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Introduction to the Symposium on Legal Structures for Managing the Pacific Northwest Salmon and Steelhead: The Biological and Historical Context

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INTRODUCTION TO THE SYMPOSIUM ON LEGAL STRUCTURES FOR MANAGING THE PACIFIC NORTHWEST SALMON AND STEELHEAD: THE BIOLOGICAL AND HISTORICAL CONTEXT

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> Effective protection to the salmon on their spawning grounds can be established only by concurrent action on the part of Washington, Oregon, and Idaho . . . . Here a serious difficulty arises. On the one hand it will be urged by the net fishermen of Washington and Oregon that any restraint on their operations will be burdensome to them without any corresponding advantage, since the fish they permit to escape their nets will be taken in the headwaters to which they go before they have had an opportunity to spawn, and so they will be subject to serious losses and inconvenience without any compensating advantage. On the other hand, the citizens of eastern Washington and Oregon and of remote Idaho will be reluctant to impose any restraints on their own people in reference to the taking of salmon, for the reason that any increase in the fishery thereby arising will inure solely to the benefit of the fishermen between the Dalles and the mouth of the river.[1]

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* B.A. Columbia College (1975); J.D. University of Oregon (1978). An article such as this creates debts of gratitude to a wide variety of people who took time to explain their speciality to a novice. In particular, my thanks to biologists Ted Bjornn and Jeff Cederholm; Mike Blumm (who needs no introduction); librarian Virginia Garst, who managed to find the unfindable; Chris Kelly who got me involved in this "little" project; and Carol Bradford for her assistance. The usual disclaimers of responsibility apply.

1. McDonald, *The Salmon Fisheries of the Columbia River Basin*, 14 U.S. FISH COMM'N BULL. 152, 167 (1895).

The defining characteristic of the Pacific Northwest is the Columbia River and its tributaries.[2] Tying together chronologically and spatially the Great Basin of southern Idaho, the high deserts of eastern Oregon and Washington, and the more humid forests of northern Idaho and western Montana, Oregon, and Washington, these rivers are also a source of regional unity.

The unifying theme of this symposium is the most unique constituent of this river system, its anadromous salmon and steelhead trout. Just as the rivers tie together a geographically diverse region, refusing to recognize ecological or political boundaries, the fish provide a common element. But fish, like rivers, divide as well as unify.[3] Anadromous fish migrations provide numerous opportunities for divisive conflicts among legal jurisdictions as well as their various fishers. Salmon and steelhead are the classic example of a "common-property" resource: since no individual has exclusive control over the fish and any individual's restraint does not redound to her benefit, the market provides a perverse incentive to overutilize the resource.[4] This common property

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2. For example, the Pacific Northwest Electric Power Planning and Conservation Act defines "Pacific Northwest" in terms of the Columbia River drainage basin. Pacific Northwest Electric Power Planning and Conservation Act [PNEPPCA], § 3(14), 16 U.S.C. § 839a(14) (1982).

3. *E.g., Haggard, The Columbia River: Protein, Power, Preservation, and Politics,* 10 ENVTL. L. 213 (1980).

4. "The common property status of Pacific Northwest salmon and steelhead resources lies at the very root of some of the major management problems that chronically try the patience and consume the energies of the region's fisheries managers." SALMON & STEELHEAD ADVISORY COMM'N, A NEW MANAGEMENT STRUCTURE FOR ANADROMOUS SALMON AND STEELHEAD RESOURCES AND FISHERIES OF THE WASHINGTON AND COLUMBIA RIVER CONSERVATION AREAS App. A at 38 (1984). *See generally* Gordon, *The Economic Theory of a Common Property Resource: The Fishery,* 62 J. POL. ECON. 124 (1956); Hardin, *The Tragedy of the Commons,* 162 SCI. 1243 (1968). Given the Indian entitlement to the resource, it is at least arguable that the emphasis on common property resources is erroneous.

In addition, the use of the term is misleading. Labeling the problem the "tragedy of the commons" actually resembles the magician's sleight of hand: it distracts and thus conceals. A more apt phrase would be the "tragedy of the market." It is the market rather than the commons that is the source of the problem, since it is the drive for a marketable surplus which causes the overutilization. *See, e.g.,* CIRIACY-WANTRUP & BISHOP, *"Common Property" as a Concept in Natural Resources Policy,* 15 NAT. RESOURCES J. 713, 718-19 (1975). Common property itself can be an ecologically valid response to seasonal resource variation. In his study of the contact between New England's indigenous peoples and the European invaders, William Cronon demonstrates that common property arrangements allowed cyclical use of seasonal resources. He concludes that it was the English conception of property as alienable things to be traded in the marketplace which led to overuse. *See generally* W. CRONON, CHANGES IN THE LAND (1983). *See also* M. SAHLINS, STONE AGE ECONOMICS 1-39 (1972). The Columbia Basin offers another

problem is exacerbated by extensive migrations crossing numerous jurisdictional boundaries.[5] One effect of such overlapping or sequential jurisdictional responsibility is a parochialism which reinforces the us/them view of the common property fishery.

The transboundary and common-property problems of the Columbia River's anadromous fish runs have long been recognized; management of the fishery has been the subject of interjurisdictional legal arrangements since the first decades of this century.[6] Within the past decade and a half, however, the institutional structure governing the

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example: the indigenous people had harvested salmon for some 10,000 years before the arrival of the Euro-Americans. Introduction of the market economy led a seemingly inexhaustible resource to near endangered species status in little more than a century. *See infra* notes 16, 117-25 and accompanying text. The same pattern can be seen in the decline of the English common pasture system. *See* Cox, *No Tragedy of the Commons*, 7 ENVTL. ETHICS 49 (1985).

What is apparent is that the law has had a detrimental effect on salmon and steelhead, sanctioning jurisdictional and institutional limitations which bear no relation to the biological needs of the resource. *See generally* WILKINSON & CONNER, *The Law of the Pacific Salmon Fishery: Conservation and Allocation of a Transboundary Common Property Resource*, 32 KAN. L. REV. 17 (1983). Salmon are not alone in this. *See Symposium on Transboundary Problems in Natural Resources Law*, *id.* at 1.

5. One recent review concludes that during its migratory cycle a chinook salmon will pass through seventeen separate management jurisdictions "with some independent authority to allocate the harvest of chinook salmon." Wilkinson & Conner, supra note 4, at 61. The management jurisdictions are (1) the high seas covered by the Trilateral Pacific Salmon Treaty, (2) article 66 of the Law of the Sea Treaty, (3) the North Pacific Fishery Management Council, (4) the Alaska Department of Fish and Game, (5) the Canada Department of Fisheries and Oceans, (6) the United States and Canada Pacific Salmon Treaty, (7) Pacific Fishery Management Council, (8) the Washington Department of Fisheries, (9) the Oregon Department of Fish and Wildlife, (10) the Columbia River Compact, (11) the Fish and Wildlife Service, U.S. Department of the Interior, (12) National Marine Fisheries Service, U.S. Department of Commerce, (13) the Warm Springs Tribe, (14) the Yakima Tribe, (15) the Umatilla Tribe, (16) the Nez Perce Tribe, and (17) the Idaho Department of Fish and Game. *Id.* at 61-78. As the authors note, the number of entities which affect the anadromous fishery is far greater. Given the historic dominance of power interests and their allies, the decisions of the Army Corps of Engineers of the Defense Department, the Bureau of Reclamation of the Department of the Interior, and the Bonneville Power Administration and the Federal Energy Regulatory Commission of the Department of Energy largely determine the total number of fish. *See generally* PACIFIC FISHERY MANAGEMENT COUNCIL, PERSPECTIVE ON MANAGEMENT OF OCEAN CHINOOK AND COHO SALMON FISHERIES IN THE FISHERY CONSERVATION ZONE OFF CALIFORNIA, OREGON AND WASHINGTON 13 (1982) [hereinafter cited as PFMC MANAGEMENT PERSPECTIVE]; Thompson, *Administrative, Legal and Political Problems*, in INVESTIGATIVE REPORTS OF THE COLUMBIA RIVER FISHERIES PROJECT at S-2 to 3 (1976).

6. Congress approved the Columbia River Compact between Oregon and Washington in 1918. The Compact provides for joint regulation of seasons, gear, and catches on the Columbia River. See Act of Apr. 8, 1918, Pub. L. No. 65-123, 45 Stat. 515. *See generally infra* note 133.

anadromous fishery of the Columbia Basin has been transformed by a handful of legal events. The papers presented in this symposium evaluate this transformation. For convenience, they are divided into two broad topics, habitat management and resource allocation. The habitat management papers are concerned with nonfishery uses of land and water resources which affect the anadromous fishery; the resource allocation papers examine the question of who is entitled to attempt to capture the fish. The difference in focus should not, however, obscure the underlying unity: ultimately both topics are allocational. Since habitat can produce fish or electricity or timber or wheat, habitat management issues are also concerned with allocating a resource among competing users.

My purpose in this introduction is to provide the context for these allocational questions. The first context is biological. Particularly for salmon and steelhead, biology is destiny. The complex biological drive of anadromy is a crucial factor underlying both allocation issues. This migratory behavior requires diverse habitats and exposes the fish to numerous fishers.

But the biology is only one context. The other context is historical: the postwar allocation of fish among fishers, as well as among habitat uses, has been shattered. New legal structures for managing the fishery have been created within the last decade. Apprising where we are requires some understanding of where we have been.

I. BIOLOGY OF THE COLUMBIA RIVER SALMON AND STEELHEAD

Anadromous fish are those species which spend a portion of their lives in salt water but migrate into fresh water to spawn. This migratory pattern appears to provide evolutionary advantages by allowing the fish to utilize the seasonal benefits of the river environment while avoiding that environment's limitations.[7] Anadromy permits the fish to feed and grow in the richer ocean environment while still returning to

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7. Anadromy is an evolutionary response to highly seasonal environments similar to other forms of animal migration. It is largely confined to rivers in the temperate and northerly latitudes, where the lands adjacent to the river have low food production for substantial parts of the year. Since river communities are dependent upon food produced outside of the river, the seasonally limited food supply restricts the size of year-around fish populations. Nevertheless, the riverine environment is extremely high in oxygen content and thus is conducive to hatching and early rearing needs. Seasonal migration into rivers to reproduce utilizes this beneficial aspect of the environment, while migration into the ocean environment avoids its limitations. *See generally* E. ODUM, FUNDAMENTALS OF ECOLOGY 37-85, 377-78 (3d ed. 1971); Cummins, *Structure and Function of Stream Ecosystems*, 24 BIOSCI. 631, 632 (1974); Schalk, *The Structure of an Anadro-*

their ancestral fresh water to spawn. While all of the species engage in such migratory behavior, there are significant variations in the life history of the six species of anadromous salmonids which spawn within the Columbia River Basin.[8]

The life of a salmon begins with the fertilization of an egg deposited in a gravel nest, or "redd," in a stream or lakeshore. Two to three months after fertilization, the alevin hatches. It remains in the gravel, however, until its yolk sac has been completely absorbed and it has completed the physiological transformation into a fry. With the emergence of the fry from the protective gravel, the life cycles of the six salmonid species diverge. The fry of chinook, coho, and steelhead disperse along the stream, each fry staking out a feeding territory; these fry will grow into fingerlings and may remain in the stream for up to three years.[9] Sockeye migrate upstream or downstream into lakes, where they remain for up to three years. On the other hand, most

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mous Fish Resource, in FOR THEORY BUILDING IN ARCHEOLOGY 207, 211-13 (1977). *Cf.* B. BROWN, MOUNTAIN IN THE CLOUDS 22-23 (1982).

8. There are seven species of anadromous salmonids in the Northern Pacific Ocean. Six of these are salmon and belong to a single genus, *Oncorhynchus*; the seventh salmonid is the steelhead trout which belongs to the closely related genus *Salmo*, the genus of the Atlantic salmon and the various species of trout found in western streams. The Pacific salmon are the chinook or king (*O. tschawytscha*), sockeye or blueback (*O. nerka*), coho or silver (*O. kisutch*), pink or humpback (*O. keta*), chum or dog (*O. gorbuscha*), and cherry or masu (*O. masou*). The latter species is limited to the Japanese islands and the adjoining Asian mainland. The genus ranges north from Monterey Bay through Alaska's Arctic Coast and south along the Asian mainland adjoining Japan. In addition to differences among species, there are "runs" which are genetically distinct. There are, for example, spring, summer, and fall chinook runs in the Columbia Basin. For a general introduction to salmonid biology, *see* R. CHILDERHOSE & M. TRIM, PACIFIC SALMON & STEELHEAD TROUT 23, 25-26, 31-45 (1979); J. COBB, PACIFIC SALMON FISHERIES 6-11 (U.S. Bureau of Fisheries Doc. No. 902, 1921); R. FREDIN, R. MAJOR, R. BAKKALA, & G. TANONAKA, PACIFIC SALMON AND THE HIGH SEAS FISHERIES OF JAPAN 3-61 (Northwest & Alaska Fisheries Center Processed Rep., 1977) [hereinafter cited as PACIFIC SALMON]; A. NETBOY, THE COLUMBIA RIVER SALMON AND STEELHEAD TROUT 38-54 (1980); Donaldson & Joyner, *The Salmonid Fishes as a Natural Livestock*, SCI. AM., July, 1983, at 51; Schalk, *supra* note 7, at 211-22 (1977). The text relies upon these works which will not be repetitiously cited.

Historically, chinook, coho, and sockeye salmon, and steelhead trout spawned in Idaho. At present, only chinook and sockeye salmon and steelhead trout still do so. COLUMBIA RIVER FISHERIES COUNCIL, COMPREHENSIVE PLAN FOR PRODUCTION AND MANAGEMENT OF COLUMBIA RIVER BASIN ANADROMOUS SALMON AND STEELHEAD 12 (public review draft 1980) [hereinafter cited as CRFC COMPREHENSIVE PLAN]; Ortmann, *Status of Salmon and Steelhead Runs into the Snake River*, in COLUMBIA RIVER SALMON AND STEELHEAD 31, 31 (Am. Fisheries Soc'y Special Pub. No. 10, 1977).

9. Variation occurs both between and within individual runs of a species. *See* F. JONES, FISH MIGRATION 47-48 (1968); PACIFIC SALMON, *supra* note 8, at 33-35.

chum and pink salmon begin their trip to the ocean soon after emerging from the gravel.

Eventually, the juveniles of all species begin the smolting process, drifting and swimming downstream to the estuary at the river's mouth. In this fertile mixture of fresh and salt water, they complete the physiological and metabolic adaptation to salt water. With smolting completed, the salmon leave the estuary for the ocean and a variety of migratory paths. Some Columbia River salmon — primarily coho — turn south, feeding off the Oregon and the California coasts as far south as Point Conception; others — primarily chinook — turn north and, following the narrow continental shelf, move in a northwesterly circle as far as the Aleutian Island and the Gulf of Alaska.[10] The adolescents will remain in the ocean, feeding and growing, for up to five years.[11] Then, in some as-yet-not-understood manner, the adult salmonid leaves this ecosystem of sea, plankton, and fish. Most return to the estuary at the mouth of the river which they left years before and begin the arduous upstream migration to the spawning grounds where they were hatched, to court, mate, and die.[12]

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10. The migratory patterns of salmon are complex and incompletely understood; they appear to differ among species, runs, and individuals. Columbia River fall Chinooks, for example, are divided into two general groups, those which migrate to the Gulf of Alaska (upper Basin "bright" and lower river wild stocks) and the fall hatchery stocks ("tule"), which have a more southerly distribution. PACIFIC FISHERY MANAGEMENT COUNCIL, PRESEASON REPORT I STOCK ABUNDANCE ANALYSIS FOR 1986 OCEAN SALMON FISHERIES at II-20 (1986). *See generally* J. FISHER & W. PEARCY, STUDIES OF JUVENILE SALMONIDS OFF THE OREGON AND WASHINGTON COAST, 1985 (Or. State U. Sea Grant Pub. ORESU-T-85-004, 1985); NORTHWEST POWER PLANNING COUNCIL, DRAFT COMPILATION OF INFORMATION ON SALMON AND STEELHEAD LOSSES IN THE COLUMBIA RIVER BASIN 81-83 (Sept. 10, 1985) [hereinafter cited as DRAFT LOSSES INFORMATION]; PFMC MANAGEMENT PERSPECTIVE, *supra* note 5, at 4-6; PACIFIC SALMON, *supra* note 8, at 3-33. Upper basin steelhead are composed of two distinct groups. Group A steelhead pass through Bonneville Dam primarily during July and August and are bound for the Snake and Salmon Rivers. Group B steelhead pass through Bonneville during late August to October and are destined for the Clearwater. While some Group A steelhead spend two years in the ocean, the majority spend only one year. Group B steelhead, on the other hand, spend two years in the ocean and return weighing 10-20 pounds. See Affadavit of Herbert A. Pollard, United States v. Oregon, Civ. No. 68-513 (D. Or.), *reprinted in To Provide for Additional Protection of Steelhead Trout as a Game Fish: Hearing on S. 954 Before the Senate Select Comm. on Indian Affairs*, 99th Cong., 1st Sess. 241 (1985). Comparatively little is known of steelhead migration because the species is not taken commercially in the ocean fisheries.

