defend claims about our relation to nature," "to nourish into being a genuinely diverse coalition of concerned individuals and communities, one that encompasses deep-cutting differences of interest and conviction."[1155] In the Elwha River story, groups that successfully managed risk had demonstrated an ability to hear and implement the advice of those who understood nature's requirements no matter the complexity, inconvenience, unpopularity or challenge of receiving the message.

Native groups on the north Olympic Peninsula, for example, had developed highly successful spiritual connections to their natural environment. They used cultural tools as a means to regulate human behaviors such as access, control, exploitation and distribution of resource flows. There were many examples of how, for example, taboo observances and ritual preparations aligned with technological considerations. Ceremonies reinforced the rule that humans could never purposefully contaminate or foul salmon waters. They also established markers of human physical endurance and skill

[1154] Leopold, A., 1989[1949], p. 223.

[1155] Fern, R.L., 2002, pp. 1, 8.

needed to earn the right to engage in hunting and the use of killing tools. In these and other ways, ceremonies prescribed spiritual reverence and practical respect toward the natural world, and in so doing minimized waste, over-exploitation and general mistreatment. Mythology reinforced these cultural guidelines and impressed the notion that to disobey them could harm the well-being of families and villages.

Reinforcing the historical experience of these groups, Roy Rappaport has argued that scientific "representations of nature" are not necessarily the most adaptive means of protecting against harms to the environment. "To drape nature in supernatural veils," using "spirits whom men respect" has been shown by some societies to help minimize "human folly and extravagance." But Rappaport was not dismissing "empirical knowledge." Rather, he was arguing that science and culture should not be seen as mutually exclusive techniques. What is most important, he believes, is how much respect a society accords its ecosystems, especially where natural processes are unpredictable or uncontrollable, because "knowledge can never replace respect as a guiding principle."[1156]

In 1963, ecosystem scientist Herbert Bormann was an instrumental force in implementing a seminal long-term biogeochemical and ecology study of forest and aquatic ecosystems in New Hampshire. Over the decades, the study generated more than 2,000 scientific papers and became a worldwide model. In 1974, he co-published a paper in *Science* that identified the environmental threat of acidic rain caused by air pollution moving over the northeastern United States. He is considered by many to be not only an icon of ecosystem science, but also a scientist who keenly applies his insights to help

[1156] Rappaport, R.A., 1979, p. 98, quote on pp. 100-101.

effect social policy and management.[1157]

In 2009, reflecting upon his career, Bormann likewise wrote of the importance of societies needing to understand and respect their natural environment in order to survive. He described how challenging it was to "know" nature as it is "extraordinarily complex…" and to tease apart the influences of naturally and human-made disturbances. He talked of the intense controversy faced from many quarters when his research undermined status quo policies and beliefs that, in the end, proved detrimental to the survival of his society. And he concluded that "social and economic factors will override natural factors unless the public is educated to understand the relationship between nature and their own long-term welfare."[1158]

[1157] Bormann, F.H., "An icon of ecosystem science with a humanist's worldview," *Environment:Yale*. The School of Forestry & Environmental Studies (Spring 2009):34-36+ 58; Likens, G.E. and Bormann, F.H., "Acid rain: a serious regional environmental problem," *Science* 184,4142(1974):1176-1179.

[1158] Bormann, F.H., 2009, pp. 34-36, 58, quotes on pp. 34, 36.

Appendix A: Study Rationale and Design

Research Objectives and Case Study Context

The broad goal of this dissertation research is to help understand how decision makers can balance environmental and human needs while avoiding natural resource and economic collapse. The project's objective was to assess a variety of factors that varied among competing user groups and drove a diverse set of socioeconomic choices on the Olympic Peninsula in western Washington State. The study's central research question asked to what extent cultural, legal, scientific and technological factors shaped decision-making strategies relating to natural resource use and treatment of the environment.

The salmon fisheries of the West Coast provide a subject area suitable for such an investigation—specifically through the analysis of events relating to the current Elwha River ecosystem and fisheries restoration effort on the Olympic Peninsula. Dating back to the mid-1800s, the Pacific Northwest region of the United States has struggled to appease competing social allegiances to conserve its environmental resources and promote its economic development. Today, important aquatic and terrestrial species are at the point of irreversible recovery. Legendary salmon runs have declined sharply during the past century. Traditional fishery and timber employment sectors are in decline. These outcomes have taken place despite over a century of resource management efforts intended to avoid the dual risk of environmental loss and economic loss. The region's leaders wish to restore damaged ecosystems and accommodate increased development. Yet it is uncertain whether current resource management strategies can meet the needs of both environmental and human systems.

A land of mountains, rivers and rainforests, the Olympic Peninsula lies between the Pacific Ocean and Puget Sound. Formerly home to several native runs of salmon and trout, the Elwha River was endowed with a fisheries rare among streams its size south of Alaska. In the early twentieth century, a power developer completed two dams on the lower river, which flows north into the Strait of Juan de Fuca. The projects provided electrical energy to create a regional timber and pulp mill economy. They also blocked access to over 90 percent of salmon and trout habitat in the river's basin. By changing habitat downstream and barring fish from quality habitat upstream, the Elwha dams altered the river basin's entire ecosystem, the bulk of which now lies in Olympic National Park. The loss of salmon has also affected the culture and economy of the Lower Elwha Klallam Tribe and treaty-reserved fishing interests of other local Indian tribes. The Elwha River formerly provided substantial commercial, recreational and subsistence catches to fishermen in the ocean approaches to the river, helping to sustain once strong fishing economies of nearby communities.[1159] In 2011, the Department of Interior started to dismantle two hydroelectric dams on the Elwha River to restore natural salmon runs to the river basin ecosystem.

Methods and analytical framework

A narrative analytical history of the Elwha River experience was conducted to provide a record of how different cultural and social forces shaped the exploitation and preservation of the region's valued natural resources. Specific emphasis was devoted to the interplay of legal, scientific and technological factors. An interdisciplinary approach treated and

[1159] See generally: National Park Service, 1995; Johnson, P., 1997.

relied upon various disciplines and scholarship across the natural and social sciences including ecology, environmental science and fisheries biology; and anthropology, ethnology, law and sociology. The policy sciences and risk studies methodological frameworks were integrated to guide and structure the analysis, which encompasses a range of decision-making actors and techniques involving a significant natural resource problem.[1160]

Historical rationale

The study assessed key historical factors that have guided natural resource use and management in the region. This included a comparative evaluation of historical and contemporary events relating to the Elwha River and the broader Pacific Northwest experience, from the 1850s to the present. The comparative case study method acknowledged the need to assess the potential general similarities and unique differences between the Elwha River and other rivers in the region. By this means, the project assessed the region's present attempt to restore and preserve its fisheries.

Dating back to Washington statehood in 1889, the Elwha experience chronicles the transition of the Pacific Northwest from a frontier territory to a mature economy. How to channel the clash of motivation and shifting of power into a reliable source of wealth and prosperity was a central public policy challenge. This change was motivated

[1160] For examples of risk studies and/or policy sciences applications that provide structured guides, see: (1) on treatment of ecosystem risks: Clark, T.W., Reading, R.P., Clarke, A.L., 1994; (2) on treatment of chemicals and pollution risks: Wargo, J., 2011, pp. 288-294; (3) on technology risks: Lawless, E.W., Jones, M.V., Jones, R.M., in *Risk Evaluation and Management*, 1986; (4) on uncertainty: Ascher, W., "Scientific information and uncertainty: challenges for the use of science in policymaking," in *Science and Engineering Ethics* 10(2004):437-455; Ludwig, D., Hilborn, R., Walters, C., 1993; and Morgan, M.G. and Henrion, M., 1990, pp. 37-43; and (5) on forecasting and decision making: Ascher, W., "Forecasting for environmental decision making: research priorities," in *Decision Making for the Environment: Social and Behavioral Science Research Priorities*, 2005b), pp. 230-245.

by a conception of progress based on creation of wealth and devotion to prosperity that supplanted former aboriginal subsistence-oriented worldviews. Three elements functioned as building blocks of the new economy: fish, timber and electricity. As each element was either directly or indirectly dependent upon rivers, the region's leaders were confronted with the need to oversee competing interests that vied for control of and access to water resources. Across several decades, these interests included industrialized commercial fisheries and forest products; recreational angling; hydroelectric infrastructure; government land and marine management agencies; advocates of environmental preservation; and Native peoples.

Policy sciences

The policy sciences approach is practical in helping to organize numerous components in a structured framework needed to assess complex environmental and social systems.[1161] Because society relies on diverse tools as a means of problem solving, methods that analyze these tools must deal with the interplay of culture, law, politics, science and other factors that are ultimately the function of the values and priorities of persons, administrations and organizations. Hence, the process of developing, choosing, implementing, evaluating and even terminating decision-making options on behalf of others all but assures conflict. Analysis of this process requires a structured approach that is adaptable, as offered by the method.[1162]

[1161] Brewer, G.D. and Clark, T.W., "A policy sciences perspective: improving implementation," in *Endangered Species Recovery: Finding the Lessons, Improving the Process*, 1994.