11. *See generally* Hartt, *Juvenile Salmonids in the Oceanic Ecosystem — The Critical First Summer*, in SALMONID ECOSYSTEMS OF THE NORTH PACIFIC 25, 46-47 (1980).

12. Not all spawners return to the same stream; there is some straying to other streams. F. JONES, *supra* note 9, at 42-61. As with Atlantic salmon, steelhead do not necessarily die after spawning and may return for two or three years. Chapman, *The Life*

At each stage of this cycle, salmon are vulnerable. As an egg and then an alevin in the gravel redd, they are prey for crayfish and aquatic insects. Fry and fingerlings are eaten by other fish and birds. As adolescents, salmon are food for larger fish, sharks, and marine mammals. Natural predation is high; the returning spawners are only a small fraction of the eggs originally laid.[13]

The salmon's life cycle makes it uniquely susceptible to human actions. Effective management requires recognition of this fact.[14] Dependent upon two distinct habitats, anadromous fish are the unintended victims of a wide range of human activities.[15] Their migratory behavior also provides harvest opportunities to a greater number of people. What began as an evolutionary advantage has become a threat to the continued existence of the species.[16]

History of the Alsea River Steelhead, 22 J. WILDLIFE MGMT. 123, 126-27 (1958). Dams now prevent multiple spawnings.

13. Mortality estimates are necessarily problematic, but one estimate for sockeye salmon concluded that of 1,900,000 eggs, only 17,000 fry — less than 0.9% — will survive to begin the seaward migration. R. FOERSTER, THE SOCKEYE SALMON 67 (Fisheries Research Bd. of Can. Research Bull. No. 162, 1968); *see generally* PACIFIC SALMON, *supra* note 8, at 61.

14. *E.g.*, *Symposium on Management of Pacific Salmon Stocks as Units Throughout Their Range*, in 36TH ANNUAL REPORT OF THE PACIFIC MARINE FISHERIES COMMISSION 1, 1 (1984) (statement of J. Harville).

15. For example, the discovery of gold in the lower Snake River Basin led to the destruction of miles of spawning and rearing habitat because placer and dredge mining technology totally altered stream beds. DRAFT LOSSES INFORMATION, *supra* note 10, at 130-31; L. FULTON, SPAWNING AREAS AND ABUNDANCE OF CHINOOK SALMON (*Oncorhyncus tshawytscha*) IN THE COLUMBIA RIVER BASIN 6-10 (U.S. Fish & Wildlife Serv. Special Sci. Rep. (Fisheries) No. 571, 1968); Thompson, *Columbia Basin Fisheries Past, Present and Future*, in INVESTIGATIVE REPORTS OF THE COLUMBIA RIVER FISHERIES PROJECT at A-19 to 21 (1976). Similarly, early logging practices relied upon streams as a primary method for transporting logs. This required major, disruptive changes to streams and their beds, including the construction of splash dams which blocked fish passage and channelization of streams which destroyed spawning areas. *See generally* DRAFT LOSSES INFORMATION, *supra* note 10, at 122-23; R. GEPPERT, C. LORENZ, & A. LARSON, CUMULATIVE EFFECTS OF FOREST PRACTICES ON THE ENVIRONMENT 3-5 (1984) [hereinafter cited as CUMULATIVE LOGGING EFFECTS].

16. The situation became sufficiently critical as a result of the disastrous losses in the mid-1970s, that the Fish and Wildlife Service and the National Marine Fisheries Service initiated procedures to list some Snake River salmon and steelhead runs as endangered species. 43 Fed. Reg. 45,628 (Oct. 3, 1978). *See generally* Bodi, *Protecting Columbia River Salmon under the Endangered Species Act*, 10 ENVTL. L. 349 (1980). The precipitous decrease of the Columbia Basin anadromous fish runs has resulted from the interaction of primarily three factors: (1) developmental activities which have destroyed spawning and rearing habitat, (2) operation of the region's hydroelectric system, and (3) overutilization of the fishery. *E.g.*, COMPTROLLER GENERAL, GENERAL ACCOUNTING OFFICE, IMPACTS AND IMPLICATIONS OF THE NORTHWEST POWER BILL App. IV at 1-2 (Rep. No.

II. ALLOCATING HABITAT

Salmon are most vulnerable while in freshwater because of the comparative ease with which river and stream habitats can be disrupted. Large areas of spawning and rearing habitat have been destroyed by human activities such as placer or dredge mining.[17] Similarly, early logging practices relied upon streams as a primary method for transporting logs; turning rivers into highways frequently required major, disruptive changes.[18]

The risk to salmon and steelhead stocks is not, however, limited to direct habitat destruction. Unlike oceanic environments, rivers are dependent upon the terrestial ecosystems which envelop them. The vast majority of energy used by stream communities, for example, comes from the surrounding lands.[19] Thus the health of the riverine environment is intimately dependent upon the surrounding land. As a result, all land use decisions that affect the physical structure of the riparian environment[20] or the quantity or quality of the river's water affect the fish dependent upon that water.

EMD-79-105, 1979); Allen, *Solutions to Critical Habitat Problems in the Columbia Basin*, in INVESTIGATIVE REPORTS OF THE COLUMBIA RIVER FISHERIES PROJECT at B-1 (1976); Thompson, *supra* note 15, at A-4 to 24.

17. *See* DRAFT LOSSES INFORMATION, *supra* note 10, at 130-31; Evermann, *A Preliminary Report upon Salmon Investigation in Idaho in 1894*, 15 U.S. FISH COMM'N BULL. 253, 263 (1896); L. FULTON, *supra* note 15, at 6-10; L. FULTON, SPAWNING AREAS AND ABUNDANCE OF STEELHEAD TROUT AND COHO, SOCKEYE, AND CHUM SALMON IN THE COLUMBIA RIVER BASIN — PAST AND PRESENT 9 (Nat'l Marine Fisheries Serv. Special Sci. Rep. (Fisheries) No. 618, 1970); Gilbert & Evermann, *A Report upon Investigations in the Columbia River Basin with Descriptions of Four New Species of Fishes*, 14 U.S. FISH COMM'N BULL. 169, 199 (1895).

18. Destructive practices included the construction of splash dams, which blocked fish passage, and channelization of streams, which destroyed spawning areas. *See generally* CUMULATIVE LOGGING EFFECTS, *supra* note 15, 3-5; DRAFT LOSSES INFORMATION, *supra* note 10, at 122-23; J. SEDELL & W. DUVAL, WATER TRANSPORTATION AND STORAGE OF LOGS, 5 INFLUENCE OF FOREST AND RANGELAND MANAGEMENT ON ANADROMOUS FISH HABITAT IN WESTERN NORTH AMERICA (U.S. Forest Service General Tech. Rep. No. PNW-186, 1985).

19. One study found that 99% of the energy input into the stream community came from the surrounding lands. Cummins, *supra* note 7, at 632. For example, studies have found that reduction of streamside vegetation through grazing reduces the percentage of terrestrial insects in salmonid diets. *E.g.*, Berry, *Impact of Sagebrush Management on Riparian and Stream Habitat*, in THE SAGEBRUSH ECOSYSTEM 192, 195 (1978). *See generally* Keller, Anderson, & Tappel, *Fish Habitat Changes in Summit Creek, Idaho, After Fencing the Riparian Area*, in PROCEEDINGS OF THE FORUM ON GRAZING AND THE RIPARIAN/STREAM ECOSYSTEM 46, 49 (Mar. 1979).

20. Cattle and sheep, for example, trample stream banks, destroying the habitat edge which is the most biologically active part of any ecosystem. In addition to physically destroying banks, grazing reduces cover which fish require. *E.g.*, Berry, *supra* note

A. Land Uses: Insidious Destroyers

1. *Water Quantity*

Fish require water. The over-appropriation of many streams in the Columbia Basin has made availability of water a major problem. Some stretches of former salmon-producing streams, such as the Lemhi River on the Idaho-Montana border and the Umatilla River in Oregon, are now drained dry by irrigators during all but the wettest years.[21] Even where streams continue to flow, salmon habitat is often reduced by flow alteration or water level fluctuation caused by irrigation withdrawals.[22] While irrigation is the major cause, insufficient water may also result from land uses which do not directly consume water. Removal of vegetation, for example, accelerates runoff and increases the likelihood that a stream will dry up in the summer.[23]

19, at 193-95; Platts, *Livestock Grazing and Riparian/Stream Ecosystems — An Overview*, in PROCEEDINGS OF THE FORUM ON GRAZING AND RIPARIAN/STREAM ECOSYSTEMS 39, 41 (1979).

21. E. CHANEY, A QUESTION OF BALANCE 25 (1978); CRFC COMPREHENSIVE PLAN, *supra* note 8, at 17; L. FULTON, *supra* note 15, at 7-12; DRAFT LOSSES INFORMATION, *supra* note 10, at 145-64; Q. STOBER, M. GRIBEN, R. WALKER, A. SETTER, I. NELSON, J. GISLASON, R. TYLER, & E. SALO, COLUMBIA RIVER IRRIGATION WITHDRAWAL ENVIRONMENTAL REVIEW 137 (U. Wash. Fisheries Research Inst. Rep. No. FRI-UW-7010, 1979) [hereinafter cited as IRRIGATION EFFECTS]. The problem is no longer restricted to arid regions. B. BROWN, *supra* note 7, at 87-88.

22. In addition to habitat loss, water level fluctuations and flow alterations reduce food sources, increase predation of eggs, alevins, and juveniles, strand fry, delay migration, and increase water temperatures. DRAFT LOSSES INFORMATION, *supra* note 10, at 147-50; IRRIGATION EFFECTS, *supra* note 21, at 141-71; D. REISER & T. BJORNN, HABITAT REQUIREMENTS OF ANADROMOUS SALMONIDS, 1 INFLUENCE OF FOREST AND RANGELAND MANAGEMENT ON ANADROMOUS FISH HABITAT IN WESTERN NORTH AMERICA 4-5, 9-13, 22-23, 33-34 (U.S. Forest Service General Tech. Rep. No. PNW-96, 1979). Unless they are screened, irrigation diversions also divert ("entrain") migrating fingerlings. It was estimated in 1963 that 422,000 fingerlings died in irrigation canals in the Lemhi River alone. DRAFT LOSSES INFORMATION, *supra* note 10, at 150; *see generally id.* at 145-64. If diversions are improperly screened or intake velocities are high, migrating fingerlings may be injured or killed when they impinge upon the screen. *See generally* IRRIGATION EFFECTS, *supra* note 21, at 187-90.

23. Liacos, *Water Yield as Influenced by Degree of Grazing in California Grasslands*, 15 J. RANGE MGMT. 34, 40-41 (1962); Meehan & Platts, *Livestock Grazing and the Aquatic Environment*, 33 J. SOIL & WATER CONSERV. 274, 275 (1978); W. PLATTS, EFFECTS OF LIVESTOCK GRAZING, 7 INFLUENCE OF FOREST AND RANGELAND MANAGEMENT ON ANADROMOUS FISH HABITAT IN WESTERN NORTH AMERICA 2, 12 (U.S. Forest Service General Tech. Rep. No. PNW-124, 1981); D. REISER & T. BJORNN, *supra* note 22, at 23.

2. *Water Quality*

The quality of the available water is as important as its quantity.[24] Massive fish kills caused by industrial pollution dramatize the importance of high-quality water.[25] More insidious, because less dramatic, are a variety of water quality problems such as temperature, water chemistry, and sedimentation.

a. *Temperature*

Water temperature is the most important determinant of the type of fishery a river supports, because it directly affects fish metabolic rates.[26] Salmonids are cold-water species, preferring water temperatures between 45°-58° F. While they can briefly survive temperatures up to 77° F, temperatures above the preferred range increase stress: salmon are adversely affected by temperatures above 62°-68° F.[27] Such temperatures affect the growth rate of juveniles, disrupt the smolting transition from fresh to saltwater, contribute to diseases, either halt

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24. The two problems are interrelated. Reduction of the quantity of water exacerbates existing quality problems. A reduction in the quantity of water reduces the velocity of the flow which affects the temperature of the water. Since fish are poikilothermic organisms, i.e., their body temperatures fluctuate in response to the environment, changing the water temperature affects all aspects of a fish's biology. *See generally* IRRIGATION EFFECTS, *supra* note 21, at 152, 156-67.

25. *E.g.*, BONNEVILLE POWER ADMINISTRATION, DEP'T OF ENERGY, ENHANCING OUR FISH & WILDLIFE RESOURCES 5 (1984). For a graphic account of the effects of industrial and urban pollution on a major river, *see* A. NETBOY, *supra* note 8, at 65-71. Even nontoxic levels of industrial pollution may have a major effect. For example, it takes upstream-migrating chinook salmon an average of over 6.5 days to negotiate the John Day Dam, while only 2 days at Bonneville Dam and 1 day at The Dalles Dam. One study which sought to determine the cause of this delay concluded that the fish were avoiding the fluoride effluent of an aluminum plant, which was discharged just upstream from the dam. D. DAMKAER, EFFECTS OF WATER-BORNE POLLUTANTS ON FISH PASSAGE AT JOHN DAY DAM, COLUMBIA RIVER 45, 74 (1983).

26. IRRIGATION EFFECTS, *supra* note 21, at 156; Bouck, *The Importance of Water Quality to Columbia River Salmon and Steelhead*, in COLUMBIA RIVER SALMON AND STEELHEAD 149, 149-50 (Am. Fisheries Soc'y Special Pub. No. 10, 1977).

27. Temperature sensitivities vary with species and activity. Spring chinook, for example, can tolerate a temperature range of 38-56 F (3.3-13.3 C) during upstream migration, while summer chinook can tolerate water between 57-68 F (10.6-19.4 C). Both spring and summer chinook require temperatures between 42-57 F (5.6-13.9 C) for spawning and between 37-58 F (5.0-14.5 C) for incubation. Temperatures above 77 F (25.1 C) are lethal to chinook, pink, sockeye, chum, and coho salmon. D. REISER & T. BJORNN, *supra* note 22, at 3, 7, 19-20, 27-28; Bouck, *supra* note 26, at 150.

the upstream migration or seriously deplete stored body fat of the migrating fish, and adversely affect gonadal development.[28]

Several land uses indirectly increase water temperature. Logging, grazing, and agricultural activities which remove tree cover or riparian vegetation expose the stream to direct sunlight, thereby increasing water temperature.[29] Similarly, irrigation return water is warmer than stream water, thus contributing to higher water temperature.[30]

b. *Chemistry*

The second major determinant of water quality is its chemistry. Land uses that alter the chemical balance of watersheds may seriously affect the fishery. Salmonids, for example, require a narrow band of water acidity.[31] Salmon and steelhead also appear particularly susceptible to heavy metal contamination.[32] Since mining often exposes both acidic spoil and heavy metal wastes to weathering, proper reclamation

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28. *See generally* IRRIGATION EFFECTS, *supra* note 21, at 163-67; D. REISER & T. BJORNN, *supra* note 22, at 2, 27-28; Bouck, *supra* note 26, at 149-51.