[1162] Brewer, G.D., 1978; Brewer, G.D., "Where the twain meet: reconciling science and politics in analysis," *Policy Sciences* 13(1981):269-279; Brewer, G.D. and deLeon, P., 1983.

Within the policy sciences framework, a special focus on termination outcomes guided the research effort relating to the Elwha River experience. One could view the Pacific Northwest region's ongoing salmon and electricity story as a termination sequence. The first termination started with the region's decision to build its economy on hydroelectricity, a means to abundant cheap power heavily subsidized by the government and marketed at discount rates. On the Elwha River, private dam construction in 1913 on river-mile five blocked salmon migration to most of the watershed, with predicable consequences. The 40-year construction of 11 mainstem dams and numerous tributary dams on the Columbia between 1930-1970, conterminous with total blockage of the upper river at Grand Coulee, largely contributed to and hastened the ongoing loss of salmon stocks in the region's largest river basin.

The second part of the termination sequence—removing dams as a means to restore salmonid populations—is to date, a rare event. Understanding dam termination as an event characterized by problems and opportunities, as well as successes and failures, is a useful analytical approach. It encourages policymakers to view dam construction and dam removal as an ongoing transitional process. The transition can be facilitated by adopting an attitude of termination as an opportunity or creative act—not simply as a defeat or destructive outcome.[1163]

Risk studies

In combination with policy sciences, a risk studies approach was used to assess how decision-making strategies affected resource sharing among user groups and the

[1163] Brewer, G.D., 1978.

requirements of natural systems. A primary task for decision makers is how to balance and mediate user groups competing for natural resources—while ensuring the conservation of natural systems—within a viable and socially sanctioned framework. Leaders are charged to determine how best to resolve who gets what, and to do so without inadvertently losing everything. This process serves to minimize risk of social and ecological collapse. "Risk" can be broadly construed as the possibility that human actions or events lead to consequences that harm aspects of things that human beings value. Through collective means, societies seek to minimize risks considered to be significant by using formal and informal strategies.

Societies have long thought about risk and devised methods to analyze and manage it.[1164] Law and science are two important social conventions used to direct this process. Legal tools comprise legislative, executive and judicial bodies exercising, for example, administrative regulatory functions or court review.[1165] Scientific and technological tools comprise various combinations of applied, natural and social science.[1166] "Technology" refers to the use and application of different types of knowledge (e.g., scientific, engineering and historical) to achieve practical result.[1167]

[1164] Covello, V.T. and Mumpower, J., 1985; Kristin S. Shrader-Frechette, *Risk and Rationality* (Berkeley: University of California Press, 1991).

[1165] Krier, J.E. "Risk and the legal system," *The Annals of the American Academy of Political and Social Science* 545(1996):176-183; Douglas S. Kysar, *Regulating from Nowhere: Environmental Law and the Search for Objectivity* (New Haven, CT: Yale University Press, 2010); Percival, Robert V., Miller, Alan S., Schroeder, Christopher H., Leape, James P., *Environmental Regulation: Law, Science, and Policy* (Boston: Little, Brown and Company, 1996).

[1166] Brewer, G.D. and Stern, P., 2005; David L. Hull, *Science as a Process: An Evolutionary Account of the Social and Conceptual Development of Science* (Chicago: The University of Chicago Press, 1988); National Research Council, 1993b; Wilson, R. and Crouch, E.A.C., "Risk assessment and comparisons: an introduction," *Science* 236,4799(1987):267-270.

[1167] Thomas S. Kuhn, *The Structure and Function of Scientific Revolutions* (Chicago: The University of Chicago Press, 1962); Mesthene, E.G., "The role of technology in society," in *Technology and Values*,

Additional cultural forces influence society's use of these risk management tools in subtle and obvious ways, enabling as well as constricting decision makers' capacity to inform policymaking to minimize the occurrence of adverse outcomes.[1168] These forces can include economics, politics, religion and value orientation.[1169]

The need to balance or mediate the interests of conflicting resource user groups and natural systems in order to diminish risk of human and environmental collapse has long been a central challenge to society.[1170] This has given rise to an analytical process through which institutions assess risks and then attempt to devise ways to reduce or control those considered to be significant. In recent decades, risk assessment and management techniques have formally defined the regulatory process of minimizing risk. These techniques are broadly referred to as risk analysis or, more broadly, risk studies. This problem solving approach has created a variety of institutional analytical methods, many of which explicitly evaluate the role and impact of technology on societal and environmental systems.[1171]

Kristin Shrader-Frechette, Laura Westra, editors (New York: Rowman & Littlefield Publishers, Inc., 1997); Kristin Shrader-Frechette and Laura Westra, editors, *Technology and Values* (New York: Rowman & Littlefield Publishers, Inc., 1997).