29. *E.g., "Clearcutting" Practices on National Timberlands: Hearings Before the Subcomm. on Public Lands of the Senate Comm. on Interior and Insular Affairs*, 92d Cong., 1st Sess. 315 (1971) (statement of Hurlon Ray, Director, State & Federal Programs, Water Quality Office, EPA) (temperature increases of 14-16 F following clearcutting); C. CEDERHOLM, THE IMPACTS OF LOGGING ON SALMONID RESOURCES IN THE PACIFIC NORTHWEST (1977); T. CHAMBERLIN, TIMBER HARVEST, 3 INFLUENCE OF FOREST AND RANGELAND MANAGEMENT ON ANADROMOUS FISH HABITAT IN WESTERN NORTH AMERICA 13 (U.S. Forest Serv. General Tech. Rep. No. PNW-136, 1982); CUMULATIVE LOGGING EFFECTS, *supra* note 15, at 155-56; DRAFT LOSSES INFORMATION, *supra* note 10, at 129; W. PLATTS, *supra* note 23, at 11; Berry, *supra* note 19, at 193-95; Saltzman, *Impact of Streamside Use on Fisheries*, in COLUMBIA RIVER SALMON AND STEELHEAD 160, 160 (Am. Fisheries Soc'y Special Pub. No. 10, 1977).

30. DRAFT LOSSES INFORMATION, *supra* note 10, at 149; IRRIGATION EFFECTS, *supra* note 21, at 155.

31. While salmonids prefer water with pH values between 6.5 and 8.7, they can survive for short periods in water outside this range. Even nonlethal pH values are deleterious, however, since they not only reduce aquatic insects upon which salmon and steelhead feed, but also directly affect fish behavior and reproduction. S. MARTIN & W. PLATTS, EFFECTS OF MINING, 8 INFLUENCE OF FOREST AND RANGELAND MANAGEMENT ON ANADROMOUS FISH HABITAT IN WESTERN NORTH AMERICA 5-6 (Forest Service General Tech. Rep. No. PNW-119, 1981).

32. Even levels of such metals which are not lethal to adults can produce significant effects such as reproductive failure, behavioral changes, and juvenile mortality. For example, sublethal dosages of copper and zinc prevent spawning. R. CHILDERHOSE & M. TRIM, *supra* note 8, at 73. Similar doses of copper prevent the adaptation of smolts to salt water. Lorz & McPherson, *Effects of Copper or Zinc in Fresh Water on the Adaptation to Sea Water and ATPase Activity and the Effects of Copper on Migratory Disposition of Coho Salmon*, 33 J. FISH. RESOURCES BD. CAN. 2023 (1976). *See generally* S. MARTIN & W. PLATTS, *supra* note 31, at 6-9; Bouck, *supra* note 26, at 151.

is important to the fishery. Mining in the Panther Creek watershed in central Idaho, for example, destroyed chinook salmon and steelhead runs when acidic and heavy metal wastes leached into the stream.[33]

Another common source of potential water chemistry problems is the wide range of herbicides, pesticides, and fertilizers used in agriculture, forest, and range management.[34] Since persistent pesticides such as the chlorinated hydrocarbons tend to become concentrated in species near the top of food chains, such chemicals may present problems for those species of salmon which spend time in freshwater before migrating to the ocean.[35]

Land uses may also adversely affect a river's chemistry by reducing its dissolved oxygen content. Salmon and steelhead require highly oxygenated water; reduced oxygen concentrations affect all stages of their life cycles.[36] A river's oxygen content may be reduced as a result of increased water temperature, reduced water flow, increased productivity (eutrophication) caused by the leaching of nutrients and fertilizers, or increased oxygen consumption from the breakdown of organic wastes.[37]

Finally, many water chemistry problems appear to be synergistic. Reduced dissolved oxygen content, for example, increases the toxicity

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33. The Blackbird mine operated intermittently between 1893 and 1967, producing gold, copper, and cobalt. Mine tailings leached sulphuric acid, copper, iron, and other heavy metals into Blackbird and Panther Creeks at levels which were independently or synergistically toxic to fish and other aquatic life. W. PLATTS, S. MARTIN, & E. PRIMBS, WATER QUALITY IN AN IDAHO STREAM DEGRADED BY ACID MINING WASTES (U.S. Forest Service General Tech. Rep. No. INT-67, 1979); Platts, *The Effects of Heavy Metals on Anadromous Fish Runs of Salmon and Steelhead in the Panther Creek Drainage*, IDAHO, PROC. 52D ANN. CONF. W.A. ST. GAME & FISH COMM'RS 582 (1972). *See generally* DRAFT LOSSES INFORMATION, *supra* note 10, at 135; E. FARMER, B. RICHARDSON, & W. BROWN, REVEGETATION OF ACID MINING WASTES IN CENTRAL IDAHO 1-2 (U.S. Forest Service General Tech. Rep. No. INT-178, 1976).

34. *See generally* DRAFT LOSSES INFORMATION, *supra* note 10, at 145; L. NORRIS, H. LORZ, & S. GREGORY, FOREST CHEMICALS, 9 INFLUENCE OF FOREST AND RANGELAND MANAGEMENT ON ANADROMOUS FISH HABITAT IN WESTERN NORTH AMERICA (U.S. Forest Service General Tech. Rep. No. PNW-149, 1983) [hereinafter cited as FOREST CHEMICALS]; Berry, *supra* note 19, at 197-201; Bouck, *supra* note 26, at 152.

35. IRRIGATION EFFECTS, *supra* note 21, at 185-86.

36. ENVIRONMENTAL PROTECTION AGENCY, AMBIENT WATER QUALITY CRITERIA FOR DISSOLVED OXYGEN 3-10 (1985); D. REISER & T. BJORNN, *supra* note 22, at 2, 16-19, 28-29.

37. T. CHAMBERLIN, *supra* note 29, at 19; G. HOLLAND, J. LASATER, E. NEUMANN, & W. ELDRIDGE, TOXIC EFFECTS OF ORGANIC AND INORGANIC POLLUTANTS ON YOUNG SALMON AND TROUT 253 (Wash. Dep't Fisheries Research Bull. No. 5, 1960); 1 PACIFIC NORTHWEST REGION, FOREST SERVICE, DEP'T OF AGRICULTURE, MANAGEMENT OF WILDLIFE AND FISH HABITATS IN FORESTS OF WESTERN OREGON AND WASHINGTON 214 (June 1985) [hereinafter cited as FISH HABITAT MANAGEMENT]; D. REISER & T. BJORNN, *supra* note 22, at 20; Berry, *supra* note 19, at 195-96.

of ammonia, a water soluble component of many fertilizers and animal wastes.[38] Similar lethal correlations appear between increased water temperature, low dissolved oxygen content, and the presence of many introduced chemicals.[39]

c. *Sediment*

Salmon require clean water; turbidity and siltation adversely affect each stage of their life cycle. Eggs and alevins require clean gravel and highly oxygenated water; siltation and turbidity reduce egg and alevin survival rates by reducing oxygen flow and acting as physical barriers to the emerging fry.[40] Siltation can also cover gravel crevices which fry use for shelter, thus reducing the number of juveniles that a stream can support.[41] Turbidity also affects susceptibility to diseases[42] and migratory behavior.[43]

Sedimentation is a frequent result of land disturbing activities. For example, logging on National Forest lands along the South Fork of the Salmon River between 1952 and 1965 deposited up to two feet of sediment on chinook salmon spawning beds.[44] Sedimentation is also a common byproduct of grazing, road building, mining, and many agricultural activities.[45]

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38. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 36, at 19; *Forest Chemicals, supra* note 34, 45-49; Meehan & Platts, *supra* note 23, at 276.

39. ENVIRONMENTAL PROTECTION AGENCY, *supra* note 36, at 19-20.

40. *Id.* at 3-10; IRRIGATION EFFECTS, *supra* note 21, at 169-70; W. PLATTS, *supra* note 23, at 11; D. REISER & T. BJORNN, *supra* note 22, at 21-22, 29-32; Berry, *supra* note 19, at 195.

41. IRRIGATION EFFECTS, *supra* note 21, at 170.

42. *Id.* at 171.

43. FISH HABITAT MANAGEMENT, *supra* note 37, at 209; D. REISER & T. BJORNN, *supra* note 22, at 2.

44. A fishery worth $100,000,000 was jeopardized for timber worth $14,000,000. E. CHANEY, *supra* note 21, at 10; W. PLATTS, THE EFFECTS OF LOGGING AND ROAD CONSTRUCTION ON THE AQUATIC HABITAT OF THE SOUTH FORK SALMON RIVER, IDAHO, *reprinted in "Clearcutting" Practices on National Timberlands: Hearings Before the Subcomm. on Public Lands of the Sentate Comm. on Interior and Insular Affairs*, 92d Cong., 1st Sess. 113 (1971); Platts & Megahan, *Time Trends in Riverbed Sediment Composition in Salmon and Steelhead Spawning Areas: South Fork Salmon River, Idaho*, TRANS. 40TH N. AM. WILDLIFE & NAT. RESOURCES CONF. 229 (1975). *See generally* T. CHAMBERLIN, *supra* note 37, at 18; DRAFT LOSSES INFORMATION, *supra* note 10, at 128-29; Cederholm, Reid, Edie, & Salo, *Effects of Forest Road Erosion on Salmonid Spawning Gravel Composition and Populations of the Clearwater River, Washington*, in HABITAT DISTURBANCE AND RECOVERY 1 (1981) [hereinafter cited as ROAD EROSION].

45. *See generally* DRAFT LOSSES INFORMATION, *supra* note 10, at 145; FISH HABITAT MANAGEMENT, *supra* note 37, at 216-18; IRRIGATION EFFECTS, *supra* note 21, at 167-68; ROAD EROSION, *supra* note 44; W. PLATTS, *supra* note 23, at 11; C. YEE & T. ROELOFS,

Increased awareness of the adverse effects of land use decisions on salmon and steelhead runs as well as environmental legislation have reduced some of the worst problems. The United States Forest Service in particular has become increasingly sensitive to fish habitat requirements, though the extent of its commitment remains open to question.[46]

As anadromous species, salmon and steelhead spend part of their lives in streams that are intimately affected by the surrounding land uses. Logging, mining, grazing, and agriculture all affect watersheds, and thus salmonids, by producing sediment, salts, toxic chemicals, heavy metals, organic and inorganic nutrients, or heat. Many of these water quality problems are the result of "nonpoint source" pollution, that residual category of pollution caused by land uses.[47] As John Hockberger notes in his article, the problem is how to motivate thousands of land users to control the pollution resulting from their conduct. This is a task which has fallen largely to the states. Mr. Hockberger examines both the federal statutory basis and this state's implementation program for controlling nonpoint source pollution. It is not a pleasing report. It is instead an example of an administrative agency hamstrung by a complicated and unnecessary procedure, of a legislature unconcerned with either water quality or fishery problems.[48]

PLANNING FOREST ROADS TO PROTECT SALMONID HABITAT, 4 INFLUENCE OF FOREST AND RANGELAND MANAGEMENT ON ANADROMOUS FISH HABITAT IN WESTERN NORTH AMERICA 2-3 (U.S. Forest Service General Tech. Rep. No. PNW-109, 1980).

46. The multi-volume series *Influence of Forest and Rangeland Management on Anadromous Fish Habitat in Western North America* is an example of this increased awareness. *Cf.* DRAFT LOSSES INFORMATION, *supra* note 10, at 129 (citing environmental awareness and legislation for reversal of trend toward salmonid habitat destruction associated with logging). A report prepared for the National Wildlife Federation and Trout Unlimited, however, concluded that the proposed forest plan and draft environmental impact statement for the Clearwater National Forest "adopted a 'ruin now, repair later' strategy, allowing significant degradation of fish habitat to occur with hopes of mitigating the problems down the road." C. KRONBERG & J. TUHOLSKE, FOREST PLANS & FISHERIES 3 (1985). The Clearwater Forest produces approximately 10% of the Columbia Basin chinook salmon. The forest plan envisions an increased timber harvest (primarily through clearcutting), more than doubling the number of miles of roads, a 25% increase in grazing, substantial increases in anadromous and resident fish, an increase in wilderness, and a doubling of elk habitat. The authors conclude that the combination of these goals is "unrealistic" and point to funding questions surrounding the intensive mitigation measures necessary to meet the goals. *Id.* at 27.

47. The Federal Clean Water Act defines "point source," 33 U.S.C. § 1362(14) (1982), and requires National Pollutant Discharge Elimination System (NPDES) permits for discharges from such sources of pollution. Id. § 1342. "Nonpoint source" is the residual category and is not covered by the NPDES.

48. *See also infra* notes 184-96 and accompanying text.

As a result, the possibilities inherent in the state's power to regulate pollution for the benefit of the anadromous fish has remained an unfulfilled promise.

B. The Regional Hydroelectric System

While competing land uses have significantly reduced salmon and steelhead habitat, the primary cause of habitat losses has been the regional hydroelectric system.[49] The system has been destructive in two distinct ways. First, its construction directly destroyed salmon and steelhead habitat. Second, the system has been operated to maximize the production of electricity rather than to produce both protein and power.

1. *The Dams: The New and Improved Columbia-Snake Lake*

Development of hydropower in the Columbia Basin began in 1888 with the construction of the T.M. Sullivan Dam at Willamette Falls on the Willamette River. Within twenty years, fourteen more hydroelectric facilities had been constructed on the Snake, Boise, and Spokane Rivers in Idaho; on the Similkameen, Naches, Spokane, and Wenatchee Rivers in Washington; on the Rock Creek and the Clackamas and Deschutes Rivers in Oregon.[50] These early facilities had low dams with relatively small storage capacity; construction of major dams did not begin until the 1930s when Rock Island, Bonneville, and Grand Coulee Dams were begun. There are now almost 130 hydroelectric or multipurpose dams on the Columbia and its tributaries.[51]

The decisions to construct these dams were habitat allocation decisions. The most obviously destructive effect of dam building has been to close off or drown spawning and rearing habitat. In 1941, the Bureau of Reclamation closed the gates on Grand Coulee Dam, thus blocking more than 1,100 river miles of spawning and rearing habitat.[52] Idaho Power's Brownlee Dam[53] and Portland General Electric's Pelton Dam[54]

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49. COMPTROLLER GENERAL, *supra* note 16, App. IV at 1-2.

50. J. CRAIG & R. HACKER, THE HISTORY OF THE DEVELOPMENT OF THE FISHERIES OF THE COLUMBIA RIVER 193 (U.S. Bureau of Fisheries Bull. No. 32, 1940); DRAFT LOSSES INFORMATION, *supra* note 10, App. C at 100-01; G. YOUNG & F. COCHRANE, HYDRO ERA 11-33 (1978).

51. DRAFT LOSSES INFORMATION, *supra* note 10, at App. C. See generally Durocher, *The Federal Columbia River Power System: A Report on the Experiment*, in HYDROPOWER 245 (1979).

52. E. CHANEY & L. PERRY, COLUMBIA BASIN SALMON AND STEELHEAD ANALYSIS 3 (1976).

53. In 1959, Brownlee ended all runs on the Snake River and its tributaries above the Salmon River, a loss of almost 3,000 miles of habitat. DRAFT LOSSES INFORMATION,

each destroyed a major run. In addition, mainstem Columbia and Snake River dams drowned spawning and rearing habitat beneath their impoundments.[55] The cumulative result has been a reduction in accessible spawning habitat by more than one-half.[56] In addition to reducing the Basin's aggregate capacity to produce salmon, shutting off habitat funnels the fish into smaller and smaller areas, which increases the species' vulnerability to a local environmental catastrophe.

Even when equipped with fish passage facilities,[57] dams kill by changing the river environment. Salmon and steelhead evolved in free-

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supra note 10, at B-21; Larson, *A Few Lessons from the Past*, in COLUMBIA RIVER SALMON AND STEELHEAD 111 (Am. Fisheries Soc'y Special Pub. No. 10, 1977). *See generally* E. CHANEY & L. PERRY, *supra* note 52, at 3; A. NETBOY, *supra* note 8, at 94-97.

54. *Cf.* FPC v. Oregon, 349 U.S. 435 (1955)(the end of Oregon's attempt to prevent the dam and preserve the runs on the Deschutes River). *See also* City of Tacoma v. Taxpayers of Tacoma, 357 U.S. 320 (1958); B. BROWN, *supra* note 7, at 96-101 (Washington's futile attempt to block the destruction of the runs on the Cowlitz River).

55. DRAFT LOSSES INFORMATION, *supra* note 10, at App. B; L. FULTON, *supra* note 15; L. FULTON, *supra* note 17.

56. While the names have a Gutheriesque poetry of their own — Chief Joseph and Green Peter, Mayfield and Merwyn and River Mill — each dam marked the end of a run. Columbia River Basin spawning habitat has been reduced from 163,000 to 73,000 square miles. NORTHWEST POWER PLANNING COUNCIL, COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM at iii (1982) [hereinafter cited as 1982 PROGRAM]. The habitat losses vary by species since different species have different ranges and habitat requirements. Thus steelhead habitat fell from 12,935 river miles in 1850 to 8,915 in 1875; spring chinook habitat decreased from 10,618 to 5,417; the summer chinook's range was reduced from 4,972 to 2,268 miles; fall chinook habitat was reduced from 1,825 to 1,658; chum habitat fell from 309 to 194 miles; sockeye lost all but 794 of its previous 2,268 miles of habitat. Coho, on the other hand, actually gained 654 miles of habitat as a result of removal of natural blockages, primarily on the Willamette River. Lavier, *Distribution of Salmon and Steelhead in the Columbia River Basin — 1850 and 1976*, in INVESTIGATIVE REPORTS OF THE COLUMBIA RIVER FISHERIES PROJECT at G-1 (1976). *See generally* B. BROWN, *supra* note 7, at 61-108.

57. Dams present fish passage problems to both upstream and downstream migrants. While upstream migration presents fewer problems, fish ladders — despite popular perception — may cause significant losses. On one dam on the Umatilla River, for example, an estimated 20% of the 1982-83 steelhead run was lost despite the presence of two fish ladders, PACIFIC NORTHWEST REGION, BUREAU OF RECLAMATION, FISH PASSAGE IMPROVEMENTS AT THREE MILE FALLS DIVERSION DAM, UMATILLA RIVER, OREGON at c-d (DOE/BPA Rep. No. 83-436, 1985). *See generally id.* at 12-15. Additionally, during high-flow years, the delay at the dams exposes adults to the nitrogen supersaturation problems caused by the need to spill water during high flows. W. EBEL, G. TANONAKA, G. MONAN, H. RAYMOND, & D. PARK, THE SNAKE RIVER SALMON AND STEELHEAD CRISIS STATUS REPORT 13 (Nw. & Alaska Fisheries Center Processed Rep. No, 79-9, 1979) [hereinafter cited as SALMON CRISIS UPDATE]. On nitrogen supersaturation, see *infra* note 62. Finally, fish ladder design is less than an exact science, involving a host of variables ranging from flow rates — which must be sufficient to attract fish to the ladder — to the physical construction of the facility. *See generally* NORTHWEST POWER PLANNING COUN-

flowing streams. The dams have completely destroyed this environment: a free-flowing river has been replaced by a series of computer-controlled, slack-water ponds.[58] The impoundments have deleterious effects on salmonids. The warmer, slack-water environment of the impoundments is conducive to native and exotic predators[59] and hostile to salmon and steelhead.[60] The impoundments expose migrating salmon to increased water temperatures[61] and altered water chemis-

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CIL, COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM 39 (amended ed. 1984) [hereinafter cited as 1984 PROGRAM]; 1 J. ORSBORN, NEW CONCEPTS IN FISH LADDER DESIGN (DOE/BPA Rep. No. 82-14, 1985); Collins, *Effects of Dams on Pacific Salmon and Steelhead Trout*, MARINE FISHERIES REV., Nov. 1976, at 39, 39-41. The problems facing downstream migrating fingerlings are discussed *infra* at notes 59-69 and accompanying text.

58. The last free-flowing sections of the Columbia River within the United States are below Bonneville Dam and a short stretch adjacent to the Hanford nuclear reservation; the Snake River is only free-flowing for a short stretch between Lewiston and Hells Canyon Dam. IRRIGATION EFFECTS, *supra* note 21, at 1; *see also* Collins, *supra* note 57, at 44.

59. Impoundments have increased the vulnerability of migrating juvenile salmon and steelhead in at least four synergistic ways. Higher water temperatures promote the growth of warm-water fish species such as squawfish, walleye, and smallmouth bass, which feed on migrating juveniles. This factor is compounded by the reduced flows, which both favor predatory species and increase the length of time during which the downstream migrating salmonids are exposed to predation. Finally, higher temperatures, reduced flows, and increased migration periods stress the fish, and there is a positive correlation between stress and increased predation. *See* J. CONGLETON, T. BJORNN, B. BURTON, B. WATSON, J. IRVING, & R. RINGE, EFFECTS OF HANDLING AND CROWDING ON THE STRESS RESPONSE AND VIABILITY OF CHINOOK SALMON PARR AND SMOLTS 109-10 (DOE/BPA Rep. No. 82-5, 1985); A. NETBOY, *supra* note 8, at 43; SALMON CRISIS UPDATE, *supra* note 57, at 9; C. WILLIS, A. NIGRO, B. UREMOVICH, J. ELLIOTT, & W. KNOX, ABUNDANCE AND DISTRIBUTION OF NORTHERN SQUAWFISH AND WALLEYE IN JOHN DAY RESERVOIR AND TAILRACE, 1982 at 2, 20-21 (DOE/BPA Rep. No. 82-12, 1985). Collins, *supra* note 57, at 44; EBEL, MAJOR PASSAGE PROBLEMS, IN COLUMBIA RIVER SALMON AND STEELHEAD 33, 34-35 (American Fisheries Soc'y Special Pub. No. 10, 1977); Raymond, *Effects of Dams and Impoundments on Migrations of Juvenile Salmon and Steelhead from the Snake River, 1966 to 1975*, 108 TRANSACTIONS AM. FISHERIES SOC'Y 505, 524 (1979).

60. The various environmental changes caused by the impoundments impose additional energy requirements on the smolts, decreasing their survival rates upon reaching saltwater. *See* D. RONDORF, M. DUTCHUK, A. KOLOK, & M. GROSS, BIOENERGETICS OF JUVENILE SALMON DURING THE SPRING OUTMIGRATION 1, 52-53 (DOE/BPA Rep. No. 82-11, 1985).

61. In 1985, the water temperature at McNary Dam was over 70 F for most of July and August. WATER BUDGET CENTER, 1985 ANNUAL REPORT FROM THE WATER BUDGET MANAGERS TO THE NORTHWEST POWER PLANNING COUNCIL AND BONNEVILLE POWER ADMINISTRATION 20 (Nov. 1, 1985) [hereinafter cited as 1985 WATER BUDGET REPORT]. Columbia River temperatures in the Bonneville Dam impoundment during August *averages* 68 F. PORTLAND DISTRICT, U.S. ARMY ENGINEER, SECRETARY OF THE ARMY, FINAL ENVIRONMENTAL IMPACT ON MODIFICATION FOR PEAKING, THE DALLES TO VANCOUVER, COLUMBIA RIVER, OREGON AND WASHINGTON, at 2-4 to 5 (1972) [hereinafter cited as FEIS ON PEAK-

try,[62] thus enhancing their susceptibility to disease.[63] In addition, the current in the impoundments is substantially reduced from that of a free-flowing river.[64] Downstream migration coincides with spring runoff when the high flow volumes allow the smolts to move quickly downstream into the estuary.[65] Prior to the impoundments, smolts migrated

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ING]; *see also* D. DAMKAER, *supra* note 25, at 23-36 (in 1982, water temperature at the John Day Dam reached 63 F by June 10 and 68 F by July 1; it did not drop below 68 F until mid-September). Salmon are adversely affected by water temperatures in excess of 62-68 F. For the effect of increased water temperatures on salmon and steelhead, see generally *supra* notes 26-28 and accompanying text. The effects of water temperature changes at high dams, such as Brownlee on the Snake River, are even more extreme: they are lethal. Collins, *supra* note 57, at 44.

62. There are two primary water chemistry problems. The first is low dissolved oxygen content. Since slow moving water tends to have low oxygen content, the reduced currents in impoundments reduce oxygen levels. This is compounded by the hydraulics of reservoirs, which become stratified by water density and temperature. The lowest water level in an impoundment is effectively cut off from oxygen and becomes anaerobic. Among other problems caused by this stratification is the fact that certain metals which are insoluble in aerobic conditions become soluble in anaerobic conditions. National Wildlife Federation v. Gorsuch, 693 F.2d 156 (D.C. Cir. 1982) (Clean Water Act not applicable to dam-caused water quality problems); D. DAMKAER, *supra* note 25, at 36; ENVIRONMENTAL PROTECTION AGENCY, THE CONTROL OF POLLUTION FROM HYDROGRAPHIC MODIFICATION 68-76 (1973); Atty & Liebert, *Clean Water, Dirty Dams: Oxygen Depletion and the Clean Water Act*, 11 ECOLOGY L.Q. 703 (1984); Nowak, *Water Quality Problems: Permitting Discharges from Hydroelectric Dams under the Clean Water Act*, in HYDROPOWER 177, 178-79 (1979). The second problem is nitrogen supersaturation. Water spilled over dams becomes supersaturated with atmospheric gases, primarily nitrogen, which produces a fatal gas bubble disease. Incidence of the disease is related to exposure times. Thus the delays in migration attributable to the mainstem dams also increase the mortality due to gas bubble disease. Nitrogen superaturation accounted for approximately 40% of the total downstream mortality in 1970, 1972, and 1974. G. COLLINS, W. EBEL, G. MONAN, H. RAYMOND, & G. TANONAKA, THE SNAKE RIVER SALMON AND STEELHEAD CRISIS 6-7 (1975) [hereinafter cited as SALMON CRISIS]; Ebel, *supra* note 59, at 35; Collins, *supra* note 57, at 45; Ebel & Raymond, *Effect of Atmospheric Gas Superaturation on Salmon and Steelhead Trout of the Snake and Columbia Rivers*, MARINE FISHERIES REV., July 1976, at 1; Raymond, *Migration Rates of Yearling Chinook Salmon in Relation to Flows and Impoundments in the Columbia and Snake Rivers*, 97 TRANS. AM.FISH. SOC'Y 356 (1968) [hereinafter cited as IMPOUNDMENT EFFECTS]. The nitrogen problem has largely been remedied by installing spillway deflectors. At present, deflectors have been installed on six of the eight dams on the Columbia-Snake run; only The Dalles and John Day dams lack them. Telephone interview with Howard Raymond, National Marine Fisheries Service (Nov. 12, 1985).

63. NORTHWEST POWER PLANNING COUNCIL, DRAFT FISH AND WILDLIFE PROGRAM 19 (1982).

64. One study concluded that outmigrating smolts traveled 24-54 kilometers per day in free-flowing streams depending upon the magnitude of flow. For the same magnitude of flow, smolts traveled only 8-24 kilometers per day in impoundments. Raymond, *supra* note 59, at 517.

65. *Id.* at 513-17.

from the Snake, Salmon, and Clearwater drainages into saltwater in ten to fourteen days; the same trip now requires more than fifty days.[66] The increased time required for migration has severe effects on the smolts, actually stopping the migration of some individuals.[67] Delayed migration also exposes the juveniles to greater predation.[68] Each dam exacts its toll with a staggering cumulative effect.[69] As a result of the radically altered river environment, the present salmon and steelhead runs in the upper Columbia Basin are mere remnants of historic runs.

2. *Operating the System: Cogenerating Power and Protein*

It is important to recognize that much of the problem is the operation of the system rather than its hardware.[70] The devastating mortality rates of downstream migrating salmonids are not the unavoidable byproduct of hydroelectricity. It *is* possible to cogenerate fish and electricity.[71] It is not possible, however, to maximize power production without simultaneously reducing the fishery; the situation is a zero sum game. This fact has been largely lost in the traditional overemphasis on

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66. Ebel, *supra* note 57, at 34; IMPOUNDMENT EFFECTS, *supra* note 62; Lothrop, *The Failure of the Fish Passage Provisions of the Columbia Basin Fish and Wildlife Program and Some Suggested Remedies*, 34 ANADROMOUS FISH L. MEMO 1, 5 (1985).

67. Smoltification is a physiological process which occurs during a short period of time. During smoltification, juvenile salmonids are motivated to migrate downstream and are physiologically capable of adapting to the saltwater environment. If migration is delayed beyond the smoltification period, some juveniles will remain in fresh water. If the smolts arrive at the estuary beyond the crucial period, they suffer high mortality rates. Raymond, *supra* note 59, at 517-18. *See generally* E. CHANEY, *supra* note 21, at 6-7; R. CHILDERHOSE & M. TRIM, *supra* note 8, at 53; COMPTROLLER GENERAL, *supra* note 16, at IV.5.

68. *See supra* note 59.

69. For example, prior to the completion of Lower Monumental and Little Goose Dams, 89% of the chinook salmon fry made it to Ice Harbor Dam; following completion of these two dams, only 33% of the fingerlings arrived at Ice Harbor. *Impoundment Effects, supra* note 62, at 519-20. *See generally* Ebel, *Effects of Hydroelectric Projects on Fish Populations*, in HYDROPOWER 170 (1979). During low-flow years such as 1973 and 1977, losses of 95% and 99% were recorded for both salmon and steelhead as a result of the Snake River Dams alone. SALMON CRISIS UPDATE, *supra* note 57, at 9.

70. As one observer has commented, "Dams are good scapegoats. . . . To blame 'the dams,' however, is to miss the point. The dams are merely instruments of a technocratic society. . . . A dam is not a problem because it is a dam. A dam is a problem because it creates benefits for some and hardships for others." C. SMITH, SALMON FISHERS OF THE COLUMBIA 4 (1979). *See* Blumm, *Hydropower vs. Salmon: The Struggle of the Pacific Northwest's Anadromous Fish Resources for a Peaceful Coexistence with the Federal Columbia River Power System*, 11 ENVTL. L. 211, 220-22 (1981).

71. E. CHANEY, COGENERATION OF ELECTRICAL ENERGY & ANADROMOUS SALMON AND STEELHEAD IN THE UPPER COLUMBIA RIVER BASIN 11 (1979); CRFC COMPREHENSIVE PLAN, *supra* note 8, at 22.

structural solutions, on modifying the hardware rather than its operation.

The regional hydroelectric system crossed a critical threshold in the 1970s. Two structural changes — an increased number of dams[72] and the addition of upstream storage[73] — allowed the system's managers to alter significantly the system's operation. Water not required for immediate power generation can be stored for high energy-demand periods;[74] more of the total flow can be run through the increased number of turbines to produce more electricity. This operational approach has two advantages. First, the firm energy load capability of the regional system is increased because water is not "wasted" by being spilled over spillways. Second, the flexibility of the system as a source of peaking power is increased because electricity can be generated precisely when

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72. As recently as 1956, a salmon migrating between the Salmon River and the Pacific faced only two dams, Bonneville and McNary. Then, in rapid succession, six additional dams were added: The Dalles (1967) and John Day (1968) Dams on the Columbia, and Ice Harbor (1961), Lower Monumental (1969), Little Goose (1970), and Lower Granite (1975) Dams on the Snake. Existing dams also had additional turbines installed. *See* BONNEVILLE POWER ADMINISTRATION, DEPARTMENT OF ENERGY, MULTIPURPOSE DAMS OF THE PACIFIC NORTHWEST 12-13, 34-38 (1980) [hereinafter cited as NORTHWEST DAMS]; SALMON CRISIS, *supra* note 62, at 25.

73. The crucial structural change was the addition of storage capacity. Even with the completion of all the projects, storage capacity within the Basin was less than one-tenth of the average annual runoff. It thus was not possible to prevent the large spring flows which propelled the migrating fingerlings downstream. In 1964, however, the United States and Canada ratified a treaty authorizing the construction of four storage dams: Libby Dam in Montana, which floods Canadian land, stores almost 5,000,000 acre feet of water; the three dams in Canada, Keenleyside, Duncan, and Mica Dams, store 15,500,000 acre feet of water. With the addition of Dworshak's 2,000,000 acre feet, the system had a storage capacity of over 43,000,000 acre feet by 1984. These dams provided the means to store the spring runoff. Treaty on the Cooperative Development of the Water Resources of the Columbia River Basin, Sept. 16, 1964, United States-Canada, 15 U.S.T. 1555, T.I.A.S. 5638. *See* COLUMBIA RIVER WATER MANAGEMENT GROUP, COLUMBIA RIVER WATER MANAGEMENT REPORT FOR WATER YEAR 1984 1 (1984); NORTHWEST DAMS, *supra* note 72. *See generally* E. CHANEY, *supra* note 21, at 12-13; Blumm, *supra* note 70, at 243-47, 251.