[1168] National Research Council, 1993; Wilson, R. and Crouch, E.A.C., 1987.

[1169] See for example: Douglas, M. and Wildavsky, A.B., 1982; Kraft, M.E. and Vig, N.J., "Environmental policy from the 1970s to the twenty-first century," in *Environmental Policy: New Directions for the Twenty-First Century*, Norman J. Vig and Michael E. Kraft, editors (Washington, D.C.: CQ Press, 2003).

[1170] See for example: Ludwig, D., Hilborn, R., Walters, C., 1993.

[1171] See for example: Klinke, A. and Renn, O., 2002; Lawless, E.W., Jones, M.V., Jones, R.M., in *Risk Evaluation and Management*, 1986; National Research Council, 1996; National Research Council, 2009.

Law

Together, the interactive mix of legal, scientific, technological and socio-cultural forces has historically shaped society's ability to anticipate and respond to risk in both productive and counter-productive ways. For example, as Hurst and McEvoy have demonstrated in Wisconsin timber and California fisheries case studies, property law can provide a useful framework for understanding the evolution of property and rights in natural resource histories.[1172] Over the past few centuries western property law has considered "property" to be a general term for the rules that govern people's access to and control of things. By the beginning of the nineteenth century, American society's traditional conception of private property, one rooted in an agrarian economy, started to change as the development of land and natural resources proceeded apace. Higher levels of economic activity made conflicts over land increase, leading to basic changes in legal conceptions about property.

These changes were complete by the time of the Civil War, when settlers first arrived onto the Olympic Peninsula in Washington State. In response to the industrialization and developmental norms of a modern era, common law moved from a feudal conception of property to prioritize utilitarian and economic efficiency approaches. The legal vanguard of these sweeping changes appeared in the area of water rights because the construction of mills and dams soared as the nineteenth century began. Such early events in the eastern United States had pivotal implications looking forward to

[1172] Hurst, J.W., 1964; McEvoy, A.F., 1986.

the twentieth century development of hydroelectric dams in the amply watered Pacific Northwest.[1173]

Science and technology

The strength of historical analysis in understanding the scientific relation to natural resource and ecological problems has been explored by Dorsey, Lee, Wargo, White and Yaffee.[1174] With respect to the Elwha River watershed and Columbia River Basin, during the early 20th century the twin rise of hydroelectricity and aquaculture technologies ushered in a new social and cultural era for the Pacific Northwest. Between 1890 and 1930, engineering advances in dam construction and power transmission marshaled hydroelectricity as a powerful technology, an innovation that transformed the region. It also, over time, threatened a preexisting salmon economy and culture.

As early Pacific Northwest policymakers well understood, should dam building result in the permanent cessation of salmon runs, individuals and institutions heavily reliant upon salmon would undoubtedly fight back efforts to change. The region's leaders attempted to mitigate salmon loss by embracing complimentary hatchery technologies. These innovations, it was argued, actually surpassed natural modes of fisheries production. It was hoped that dams could coexist with hatchery production facilities and fish passage infrastructure, mitigation strategies that today's resource managers continue to use. In this way, the extent to which hydroelectricity innovations impinged on

[1173] Horwitz, M.J., 1977.

[1174] Dorsey, K., 1998; Lee, K.N., 1993; Wargo, J., 1996; Wargo, J., 2011; Richard White, *Land Use, Environment, and Social Change: The Shaping of Island County, Washington* (Seattle: University of Washington Press, 1979); and Yaffee, S.L., 1994.

preexisting social change and structure was counterbalanced by the concept of "fair exchange." But inequity nonetheless occurred, especially among fishing communities heavily dependent upon salmon for economic survival and aboriginal cultures whose spiritual mores were tied to subsistence use of fisheries.