74. The basin annually discharges an average 256,000,000 cubic feet of water at the mouth of the Columbia River; spring snowmelt accounts for almost half (120,000,000 acre feet) of this total. Peak flow occurs in May or June; peak energy demand, on the other hand, occurs in December through January. *See generally* ARMY ENGINEER, SECRETARY OF THE ARMY, COLUMBIA RIVER AND TRIBUTARIES REVIEW STUDIES at I-1 to 2 (1976).

and as needed.[75] The effects of these operational changes on the already stressed riverine environment, however, are drastic.[76]

The addition of storage capacity changed the natural flow patterns by allowing the spring run-off to be stored for later use and substantially increased the risks facing downstream migrating smolts. This had two synergistic effects on salmon and steelhead. First, it compounded the environmental problems caused by the impoundments: delayed outmigration,[77] altered water chemistry,[78] and increased predation.[79] Second, the addition of storage capacity allowed the river managers to route a higher percentage of water — and fish — through their turbines. As a result, turbines are now the major cause of juvenile mortality.[80] While research is currently underway to retrofit the dams with

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75. Traditionally, the hydroelectric system was used to meet the regional "base load," i.e., the minimum continual load. During the past ten years, the base load has increasingly been met by thermal generating units, while the hydroelectric component of the regional system has been used to meet "peak loads," i.e., those loads above the base load. The result is rapid flow fluctuations. *See generally* M. BELL, Z. PARKHURST, R. PORTER, & M. STEVENS, EFFECTS OF POWER PEAKING ON SURVIVAL OF JUVENILE FISH AT LOWER COLUMBIA AND SNAKE RIVER DAMS (1976) [hereinafter cited as PEAKING EFFECTS].

76. One study prepared by National Marine Fisheries Service concluded that "one *average* or low flow year after 1979 can nearly destroy the outmigrant population for that year. Two successive years of low flow or *average* flow, or a combination will be disastrous to the salmon and steelhead of the Snake River" due to the absence of spilling any spring runoff. SALMON CRISIS, *supra* note 62, at 25. Prior to the creation of the Power Planning Council, two strategies were employed to avoid these losses. The first was to screen the turbine intakes, thus directing the fingerlings into a bypass system. The second was to collect the fry at the highest dam and transport them down river for release below Bonneville. E. CHANEY & L. PERRY, *supra* note 52, at 32-35 (1976); SALMON CRISIS, *supra* note 62, at 9-15; 1984 PROGRAM, *supra* note 57, at 23-24; Ebel, *supra* note 59, at 35-37. Among the tools given to the Council was the authority to require flows "of sufficient quality and quantity" to insure the survival of the fisheries. PNEPPCA § 4(h)(6)(E)(ii), 16 U.S.C. § 839b(h)(6)(E)(ii) (1982). On the efficacy of the Council's Program, see *infra* notes 106-14 and accompanying text.

77. *See supra* note 67.

78. *See supra* note 62.

79. *See supra* note 59.

80. Turbine mortality is approximately 15% per dam, totaling 75% of the Idaho smolts passing through the eight downstream dams. Lothrop, *supra* note 66, at 3. Although rapid pressure changes within the turbine are the primary cause of death, contact with the blades and the effects of water shear contribute to mortality. SALMON CRISIS, *supra* note 62, at 6; 1984 PROGRAM, *supra* note 57, at 23; Collins, *supra* note 57, at 41. In addition, many fish are injured or temporarily stunned and are easy prey for the squawfish and gulls which feed in the eddies below the dams. While actual mortality varies with a number of factors, the combination of predation and turbine losses can be enormous; one study has concluded that the combined losses are 30% per dam. PEAKING EFFECTS, *supra* note 75, at 15-16. The cumulative effect of such per dam losses is staggering. For example, in the low-flow years of 1973 and 1977, 95-99% of all fingerlings leav-

screening devices so that juveniles are directed away from the turbines, the devices themselves cause some mortality.[81] Even if bypass mechanisms are successful in routing the fish around the turbines, the environmental problems associated with the impoundments remain.

The use of the system to provide peaking power further exacerbates these difficulties. Most of the problems are the result of the dramatic flow fluctuation associated with the use of the system for peaking. During the summer operating season, for example, the river level below Bonneville Dam rises and falls as much as five feet during both of the daily peak energy demand periods; during winter, the fluctuation may be ten feet.[82] Such rapid fluctuations delay upstream migrants and obscure fish ladder entrances;[83] they also delay migrating juveniles and lead to stranding.[84] The use of the system for peaking power also increases turbine mortalities.[85]

While the full effect of the regional system on the anadromous fish runs did not become obvious until the structural changes of the mid-1970s, there have consistently been those who urged caution. In 1946, for example, the United States Fish and Wildlife Service recommended an indefinite moratorium on the construction of additional Columbia and Snake River Dams, arguing that the effect of dams on the fish was cumulative. Such objections were lost in the chorus of power, irrigation, and navigation interests.[86] Similarly, the statutory requirement

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ing the Snake River Basin failed to reach The Dalles Dam. E. CHANEY, *supra* note 21, at 7; H. RAYMOND, SNAKE RIVER RUNS OF SALMON AND STEELHEAD TROUT (1974); SALMON CRISIS UPDATE, *supra* note 57, at 9; C. SIMS, W. BENTLEY, & R. JOHNSEN, EFFECTS OF POWER PEAKING OPERATIONS ON JUVENILE SALMON AND STEELHEAD TROUT MIGRATIONS (1978); Blumm, *supra* note 70, at 211.

81. Indeed, one study concluded that the losses from screening and bypassing might in some cases be higher than routing the fish through the turbines. SALMON CRISIS UPDATE, *supra* note 57, at 21.

82. FEIS ON PEAKING, *supra* note 61, at 1-6.

83. All salmon and steelhead species seek out high velocity flows during upstream migration. Thus the increased flows through the turbines, which result from the use of the dams for peaking power, increase problems in locating fish passage facilities. *See* Collins, *supra* note 57, at 41. *See generally supra* note 57.

84. FEIS ON PEAKING, *supra* note 61, at 3-1 to -2.

85. Generally, fish survival during passage through turbines is highest when the turbine is operating at its maximum efficiency because this is the point at which turbulence is lowest. PEAKING EFFECTS, *supra* note 75, at 5-6, 21. Peaking operation results in either under- or over-loading of turbines, and thus in increased turbulence. DRAFT LOSSES INFORMATION, *supra* note 10, at 119.

86. As one commenter has noted,

> "[t]hese days I look back again at our sorry history with the dams, thinking that every time we build a dam, somebody assures us that we're going to take excellent care of the fish resource. Yet when there's a problem that demands

that fish be accorded "equal consideration" in planning and operating water projects has had little effect on the operators of the regional system.[87]

The problems are at least partially attributable to the fact that the decisions are made by agencies with vested interests in nonfishery uses. Bonneville Power Administration (BPA), the Federal Energy Regulatory Commission (FERC), the Army Corps of Engineers, and the Bureau of Reclamation exist because of electricity, irrigation, or navigation, not because of fish. Multiple-use requirements have little effect on single-use agencies.[88] Fish have been viewed as an impediment to maximizing electricity production, a view captured by the perhaps-apocryphal statement attributed to the Chief of the Army Corps of Engineers: "We do not intend to play nursemaid to the fish!"[89]

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mitigation, those efforts begin after damages have occurred for two or three years."

Larson, *supra* note 53, at 112-13. *See* A. NETBOY, *supra* note 8, at 78-79.

87. The "equal consideration" requirement is contained in section 1 of the Fish and Wildlife Coordination Act, 16 U.S.C. § 661 (1982). The Act has had notoriously little effect on the operations of permitting agencies such as the Army Corps of Engineers. In 1974, the General Accounting Office reported that "wildlife conservation has not been considered equally with other features" of water resource developments. COMPTROLLER GENERAL, GENERAL ACCOUNTING OFFICE, IMPROVED FEDERAL EFFORTS NEEDED TO EQUALLY CONSIDER WILDLIFE CONSERVATION WITH OTHER FEATURES OF WATER RESOURCE DEVELOPMENTS 8 (GAO Rep. No. B-118370, 1974). The Courts have generally refused to restrict agency action based upon the Act's consultation requirements. *E.g.*, Environmental Defense Fund v. Corps of Engineers, 325 F. Supp. 749, *aff'd on other grounds*, 470 F.2d 289 (8th Cir. 1972), *cert. denied*, 412 U.S. 931 (1973); *see generally* Blumm, *supra* note 70, at 268-276.

88. One commentator on the politics of the Columbia River has noted how organizational self-interest tends to dominate:

> History suggests that a compact's acceptability for the Columbia River does not rest upon a rational, objective evaluation of its operational, political, and institutional advantages, but rather upon the political and organizational perceptions of how a compact can help or hurt a member entity. If each organization is free to pursue its own institutional interest, it will do so at a miminum sacrifice to itself, with a concomitant disregard of the costs to others. . . . Even mandated participation in an organization that has no sanction or control over its members generally fails to mitigate organizational self-interest.

Haggard, *supra* note 3, at 231 (footnotes omitted). *Cf.* Blumm & Johnson, *Promising a Process for Parity: The Pacific Northwest Electric Power Planning and Conservation Act and Anadromous Fish Protection*, 11 ENVTL. L. 497, 549-53 (1981) (arguing that increased public participation requirements are useful in ensuring "responsive and responsible" decisionmaking).

89. *See* A. NETBOY, *supra* note 8, at 75 & n.2. While the statement may be apocryphal, the sentiment is not. It is apparent, for example, that fish were not a priority for Corps' planners since the original plans for Bonneville Dam did not include *any* fish passage devices. If built as initially designed, all anadromous fish runs in the Basin above

The problem of forcing such agencies to incorporate divergent viewpoints into their decisionmaking is addressed by two of the symposium papers. Both examine ways to broaden the legendarily narrow focus of the FERC.[90] Allen Sanders addresses the adequacy of the Cluster Impact Assessment Procedure (CIAP), which FERC plans to use to determine the effects of multiple small hydroelectric developments within a single basin. While the projects are labeled "small hydro," there is no guarantee that they are small in any sense other than in the amount of electricity produced: among the small hydro projects currently proposed for the region is a 210 foot high and 740 foot wide dam on the Coquille River in Oregon.[91] Even when a small hydro project is indeed physically small, it may have environmental effects of large proportion particularly when there are several projects in a comparatively small area. Within the Region, there are twelve river basins in which multiple applications are pending.[92] These basins are the subject of FERC's proposed cluster analysis. As Allen convincingly demonstrates, the CIAP is inadequate to the task: it relies upon arbitrary spatial and

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Bonneville would have been destroyed. Nor is the attitude purely of historical interest: during the 1984 and 1985 downstream migration period, the Corps consistently refused to release water from Dworshak Dam to aid the migrants. *See infra* notes 106-12 and accompanying text. Nor is the problem confined to the Corps: in a May 8, 1980 press release, for example, the BPA characterized a spill designed to reduce salmon mortality by noting that "[t]his week power dams on the Columbia will waste more water than normal in order to save fish." Quoted in E. CHANEY, *supra* note 71, at 4 n.1. Similarly, in the multivolume environmental impact statement on its role in the regional power system, BPA discusses only its role as a power marketing agency; fish are scarcely mentioned. 2 BONNEVILLE POWER ADMINISTRATION, DEP'T OF THE INTERIOR, THE ROLE OF THE BONNEVILLE POWER ADMINISTRATION IN THE PACIFIC NORTHWEST POWER SUPPLY SYSTEM at VII-1 to 14 (1977). *See also* E. CHANEY & L. PERRY, *supra* note 52, at 33 (discussing refusal of BPA to provide requested summer flows "due to priority power commitments"); Blumm, *Reexamining the Parity Promise: More Challenges than Successes to the Implementation of the Columbia Basin Fish and Wildlife Porgram*, 16 ENVTL. L. (1986) (in press); Columbia R. Intertribal Fish Comm'n., *Dam Operators Fight Increased Spills*, CRITFC NEWS, Oct. 1985 - Feb. 1986, at 1.

90. *E.g.*, Udall v. FPC, 387 U.S. 428 (1967).

91. 47 Fed. Reg. 4,723 (1982). *See generally* Eckberg, *Cumulative Impacts of Hydropower Development Under the National Environmental Policy Act: The Requirement of a Basin-Wide Approach*, 31 ANADROMOUS FISH L. MEMO 1 (1985); Thatcher, *The Pacific Northwest Electric Power Planning and Conservation Act: Fish and Wildlife Protection Outside the Columbia River Basin*, 13 ENVTL. L. 516 (1983).

92. The basins and the number of pending projects as of August 31, 1985 are: Nooksack (WA): 14; Skagit (WA): 20; Dungeness (WA): 3; Hamma Hamma (WA): 4; Snohomish (WA): 5; Yakima (WA): 5; Cowlitz (WA): 6; Clearwater (ID): 4; Salmon (ID): 19; Deschutes (OR): 7; Willamette (OR): 7; Rogue (OR): 4. FEDERAL ENERGY REGULATORY COMM'N, DEP'T OF ENERGY, CLUSTER IMPACT ASSESSMENT PROCEDURE (CIAP) 5 (1985).

temporal limitations to avoid the necessary cumulative impact analysis.

A second paper also examines FERC — "an agency that just couldn't say no," in Scott Reed's phrase. He offers a refreshing review of FERC's inability to refuse a license for a hydroelectric project, and the current status of federal legislation seeking to curb the agency's desires.

C. Some Changes, Some Hopes, Some Questions

A wide variety of land and instream uses affect critical spawning and rearing habitat. This habitat is frequently allocated to produce wheat or timber, electricity or lead, rather than salmon and steelhead. These tradeoffs are not news. As one early commenter noted:

> In future developments of other land and water resources, plans in which fisheries receive a just amount of consideration should be made, so that other industries will not be developed at the expense of one which is already important and well established. This situation presents an outstanding opportunity for sound, well-conceived, and coordinated planning.[93]

Other land and water users have avoided paying the full cost of their habitat-destroying activities. Although there is a strong constituency for continuing such subsidies, the interest of the fish may finally have a legally effective voice.[94]

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93. J. CRAIG & R. HACKER, *supra* note 50, at 195. *See generally id.* at 134-36, 188-90.

94. In addition to the PNEPPCA, the fish's interest have a powerful voice in the region's indigenous peoples who have increasingly brought their case before the federal courts. Beginning in 1969, the treaty tribes initiated litigation to enforce their claim to a specific percentage of the runs. This claim was upheld in a series of decisions known as *Boldt I* after district court Judge George Boldt who wrote the initial decision. This litigation is reviewed *infra* in the text accompanying notes 149-57. In addition to their entitlement claims, the treaty tribes argued that their right to take fish included the right to have the fishery protected from environmental degradation. This second claim was severed from the entitlement claim and has come to be known as *Boldt II*. In 1980, the district court concluded that "implicitly incorporated into the treaties' fishing clause is the right to have the fishery habitat protected from man-made despoliation." United States v. Washington, 506 F. Supp. 187, 203 (W.D. Wash. 1980). This right was applicable to both federal and state activities. *Id.* at 206. On appeal, a panel of the Ninth Circuit Court of Appeals reversed the district court, concluding "we find no absolute right to any particular level of fish supply" and thus no environmental right. 694 F.2d 1374, 1380 (9th Cir. 1983). Rather, the court felt that what was owed was a "cooperative stewardship of the anadromous fish runs." *Id.* at 1381. The decision was vacated as premature and advisory by the Ninth Circuit. 759 F.2d 1353, 1360 (9th Cir. 1985) (en banc). The environmental issue thus remains unresolved.

One of the recent events that has transformed the legal structure for managing anadromous fish was the enactment in 1980 of the Pacific Northwest Electric Power Planning and Conservation Act.[95] The Act created an eight-member planning council with authority to develop a Fish and Wildlife Program "to protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat, on the Columbia River and its tributaries."[96] The Act is intended to mark a shift in the treatment of the anadromous fish resource.[97] The resource is finally to receive "equitable treatment" from all federal agencies with regulatory or management authority over both federal and nonfederal hydroelectric projects.[98] To this end, the Act introduced new decision-making standards[99] and shifted the emphasis to improving wild stocks through habitat enhancement.[100]

In other contexts, however, various federal courts have found more specific environmental protections in the treaty fishing rights. For example, in Kittitas Reclamation Dist. v. Sunnyside Irrigation Dist., 763 F.2d 1032 (9th Cir. 1985), the court of appeals upheld a district court order requiring an irrigation district to maintain sufficient water flows to protect some sixty salmon redds. *See also* Colville Confederated Tribes v. Walton, 647 F.2d 42 (9th Cir.), *cert. denied*, 454 U.S. 1092 (1981); No Oilport! v. Carter, 520 F. Supp. 334 (W.D. Wash. 1981); Confederated Tribes of the Umatilla Indian Reservation v. Alexander, 440 F. Supp. 553 (D. Or. 1977). *But see* Northwest Indian Cemetery Protective Ass'n v. Peterson, 764 F.2d 581 (9th Cir. 1984); Swinomish Tribal Community v. FERC, 627 F.2d 499 (9th Cir. 1980). *See generally* Blumm and Johnson, *Indian Treaty Fishing Rights and Protection of the Environment*, 12 ANADROMOUS FISH L. MEMO 1, 16-28 (1981); Comment, *Indian Fishing Rights Return to Spawn: Toward Environmental Protection of Indian Treaty Fisheries*, 61 OR. L. REV. 93 (1982).

95. Pacific Northwest Electric Power Planning and Conservation Act, Pub. L. No. 96-501, 94 Stat. 2697 (codified in 16 U.S.C. §§ 839-839g (1982)).

96. PNEPPCA § 4(h)(1)(A), 16 U.S.C. § 839b(h)(1)(A).

97. *E.g.*, H.R. Rep. No. 976, pt. I, 96th Cong., 2d Sess. 45 (1980); *id.* pt. II, at 37-38, 48; 126 Cong. Rec. H10,681 (daily ed. Nov. 17, 1980) (statement of Rep. Dingell).

98. PNEPPCA § 4(h)(11)(A)(i), 16 U.S.C. § 839b(h)(11)(A)(i). *See generally* Blumm, *Implementing the Parity Promise: An Evaluation of the Columbia Basin Fish and Wildlife Program*, 14 ENVTL. L. 277 (1984).

99. The Program, for example, is to be based upon "the best available scientific knowledge" rather than certainty. Thus, one of the traditional excuses for delay, the need for "better information," should no longer be available. PNEPPCA § 4(h)(6)(B), 16 U.S.C. § 839b(h)(6)(B). Similarly, in place of the traditional "cost-effective" standard, Program measures are to be the least cost necessary to accomplish the "same sound biological objective." *Id.* § (C), 16 U.S.C. § 839b(h)(6)(C). Finally, the states and Indian tribes are to consulted. *Id.* §§ (4)(A), (6)(D), (7), 16 U.S.C. §§ 839b(h)(4)(A), (6)(D), (7). *See* Blumm, *Fulfilling the Parity Promise: A Perspective on Scientific Proof, Economic Cost, and Indian Treaty Rights in the Approval of the Columbia Basin Fish and Wildlife Program*, 13 ENVTL. L. 103 (1982).

100. Early warnings that "[a]rtificial propagation should be invoked as an aid and not as a substitute for reproduction under natural conditions" went largely unheeded. McDonald, *supra* note 1, at 154. "Mitigation," the traditional requirement for water

In 1982, the Council adopted its first Columbia Basin Fish and Wildlife Program.[101] The centerpiece of the Program was the "water budget," a volume of water made available during the period between April 15 and June 15.[102] By timing the release of the water to coincide with downstream migration, the smolts were to be flushed through the dams and their reservoirs. Control of the timing of the releases was

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projects, has become little more than a euphemism for the construction of hatcheries. NORTHWEST POWER PLANNING COUNCIL, COMPILATION OF INFORMATION ON SALMON AND STEELHEAD LOSSES IN THE COLUMBIA RIVER BASIN 162 (Rev. Draft, Dec. 2, 1985) [hereinafter cited as REVISED DRAFT LOSSES]. Mitigation through artificial propagation, however, actually has several adverse consequences. First, such mitigation can be harmful to the remaining wild runs. Hatchery fry are larger than wild fry of the same age because of the controlled hatchery environment; hatchery fry thus are able to out-compete their wild counterparts for rearing space and food in the remaining riparian environment. Increasing the number of fry does not increase the carrying capacity of the river which must support the mixed stock. Second, increasing reliance on artificial propagation reduces the genetic diversity found in wild stocks. Third, hatchery stocks can support higher harvests because fewer spawners are required. Thus where hatchery and wild stocks intermingle and are simultaneously harvested, there can be overfishing of the wild stocks. This is the situation with the Columbia Basin stocks. The result of these three factors is a progressive erosion of natural stocks and a concomitantly increased dependence upon increasingly costly artificial propagation programs. As a result, the Council has concluded that "[p]riority shall be given to improving and reprogramming propagation at existing hatchery facilities over construction of new facilities." 1984 PROGRAM, *supra* note 57, at 60. *See generally* H.R. REP. No. 1243, 96th Cong., 2d sess. 44, *reprinted in* 1980 U.S. CODE CONG. & AD. NEWS 6793, 6827-28; PFMC MANAGEMENT PERSPECTIVE, *supra* note 5, at 9, 27-28; 1984 PROGRAM, *supra* note 57, at 43; Blumm, *supra* note 98, at 312-16; Wilkinson & Conner, *supra* note 4, at 85-92. *Cf.* Salmon and Steelhead Conservation and Enhancement Act of 1980, § 120(d)(2), 16 U.S.C. § 3321(d)(2) (1982) (statutory standard requiring comprehensive management plans to minimize the "adverse interaction between naturally spawning and artifically [sic] propogated stocks").

Additionally, mitigation through artifical propagation has shifted the location of many runs. As upstream stocks have been destroyed or depleted by hydroelectric developments, mitigation has occurred below Bonneville Dam. For example, between 1949 and 1983, 22 hatcheries and 3 major rearing ponds were constructed to mitigate the effects of federal developments in the Basin under the Mitchell Act. 16 U.S.C. § 755 (1982). Only two of the rearing ponds (both on the Columbia River) were located above the confluence with the Snake River. The result has been a "dramatic" shift in the location of runs. REVISED DRAFT LOSSES, *supra*, at 163. *See generally* DRAFT LOSSES INFORMATION, *supra* note 10, at 207; REVISED DRAFT LOSSES, *supra*, at 162-77; 1984 PROGRAM, *supra* note 57, at 43.

101. 1982 PROGRAM, *supra* note 56.

102. *Id.* § 304(a). *See* 1984 PROGRAM, *supra* note 57, § 304(a). The Power Act required the Council to include in the Program provisions for "flows of sufficient quality and quantity between [hydroelectric] facilities to improve production, migration, and survival of such fish as necessary to meet sound biological objectives." PNEPPCA, § 4(h)(6)(E)(ii), 16 U.S.C. § 839b(h)(6)(E)(ii). *See generally* Blumm, *supra* note 98, at 293-302 (discussing the genesis of the water budget).

given to the Water Budget Managers, representing the federal and state fish agencies and the Indian tribes.[103] While the budget is subject to non-power requirements such as navigation and flood control, firm-power obligations, and physical conditions, it is to have priority over refilling reservoirs or selling secondary power.[104] Although controversial, the water budget was viewed by fishery interests as a major step toward protecting the anadromous fishery.[105]

The initial optimism triggered by the passage of the Act and the adoption of the Program has begun to dissipate.[106] The water budget has largely failed to achieve its objectives, primarily due to the resistance of the operators of the Columbia River Federal Power System (CRFPS) and Idaho Power Company.[107] Since the water in the water budget is unavailable for power generation, the system's operators have opposed the concept from the beginning.[108] Implementation of the water budget was delayed for one year when BPA, the Corps, and the Bureau of Reclamation concluded that an environmental impact statement was required;[109] once implemented, the Corps has refused to release water when requested to do so, filling reservoirs or generating secondary power instead.[110] The problem has been compounded on the Snake River by the recalcitrance of Idaho Power Company, which has refused to comply with the water budget by releasing water from

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103. 1982 PROGRAM, *supra* note 56, § 304(b)(1). *See also* 1984 PROGRAM, *supra* note 57, § 304(b)(1) (same provisions in amended Program).

104. 1982 PROGRAM, *supra* note 56, §§ 304(a)(1), (8). *See also* 1984 PROGRAM, *supra* note 57, §§ 304(a)(1), (8).

105. J. LAWRENCE, K. LEE, & R. PALMER, THE WATER BUDGET (U. Wash. Water Resources Tech. Rep. No. 81, 1983) [hereinafter cited as THE WATER BUDGET]; Blumm, *supra* note 89.

106. Blumm, *supra* note 89; Lothrop, *supra* note 66.

107. WATER BUDGET CENTER, 1984 ANNUAL REPORT TO THE NORTHWEST POWER PLANNING COUNCIL AND BONNEVILLE POWER ADMINISTRATION 59-60 (1984) [hereinafter cited as 1984 WATER BUDGET REPORT] ("resistance to change, to adapt to the new realities brought on by the Congressional mandate of the Act, must be countered at all levels if significant improvement in the status of the fishery resource is to be realized").

108. The total water budget is 4.64 million acre feet and is expected to result in a loss of 550 MW of firm energy load carrying capability. 1982 PROGRAM, *supra* note 56, §§ 304(a)(1), (4). BPA opposed the water budget mechanism, preferring artificial transportation of smolts. Blumm, *supra* note 98, at 294 & n.70.

109. *See* Blumm, *supra* note 98, at 296-97. The irony is that BPA felt that an environmental impact statement was unnecessary when it prepared 145 power supply contracts obligating it to provide electricity to the region's utilities and direct service industry for 20 years. It was wrong. Forelaws on Board v. Johnson, 743 F.2d 677 (9th Cir. 1985).

110. 1984 WATER BUDGET REPORT, *supra* note 107, at 2-3, 8; 1985 WATER BUDGET REPORT, *supra* note 61, at 15-18, 62-63; Lothrop, *supra* note 66.

Brownlee Dam.[111] As a result, Snake River flows during both the 1984 and 1985 migration periods were below those targeted by the Water Budget which is itself twenty-five percent below the flows deemed biologically necessary.[112] Revenues from power sales to California remain more important than fish.

Unfortunately, the institutional resistance to implementation of the Water Budget is only one example of a more general problem: the region's power interests continue to believe that fish are an impediment to the full utilization of the Basin's waters to produce electricity. They comply with the Program only to the extent that it does not interfere with power production. This extensive problem is documented by Ed Chaney in his review of the fish enhancement projects in the Umatilla Basin. Since the Umatilla drainage was given top priority by all state, federal, and tribal interests, BPA's recalcitrance is particularly notable.

Much of the resistance to the Fish and Wildlife Program and the water budget seems traceable to a reluctance to accept the changed legal structure of the region's hydroelectric system. For example, the Corps' North Pacific Division Engineer, General James van Loben Sels has stated that he is not obligated to comply with the Program: "Notwithstanding the water budget plan and all [the Council's] planning, I am still the decisionmaker. I don't work for the Council and I don't work for the water budget managers. Their plan is not law."[113] This position, which is shared by BPA, seems predicated upon the conclusion that the Council cannot constitutionally oversee federal agencies. The Ninth Circuit Court of Appeals, however, has recently held that the Council is constitutional.[114] The court concluded that the Council is an interstate compact agency and that it is constitutionally permissible for Congress to require federal agencies to act consistently with Council-determined policy.[115] There once again may be some grounds for optimism.

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111. The Company contends that its settlement agreement and FERC license are full compensation for fish losses associated with Brownlee Dam. *See* 1982 PROGRAM, *supra* note 56, § 304(a)(5). 1985 WATER BUDGET REPORT, *supra* note 61, 14-18, 62-63. *See generally* Blumm, *supra* note 98, at 298-99.

112. 1985 WATER BUDGET REPORT, *supra* note 61, at 14-18; Blumm, *supra* note 98, at 294-95; Blumm, *supra* note 89.

113. THE WATER BUDGET, *supra* note 105, at 66.

114. Seattle Master Builders Ass'n v. Northwest Power Planning Council, No. 83-7585, slip op. at 11 (9th Cir. Apr. 10, 1986).

115. *Id.* at 8. *See* Goble, *The Council and the Constitution: A Note on the Northwest Power Planning Council and the Property Clause*, 1 J. ENVTL. L. & LITIGATION (1986) (in press).

Habitat destruction and the current legally mandated attempts to mitigate that destruction are only part of the story. In addition to loss of habitat, the anadromous fishery has suffered from destructive overutilization.

III. ALLOCATING THE FISH

Just as the biological drives of anadromy bring the fish into contact with a great variety of human activities that incidentally destroy their habitat, so their migratory behavior brings the salmon and steelhead within the range of a diverse group of fishers. The drive to spawn also congregates the fish, making them particularly vulnerable to fishers.[116]

The law has frequently exacerbated this biological vulnerability, sanctioning jurisdictional boundaries and institutional arrangements unrelated to the migratory resource. Legal institutions have often produced a perverse incentive to overharvest while reducing the likelihood of effective regulation. One result has been a century of fish wars as an increasing number of fishers have sought to harvest a decreasing number of fish. Increased competition has also spurred technological change as fishers have sought to move to the head of the line.

But a concomitant development has been an increasing recognition that interjurisdictional cooperation is the only practical solution. While this recognition of the need to regulate has frequently lagged behind technological changes, the past century has seen increasingly extensive jurisdictional cooperation.

A. The Historical Context: A Century of Fish Wars

The indigenous salmon fishers of the region[117] took salmon throughout the basin, often travelling great distances to use favorable

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116. *E.g.*, Van Cleve & Johnson, *Management of the High Seas Fisheries of the Northeastern Pacific*, 2:2 U. WASH. PUBS. FISHERIES (n.s.) 29 (1963). *See also* SALMON & STEELHEAD ADVISORY COMM'N, A NEW MANAGEMENT STRUCTURE FOR ANADROMOUS SALMON AND STEELHEAD RESOURCES AND FISHERIES OF THE WASHINGTON AND COLUMBIA RIVER CONSERVATION AREAS 4 (1984).

117. The salmon runs entering the Columbia River were exploited by three distinct cultural groupings: (1) the Northwest Coast cultural area west of the Cascades was peopled primarily by the Kalapuya and Chinook; (2) the Plateau cultural area east of the Cascades extending into the Salmon River drainage in Idaho and was peopled by a large number of groups including the Wishram, Umatilla, Walla Walla, Yakima, and Nez Perce; and (3) the Great Basin cultural area covering the Snake River and its tributaries below the Salmon River as well as the headwaters of the Salmon was peopled by the Paiute, Shoshoni, and Bannock. *See generally* DRAFT LOSSES INFORMATION, *supra* note 10, at 7-39. On the cultural and economic significance of salmon to the indigenous peo-

fishing sites.[118] For at least 10,000 years these indigenous peoples had annually harvested millions of pounds of fish without depleting the runs.[119] Prior to the opening of the first cannery on the Columbia in 1866, the Euro-American invasion also had little effect on the salmon runs.[120] Canning quickly changed this. After the first year's production of less than 6,000 pounds, the number of canneries and their output expanded rapidly.[121]

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ple, see J. Baenen, Hunting and Fishing Rights of the Nez Perce Indians (1965) (unpublished M.A. Thesis, Washington State University); C. SMITH, *supra* note 70, at 5-13; D. WALKER, MUTUAL CROSS-UTILIZATION OF ECONOMIC RESOURCES IN THE PLATEAU 21-22 (1967); Murphy & Murphy, *Shoshone-Bannock Subsistence and Society*, 16 ANTHROPOLOGICAL RECS. 293, 315-34 (1960); Wilkinson & Conner, *supra* note 4, at 26-29.