The rise of ecological knowledge in the final decades of the twentieth century as a method of studying and managing natural systems has largely guided recent use of science in environmental problem solving.[1175] It figures largely in the Elwha River case study. The development of the ecosystem management concept is rooted in early twentieth century studies arguing for the need for landscape-level management of species. These observations eventually led to concepts of ecological integrity that include the ideas of maintaining viable populations, ecosystem representation, maintaining ecological processes, protecting evolutionary potential of species and ecosystems, and accommodating human use.[1176]

Relevance to decision making

The analysis found that societal groups are at risk of economic and natural resource collapse for several reasons. Nine core reasons include risks occurring under the following conditions:

[1175] Brunner, R.D. and Clark, T.W., 1997; Clark, T.W., Reading, R.P., Clarke, A.L., 1994; Clark, T.W., Stevenson, M.J., Ziegelmayer, K., Rutherford, M.B., 2001; Clark, J.S., Carpenter, S.R., Barber, M., Collins, S., Dobson, A., Foley, J.A., Lodge, D.M., Pascual, M., Pielke, Jr., R., Pizer, W., Pringle, C., Reid, W.V., Rose, K.A., Sala, O., Schlesinger, W.H., Wall, D.H., Wear, D., 2001; Lackey, R.T., "Restoring wild salmon to the Pacific Northwest: framing the risk question," *Human and Ecological Risk Assessment* 8,2(2002):223-232; National Research Council, 1986; Power, M. and McCarty, L.S., 2002.

[1176] Grumbine, R.E., 1994.

1) Ineffective cultural alignment with nature and natural resource systems leading to lack of appropriate social sanctions, disconnected regulatory apparatus and low participation of laypersons in resource protection;
2) Incapacity to imagine or prepare for pending worst-case scenarios;
3) Inability to manage power and equity dimensions in order to channel competition among users fairly and without disproportionate impacts;
4) Embracing of technological strategies as all-purpose management tools that lead to an atrophy of other mechanisms to guide and limit destructive behaviors;
5) Underestimation or dismissal of complexity of natural resource problems that overlap regulatory and institutional spheres;
6) Difficulty in coping with uncertainty inherent in scientific knowledge systems;
7) Inadequate support, maintenance and receptivity to rigorous, unfettered and potentially heterodox scientific problem solving within governing entities and institutional systems;
8) Insufficient respect for and incorporation of local knowledge systems and experience into policymaking and decision-making processes; and
9) Deficient societal understanding of, respect for and interaction with natural systems.

Conversely, societies that have successfully managed their dependence upon natural systems have:

1) Developed cultural systems to guide and shape relationships with and attitudes toward nature and natural resources;

2) Fostered civic participation and direct engagement in regulatory or risk management systems at local and regional levels;
3) Articulated worst-case scenarios and implemented preventative or mitigative techniques in anticipation of outcomes;
4) Used socioeconomic mechanisms to distribute resources across user group strata notwithstanding resource flux and availability;
5) Socially harnessed adverse impacts of technologies capable of damaging or destroying natural resources;
6) Developed interdisciplinary management and decision-making techniques;
7) Enabled adaptive social and governing mechanisms to consider and incorporate non-conventional or otherwise counter-establishment forms of information and experience; and
8) Emphasized social importance of reverential attitudes and perspectives toward natural systems.

Table A.1 Relative 2013 price valuations, 1870-1990

Initial year	Initial amount ($)	2013 amount ($)
1870	1,000	17,800
1880	1,000	22,700
	50,000	1.13 million
	800,000	18.2 million
	40 million	908 million
1890	1,000	25,500
	2,000	51,000
	6,000	153,000
	10,000	255,000
	85,000	2.17 million
	143,000	3.65 million
1900	50,000	1.38 million
	90,000	2.49 million
	250,000	6.91 million
1910	200	4,880
	500	12,200
	2,000	48,800
	15,000	366,000
	70,000	1.71 million
	350,000	8.55 million
	750,000	18.3 million
	1.7 million	41.5 million
1915	10	231
	40,000	924,000
	80,000	1.85 million

1930	60,000	808,000
	500,000	6.73 million
	800,000	10.8 million
	4 million	53.9 million
1940	5,000	80,200
1950	50	467
1960	23,000	175,000
	310,000	2.35 million
1970	145,000	840,000
	500,000	2.9 million
	30 million	174 million
1980	450,000	1.23 million
1990	10 million	17.2 million
	40 million	68.8 million
	70 million	120 million

Source: Approximate relative values for 2013 generated using a purchasing power calculator at http://www.measuringworth.com/ [viewed February 23, 2013].

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