118. The major fishing site was at Celilo Falls on the Columbia, which drew fishers from many Plateau groups. There were, however, many other sites. Washington Irving, for example, reported that at Salmon Falls on the Snake River a group of explorers employed by John Jacob Astor had in 1811 come upon

> about one hundred lodges of Shoshonies busily engaging in killing and drying fish. The salmon begin to leap shortly after sunrise. At this time the Indians swim to the centre of the falls, where some station themselves on rocks, and others stand to their waists in the water, all armed with spears, with which they assail the salmon as they attempt to leap, or fall back exhausted. It is an incessant slaughter, so great is the throng of fish.

W. IRVING, ASTORIA OR ANECDOTES OF AN ENTERPRISE BEYOND THE ROCKY MOUNTAINS 373 (E. Todd ed., 1964). Irving noted that "salmon are taken here in incredible quantities" and reported that one explorer "had seen several thousand salmon taken in the course of one afternnon." *Id. See generally* J. Craig & R. Hacker, *supra* note 50, at 137-47; P. CUTRIGHT, LEWIS AND CLARK 189-90 (1969); A. ROSS, ADVENTURES OF THE FIRST SETTLERS ON THE OREGON OR COLUMBIA RIVER 117-18 (London, 1849); C. WILKES, NARRATIVE OF THE UNITED STATES EXPLORING EXPEDITION DURING THE YEARS 1838, 1839, 1840, 1841, AND 1842, at 284-85 (abridged ed., London, 1851).

119. The annual catch is necessarily conjectural. The most recent and comprehensive review of the available information estimated the total annual consumption at almost 42,000,000 pounds. DRAFT LOSSES INFORMATION, *supra* note 10, at 44. *See generally* J. CRAIG & R. HACKER, *supra* note 50, at 142 (estimating 18,000,000 pounds based upon a population of 50,000); G. Hewes, Aboriginal Use of Fishery Resources in Northwestern North America 227-28 (unpublished Ph.D. Thesis Univ. Cal. Berkeley, 1947) (estimating more than 22,000,000 pounds); D. WALKER, *supra* note 117, at 21-22 (estimating a population of 70,850 and a total catch of 30,188,500 pounds). *See generally* DRAFT LOSSES INFORMATION, *supra* note 10, at 39-45.

120. Attempts to create a commercial fishery began in 1831 when the brig *Owyhee* left the Columbia River carrying 50 barrels of salted salmon purchased from the Indians. A small commercial salted salmon industry existed into the 1880s but was only marginally successful, in part because salmon could not be shipped in a form palatable to Eastern or European markets. J. COBB, *supra* note 8, at 25-26; J. CRAIG & R. HACKER, *supra* note 50, at 147-50, 159-60; A. NETBOY, *supra* note 8, at 19; C. SMITH, *supra* note 70, at 13, 15-17.

121. J. COBB, *supra* note 8, at 27; J. CRAIG & R. HACKER, *supra* note 50, at 150-59; J. HITTELL, THE COMMERCE AND INDUSTRIES OF THE PACIFIC COAST OF NORTH AMERICA

The canneries' demand for fish fostered technological innovation. Traps and fishwheels replaced the dipnets, harpoons, and weirs that had served the Indians for millennia and were, in turn, replaced by gillnetters, purse seiners, and, most recently, ocean trollers.[122] The canneries' demand also fostered overfishing: the chinook catch peaked in 1883 when 40 canneries packed 43,000,000 pounds.[123] Total production reached its maximum in 1911 when almost 50,000,000 pounds of salmon were packed.[124] By 1975, the amount of Columbia salmon which was canned dropped to less than that in 1867, the second year of cannery operations.[125]

Concurrent with the decrease in the size of the runs was an increase in competition among groups of fishers for control over access to the resource. Gillnetters fought trappers and fishwheel operators; upriver fishers fought downriver fishers; recreational fishers fought commercial fishers.[126] While the competitors employed the rhetoric of conservation, the real issue was one of allocation: who would be al-

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372-86 (2d ed. 1882); A. NETBOY, *supra* note 8, at 20; C. SMITH, *supra* note 70, at 17. In addition to the can, other technological developments that played significant roles included the refrigerated railroad car, which allowed fresh salmon to be marketed, and the gasoline-powered trollers, which expanded ocean fishing. Pruter, *Review of Commercial Fisheries in the Columbia River and in Contiguous Ocean Waters*, in THE COLUMBIA RIVER ESTUARY AND ADJACENT OCEAN WATERS 81, 86-87 (1972).

122. *See generally* C. SMITH, *supra* note 70, at 25-40, 83-90. For a review of the various fishing technologies, *see* J. CRAIG & R. HACKER, *supra* note 50, at 164-82; J. HITTELL, *supra* note 121, at 370-71.

123. A. NETBOY, *supra* note 8, at 20-21; C. SMITH, *supra* note 70, at 20-22.

124. *C. Smith, supra* note 70, App. B at 111. *See generally* DRAFT LOSSES INFORMATION, *supra* note 10, at App. A; Beiningen, *Fish Runs*, in INVESTIGATIVE REPORTS OF THE COLUMBIA RIVER FISHERIES PROJECT at E-4 to 7 (1976). The problem, however, has long been recognized; in 1894 the Oregon Fish and Game Protector wrote:

> It does not require a study of the statistics to convince one that the salmon industry has suffered a great decline during the past decade, and that it is only a matter of a few years under the present conditions when the chinook of the Columbia will be as scarce as the beaver that once was so plentiful in our streams. . . . For a third of a century Oregon has drawn wealth from her streams, but now, by reason of her wastefulness and a lack of intelligent provision for the future, the source of that wealth is disappearing and is threatened with annihilation.

Quoted in A. NETBOY, *supra* note 8, at 36. *Cf.* W. JONES, THE SALMON FISHERIES OF THE COLUMBIA RIVER, S. Doc. No. 123, 50th Cong., 1st Sess. 9, 44 (1888) (noting that, although it has "uniformly been the history of the salmon fishery" that overfishing and environmetal degradation have "depleted the streams of fish," the Columbia could prove an exception if care is excercised).

125. C. SMITH, *supra* note 70, at 1. *See generally* Beiningen, *supra* note 124.

126. *See generally* I. DONALDSON & F. CRAMER, FISHWHEELS OF THE COLUMBIA 111-13 (1971); C. SMITH, OREGON FISH FIGHTS (1974); C. SMITH, *supra* note 70, at 30-40; Thompson, *supra* note 4, at S-5; Wilkinson & Conner, *supra* note 4, at 30-35.

lowed to take the fish?[127] During the 1960s and early 1970s it was the ocean trollers and the coastal communities dependent on the commercial and recreational salmon fishery that held political power. The result was the imposition of increasingly severe restrictions on the fishery in the rivers and estuary.[128] The Indian commercial fishers in particular bore the brunt of this reallocation of fish to the ocean trollers.[129] By the mid-1970s, ocean fishers were taking two-thirds of the total chi-

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127. *See generally* R. COOLEY, POLITICS AND CONSERVATION 195-206 (1963); I. DONALDSON & F. CRAMER, *supra* note 126, at 113; C. SMITH, *supra* note 126, at 1; C. SMITH, *supra* note 70, at 83. As one study noted, the salmon's biological drive to spawn leads to concentrations of fish which could be efficiently harvested with a relatively small number of traps at strategic locations — a situation not changed by "laws which prohibit such efficient fishing in favor of methods which guarantee participation of more fishermen." Van Cleve & Johnson, *supra* note 116, at 29.

128. PFMC MANAGEMENT PERSPECTIVE, *supra* note 5, at 3. This regulatory allocation of the stocks to ocean trawlers was not only economically inefficient — since the least expensive method for catching salmon is the installation of a small number of traps at strategic locations just inside the Columbia River's mouth — but biologically inefficient as well — since salmon continue to gain weight until they enter the River. Van Cleve & Johnson, *supra* note 116, at 17-18.

129. The effect on the Indian fishery is graphically presented in Beiningen, *Apportionment of Columbia River Salmon and Steelhead*, in INVESTIGATIVE REPORTS OF THE COLUMBIA RIVER FISHERIES PROJECT at R-3 (1976). The transfer was accomplished through progressively expanded state regulatory actions. State "conservation" regulations had an allocational effect since they were

> also designed to allocate the salmon among various user groups. There are two principal means of accomplishing this: by a "zoning" system under which the state determines where fishing can take place, and by regulations determining the type of fishing gear that can be used. As for the zoning system, unfortunately the Indians find themselves in the worst possible zone. Under the zone system, generally only sports fishermen and commercial trollers are permitted to fish at sea . . . . Gill netters, reef netters, and purse seiners are permitted in the Straits of Juan de Fuca. Sportsmen and gill netters can fish in Puget Sound, with each type of fishermen excluded from certain areas and all fishermen excluded from waters near the river mouths. Most of the Indians' usual and accustomed fishing sites are on or very near the rivers. As the fish move toward the river each of the non-Indian groups take part of the run. The zoning system permits the non-Indian commercial and sports fishermen to get the first crack at the fish. By the time the fish enter the rivers and move toward the Indian fishing sites, there are few left to catch; those remaining are needed for spawning.

Johnson, *The States versus Indian Off-Reservation Fishing: A United States Supreme Court Error*, 47 WASH. L. REV. 207, 234 (1972). Similarly, by restricting fishing gear and establishing catch limitations, the Washington Department of Game effectively allocated the entire steelhead run to non-treaty sportfishers. *See* Department of Game v. Puyallup Tribe, 414 U.S. 44, 46-47 (1973). The case is also an example of the recalcitrance of state officials that characterized the period. *See generally infra* note 148.

nook and coho catch.[130] While the river fishery was increasingly restricted, the ocean fishery was largely unregulated. State regulation of catch, gear, or seasons in the ocean was minimal within the three-mile territorial limit and was nonexistent beyond it.[131] Ocean trollers could evade any individual state's restriction simply by unloading elsewhere, and thus there was little incentive for any state to regulate.[132]

This transboundary aspect of the problem had long been recognized. In 1918, Congress approved a compact between Oregon and Washington for joint regulation of the salmon and steelhead runs of the Columbia River.[133] In 1945, interjurisdictional cooperation was extended to the ocean fishery when California, Oregon, and Washington agreed to the creation of an interstate compact commission to supervise the ocean fishery off their coasts.[134] The compact created the Pacific Marine Fisheries Commission "to promote the better utilization of fisheries, marine, shell and anadromous, . . . and to develop a joint program of protection and prevention of physical waste of such fisher-

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130. In 1976, 4,314,000 chinook and coho salmon were harvested; 2,860,000 (66.3%) were taken by ocean fishers. PFMC MANAGEMENT PERSPECTIVE, *supra* note 5, at 22-23.

131. The first attempt by Oregon and Washington to regulate ocean trollers within the territorial limit was in 1976, just as the federal government was preparing to become involved in regulating the ocean fishery. *See* Beiningen, *supra* note 129, at R-5. *See generally* J. CRAIG & R. HACKER, *supra* note 50, at 179; PFMC MANAGEMENT PERSPECTIVE, *supra* note 5, at 6; Phinney, *Commercial Fishery Regulations and Management Objectives*, in INVESTIGATIVE REPORTS OF COLUMBIA RIVER FISHERIES PROJECT at O-9 to 10 (1976); C. SMITH, *supra* note 70, at 90; Magnuson, *The Fishery Conservation and Management Act of 1976: First Step Toward Improved Management of Marine Fisheries*, 52 WASH. L. REV. 427, 428-32 (1977).

132. *See* Douglas v. Seacoast Products, 431 U.S. 265 (1977); Toomer v. Witsell, 334 U.S. 385 (1948); Skiriotes v. Florida, 313 U.S. 69 (1941); *compare* Hjelle v. Brooks, 377 F. Supp. 430 (D. Alaska 1974) *with* State v. Bundrant, 546 P.2d 530 (Alaska), *appeal dismissed sub nom.*, Uri v. Alaska, 429 U.S. 806 (1976).

133. The compact required mutual agreement for any changes to laws or regulations affecting the Columbia River runs. Act of Apr. 8, 1918, Pub. L. No. 65-123, 40 Stat. 515. *See also* OR. REV. STAT. § 507.010; WASH. REV. CODE § 75.40.010. The compact was adopted after an Oregon prosecution of two Washington residents for violation of Oregon's more stringent fishing laws was reversed by the United States Supreme Court. Nielsen v. Oregon, 212 U.S. 315 (1909). *See* Wollenberg, *The Columbia River Fish Compact*, 18 OR. L. REV. 88, 92-94 (1938). *See generally* Heinemann & Rosenbaum, *Securing a Fair Share: Indian Treaty Rights and the "Comprehensive" Plan for the Columbia River*, 21 ANADROMOUS FISH L. MEMO 1, 2-4 (1983).

134. The tri-state compact was approved by Congress in 1947. See Pacific Marine Fisheries Compact, Pub. L. No. 80-232, 61 Stat. 419 (1947). *Cf.* R. LEACH & R. SUGG, THE ADMINISTRATION OF INTERSTATE COMPACTS 167-76 (1959)(examining the operation of the Atlantic States Marine Fisheries Compact).

ies."[135] The Commission was, however, limited to making recommendations to the states and, thus, had little effect on overfishing.

Most importantly, the regulatory void beyond the three-mile limit remained. Chinook salmon hatched in the Salmon River in Idaho grow to maturity in the Alaskan gyre, a rotating ocean environment off the Aleutian Islands and the Gulf of Alaska.[136] On these feeding grounds, the salmon are taken by the Japanese high seas net fishers. Returning salmon migrate along the coast of British Columbia where they are intercepted by Canadian fishers. It has been estimated, for example, that over half of the Columbia Basin fall chinook are harvested by Alaskan and Canadian fishers.[137] Adequate conservation thus requires both international as well as interstate cooperation. The management of international fisheries, however, has traditionally been "a matter of continuously negotiating ad hoc arrangements, bilaterally or multilaterally, to some particular problems," a process which has resulted in "a patchwork quilt of arrangements" that are only applicable to certain types of fish in certain areas among certain nations.[138]

The first international agreement covering Pacific salmon applied only to the sockeye runs originating in British Columbia's Fraser River. Part of these runs are harvested by United States fishers in the Puget Sound.[139] The convention created the International Pacific Salmon

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135. Pacific Marine Fisheries Compact, Pub. L. No. 80-232, art. I, 61 Stat. 419 (1947).

136. *E.g.*, PACIFIC SALMON, *supra* note 8, at 19, 58. *See generally supra* notes 10-11 and accompanying text.

137. It was estimated that 10% were caught by Alaskan and 43% were caught by Canadian fishers. *1982 Harvest: Small Returns for Same Reasons*, COLUMBIA RIVER INTER-TRIBAL FISH COUNCIL NEWS, July-Dec. 1982, at 2, 2-3. Comparatively few Snake River Basin chinook or steelhead are caught by Alaskan or Canadian fishers. Interview with Ted Bjornn, Moscow, Idaho (Jan. 16, 1986). It is estimated that Alaskans harvest only 2% of the Idaho-produced spring chinook and that the Canadians harvest only 10-12%. Address by Timothy Wapato, Executive Director, Columbia River Inter-Tribal Fish Commission, at the Idaho Law Review Symposium, *Legal Management of the Pacific Northwest Salmon and Stheelhead*, in Boise, Idaho (Mar. 1, 1986).

138. E. MILES, S. GIBBS, D. FLUHARTY, C. DAWSON, & D. TEETER, THE MANAGEMENT OF MARINE REGIONS 52 (1982) [hereinafter cited as MARINE MANAGEMENT]. *See generally id.* at App. B.

139. Convention on the Sockeye Salmon Fisheries, May 26, 1930, United States-Canada, 50 Stat. 1355, T.S. No. 918. The Convention was initialed in 1930 and finally ratified in 1937. In 1956 it was amended to include pink salmon. See Protocol on Sockeye and Pink Salmon Fisheries, Dec. 28, 1956, United States-Canada, 8 U.S.T. 1057, T.I.A.S. No. 3857. *See generally* J. CRUTCHFIELD & G. PONTECORVO, THE PACIFIC SALMON FISHERIES 140-46 (1969). The allocational structure of the treaty had become increasingly bothersome to Canadians who felt that they bore the cost of maintaining the salmon runs — not developing the Fraser River's hydroelectric potential — while receiving only half the fish. See MARINE MANAGEMENT, *supra* note 138, at 108.

Fisheries Commission to restore the runs and ensure an equal division between the fishers of the two countries. Outside the waters covered by the convention, fishing was governed by a series of agreements authorizing reciprocal fishing privileges.[140]

The other significant agreement applicable to Pacific salmon was the Trilateral Convention between Canada, Japan, and the United States. The Convention provided for Japanese "abstention" from high seas salmon fishing in areas where North American salmon fed.[141]

The Columbia Basin salmon and steelhead runs thus have gone from an apparently unlimited abundance to near-endangered species status in little more than a century. Both habitat destruction and overfishing have contributed to the precipitous decline. But fishing is both a more visible and a more regulable cause of the decline. As a result, while the allocation among habitat users has drawn comparatively little attention, the allocation among fishers has produced a struggle for political power which has been expressed through catch, gear, and seasonal restrictions. Another result of the fish wars has been increasing interjurisdictional cooperation. Despite this cooperation, however, regulation of salmon fishing remained a helter skelter pro-

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140. The most recent of these agreements was ratified in 1970. *See* Agreement on Reciprocal Fishing Privileges, Apr. 24, 1970, United States-Canada, 21 U.S.T. 1283, T.I.A.S. No. 6879. This agreement was terminated in 1976 when both nations extended their jurisdiction to 200 miles. *See infra* notes 168-67 and accompanying text. *See generally* MARINE MANAGEMENT, *supra* note 138, at 95-97.

141. Trilateral Convention, May 9, 1952, United States-Canada-Japan, 4 U.S.T. 380, T.I.A.S. No. 2786. The Convention went into effect in 1953. The object of the Convention is "to ensure the maximum sustained productivity of the fishery resources of the North Pacific Ocean." *Id.* at preamble. In an annex to the Convention, Japan agreed to abstain from fishing for salmon east of 175° west longitude, the then-presumed boundary between Asian and North American salmon stocks. It has subsequently been determined, however, that some North American stocks migrate west of the line; between 1956 and 1975, the Japanese harvested approximately 51,000,000 pounds of North American salmon. After lengthy negotiations and the passage of the FCMA, the abstention line was moved ten degrees west, from 175° west longitude to 175° east longitude. Protocol Amending the International Convention for the High Seas Fisheries of the North Pacific Ocean, Apr. 25, 1978, United States-Canada-Japan, 30 U.S.T. 1095, T.I.A.S. No. 9242. While the number of most North American salmon species caught by the Japanese dropped following approval of the Protocol, the chinook salmon catch increased dramatically in 1980. This resulted in an agreement limiting the Japanese fleet to 110,000 chinook per year. Nonetheless, Japanese fishing remains a highly volatile issue. *See generally* J. CRUTCHFIELD & G. PONTECORVO, *supra* note 139, at 190-94; MARINE MANAGEMENT, *supra* note 138, at 90-97, 170-73; PACIFIC SALMON, *supra* note 8, at 1-2; Johnson, *The Japan-United States Salmon Conflict*, 43 WASH. L. REV. 1 (1967); Sathre, *The International North Pacific Fisheries Commission: A Thirty-Year Effort to Manage High Seas Salmon and Some Suggestions for the Future*, 29 ANADROMOUS FISH L. MEMO 1 (1985); Van Cleve & Johnson, *supra* note 116.

position.[142] Some stocks, such as chum and coho salmon, and some regions, such as the extraterritorial waters off the western states, were effectively unregulated; overfishing remained a significant problem. But just as the primacy of hydropower in the allocation of the Columbia Basin's instream habitat has been qualified in the past decade, so has the allocation of rights to take fish.[143] This reallocation is the result of the convergence of national and international trends reflecting increased competition for fewer fish.

B. Reallocation of Fishing Rights

1. *National Reallocation*

Nationally, the primary vehicle for the reallocation was a series of federal court decisions reinvigorating Indian treaty rights.[144] In 1855, the Governor of the Washington Territory, Isaac Stevens, negotiated treaties with the Columbia Plateau Indians that created reservations and opened most of the Territory to European settlers.[145] Given the importance of the fishery to the Plateau people, off-reservation fishing rights were retained in the treaties.[146] Despite these guarantees, however, the Indian share of the catch was substantially reduced by the

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142. McKean, *Problems of Fishery Jurisdiction on the Columbia River*, in COLUMBIA RIVER SALMON AND STEELHEAD 99 (Am. Fisheries Soc'y Special Pub. No. 10, 1977); Thompson, *supra* note 126, at S-2 to 3.

143. Indeed, it can be argued that it was the reallocation of fishery rights which prompted the drive for "equitable treatment" of fish and power.

144. *See, e.g.*, Beiningen, *supra* note 129, at R-14 to 15.

145. The treaties with the Columbia Basin peoples are: Treaty with the Umatilla Tribe, June 9, 1855, 12 Stat. 945; Treaty with the Yakima Tribe, June 9, 1855, 12 Stat. 951; Treaty with the Nez Perce Tribe, June 11, 1855, 12 Stat. 957; Treaty with the Tribes of Middle Oregon, June 25, 1855, 12 Stat. 963. In addition to these 1855 treaties with the Columbia Plateau people, the government also treated with the people occupying the upper basin. Treaty with the Shoshonees & Bannacks [sic], July 3, 1868, 15 Stat. 673. *See generally* F. COHEN, HANDBOOK OF FEDERAL INDIAN LAW 101-02 (1982 ed.).

146. The treaties provided that the Indians retained "the right of taking fish at all usual and accustomed [off-reservation] places in common with the citizens of the Territory." *E.g.*, Treaty with the Nez Perce, art. 3, June 11, 1855, 12 Stat. 957. On the background to these provisions, see Comment, *Sohappy v. Smith: Eight Years of Litigation over Indian Fishing Rights*, 56 OR. L. REV. 680, 683 nn.19-20 (1977). *Cf.* United States v. Winans, 198 U.S. 371, 381 (1905) ("The right to resort to the fishing places in controversy was . . . not much less necessary to the existence of the Indians than the atmosphere they breathed."). The Treaty with the Shoshones and Bannocks was negotiated in conjunction with those of the northern Rocky Mountain tribes and thus contained different language, providing only that they were to "have the right to hunt on the unoccupied lands of the United States so long as game may be found thereon." Treaty with the Shoshonees & Bannacks [sic], art. IV, July 3, 1868, 15 Stat. 673. This language includes the right to take salmon. State v. Tinno, 94 Idaho 759, 497 P.2d 1386 (1972).

late 1950s as a result of the inundation of the most important Indian fishing site at Celilo Falls in 1956[147] and the steadily increasing assertions of state regulatory authority.[148]

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147. *See* A. NETBOY, *supra* note 8, at 14-18. The United States Court of Claims subsequently concluded that the $27,000,000 in compensation payed to the Tribes for drowning Celilo Falls purchased a flowage easement and did not terminate the treaty rights. Whitefoot v. United States, 293 F.2d 658 (Ct. Cl. 1961), *cert. denied*, 369 U.S. 818 (1962).

148. *E.g.*, State v. Tinno, 94 Idaho 759, 497 P.2d 1386 (1972); Department of Game v. Puyallup Tribe, Inc., 70 Wash. 2d 245, 422 P.2d 754 (1967), *aff'd*, Puyallup Tribe v. Department of Game, 391 U.S. 392 (1968), *on remand*, Department of Game v. Puyallup Tribe, Inc., 80 Wash. 2d 561, 497 P.2d 171 (1972), *rev'd*, 414 U.S. 44 (1973); State v. McCoy, 63 Wash. 2d 421, 387 P.2d 942 (1963). As one exasperated Ninth Circuit Court of Appeals Judge noted:

> The record in this case . . . among others, make it crystal clear that it has been the recalcitrance of Washington State officials (and their vocal non-Indian commercial and sports fishing allies) which produced the denial of Indian rights requiring intervention by the district court. This responsibility should neither escape notice nor be forgotten.

United States v. Washington, 520 F.2d 676, 693 (9th Cir. 1975), *cert. denied*, 423 U.S. 1086 (1976) (Burns, J., concurring). The recalcitrance is demonstrated by their response to the "Boldt decision," United States v. Washington, 384 F. Supp. 312 (W.D. Wash. 1974). In a classic example of state interposition, the Washington Supreme Court issued a countermanding order to the applicable state agency. Puget Sound Gillnetters Ass'n v. Moos, 88 Wash. 2d 677, 691-92, 565 P.2d 1151, 1158-59 (1977). *Cf.* United States v. Crookshank, 441 F. Supp. 268 (D. Or. 1977) (similar countermanding order issued by state trial court). As a result, the District Court for Eastern Washington took over operation of the state fish and game departments, an action upheld by the court of appeals. Puget Sound Gillnetters Ass'n v. United States District Court, 573 F.2d 1123 (9th Cir. 1978), *vacated on other grounds*, 443 U.S. 658 (1979). The lawlessness of the state officials fed the lawlessness of the non-treaty commercial and sport fishers; six shootings were reported in the ten days after the Boldt decision was handed down. Schmidhauser, *The Struggle for Cultural Survival: The Fishing Rights of the Treaty Tribes of the Pacific Northwest*, 52 NOTRE DAME LAW. 30, 39 (1976). There also was massive illegal fishing by non-Indians; in 1976 it was estimated that 34% of the runs was harvested illegally. UNITED STATES CIVIL RIGHTS COMM'N, INDIAN TRIBES 72 (1981). *See generally* United States v. Baker, 641 F.2d 1311 (9th Cir. 1981); United States v. Olander, 584 F.2d 876 (9th Cir. 1978); United States v. Crookshanks, 441 F. Supp. 268 (D. Or. 1977).

The dispute has strong racist overtones. As the Supreme Court noted, the exclusion of Indians from the salmon fisheries was fostered in part "by the onset of often-discriminatory state regulation in the early decades of the twentieth century." Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658, 669 (1979); *see also id.* at 673 n.20. For one example of such racially discriminatory attitudes, see State v. Towessnute, 89 Wash. 478, 481, 154 P.2d 805, 807 (1916). *See generally* AMERICAN FRIENDS SERVICE COMMITTEE, UNCOMMON CONTROVERSY (1970); U.S. CIVIL RIGHTS COMM'N, *supra*, at 70-75; Burnett, *Indian Hunting, Fishing and Trapping Rights: The Record and the Controversy*, 7 IDAHO L. REV. 49 (1970); Comment, *supra* note 146. For the states' perspective, see Beiningen, *Indian Fishery*, in INVESTIGATIVE REPORTS OF THE COLUMBIA RIVER FISHERIES PROJECT at P-1 (1976).

In a series of cases beginning in 1969, the federal courts resuscitated the Stevens' treaties, repeatedly finding state regulation of Indian fishing in the name of resource conservation to be an impermissible allocation of fish to non-Indians.[149] The result has been a fundamental reordering of rights in the fishery. Indian fishers are now entitled to fifty percent of the runs.[150]

Not all of the tribes that depended upon salmon for subsistence have, however, received a judicial allocation. The Shoshone and Bannock Tribes of southern Idaho, for example, previously took a large amount of salmon in the upper Snake and Salmon River drainages.[151] While the tribes' fishing rights have been recognized by the Idaho courts,[152] they have not participated in the litigation concerning the Columbia River and thus do not presently have a quantified, federally protected entitlement.[153]

The resuscitation of the Indian fishery and the creation of a specific entitlement not only reallocated fish, but also strained existing resource management structures. State resource managers, under court order to ensure specific catches, found the existing data to be too sketchy and unreliable.[154] While predicting the sizes of individual runs is necessarily an uncertain process, the consistent prediction of larger-than-actual runs was suspicious since it allowed ocean and lower river non-Indian fishers to overharvest. The history of state allocations to non-Indians and the repeated forecasting errors created a legacy of distrust. As a result, attempts to create a comprehensive plan for manag-

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149. *E.g.*, Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979); United States v. Washington, 384 F. Supp. 312 (W.D. Wash. 1974), *aff'd*, 520 F.2d 676 (9th Cir. 1975), *cert. denied*, 423 U.S. 1086 (1976); Sohappy v. Smith, 302 F. Supp. 899 (D. Or. 1969), *aff'd*, 529 F.2d 570 (9th Cir. 1976). *See generally* Comment, *supra* note 146; Comment, *Empty Victories: Indian Treaty Fishing Rights in the Pacific Northwest*, 10 ENVTL. L. 413 (1980).

150. The fifty percent allocation was initially applied in litigation affecting treaty rights in the Puget Sound fishery. United States v. Washington, 384 F. Supp. 312 (W.D. Wash. 1974), *aff'd*, 520 F.2d 676 (9th Cir. 1975), *cert. denied*, 423 U.S. 1086 (1976). It was subsequently upheld in a collateral attack. Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979). The allocational formula was applied to the Columbia Plateau Tribes by the Ninth Circuit Court of Appeals in Sohappy v. Smith, 529 F.2d 570 (9th Cir. 1976).

151. *See generally* R. MURPHY & Y. MURPHY, *supra* note 117, at 315-34; W. IRVING, *supra* note 118, at 373-74.

152. State v. Tinno, 94 Idaho 759, 497 P.2d 1386 (1972).

153. *See generally* Sohappy v. Smith, 302 F. Supp. 899 (D. Or. 1969), *aff'd*, 529 F.2d 570 (9th Cir. 1976). *See also* Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979).

154. *See, e.g.*, Beiningen, *supra* note 129, at R-21 to 53.

ing the entire Basin's runs have been notably unsuccessful.[155] The lack of certainty, the complexity of the process, and the distrust proved fertile grounds for litigation. As one judge remarked, the district court has become a "perpetual fishmaster," responsible for managing the fishery.[156]

Mason Morisset demonstrates something of this complexity in his article examining the allocational formulas which are currently applicable in the Pacific salmon fishery. He also reviews the performance of the federal-court-system-as-fishmaster as it elaborates the practical effects of a couple dozen words from a series of treaties. While there are those who suggest that a court should not be sitting as a "perpetual fishmaster" because of the complexity and uncertainty of the process, Mason's article supports a contrary view: by reinvigorating and quantifying the treaty rights, the federal courts enfranchised the tribes. Given the states' intransigence and the tribes' political vulnerability, it is inconceivable that the legislative process could have produced a satisfactory resolution.[157] But, as Mason also notes, the issues confronting

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155. In an attempt to end the continuing litigation over fishing rights, Oregon, Washington, and the four treaty tribes (the Nez Perce, the Confederated Tribes of the Umatilla Reservation, the Confederated Tribes of the Warm Springs Reservation, and the Bands of the Yakima Nation) agreed to a five-year comprehensive plan for managing the anadromous fish of the Columbia River. The plan was to establish a functioning regulatory system which recognized the Indian entitlement. Its goals were to conserve the runs, to allocate them equitably among competing fishers, and to provide the Indians a voice in resource management decisions. The plan was largely a failure on each item. It failed to conserve the resource because it was insufficiently comprehensive: the majority of the runs were harvested by ocean fishers who were not parties to the agreement. The allocation aspect failed due to illegal fishing and overestimation of run sizes; as a result, the Tribes did not receive their full share. The Tribes also were insufficiently involved in management decisionmaking; litigation continued. When the plan expired, renegotiations dragged. A general framework for managing the runs was eventually adopted, though the Tribes abstained. *See generally* COLUMBIA RIVER FISHERIES COUNCIL, COLUMBIA RIVER BASIN SALMON & STEELHEAD MANAGEMENT FRAMEWORK PLAN at i, 19 (1981); Heinemann & Rosenbaum, *supra* note 133; Wilkinson & Conner, *supra* note 4, at 73 n.299.

156. United States v. Washington, 520 F.2d 676, 693 (9th Cir. 1975), *cert. denied*, 423 U.S. 1086 (1976) (Burns, J., concurring). As Judge Burns noted, the necessity of continuing judicial involvement was the result of the obstinancy of the states which sought to evade actual recognition of Indian treaty rights. *See supra* note 148. Judge Belloni who had continuing jurisdiction over the Columbia River fisheries in the *Sohappy* litigation was similarly unhappy with his role, noting that "[f]or six years I have attempted to persuade the states to adopt a comprehensive plan to assure a fair share to all parties but that plan has not been forthcoming." Order (Aug. 20, 1975), quoted in Comment, *supra* note 146, at 699.

157. The situation thus differed dramatically from the largely successful, regionally negotiated allocation of the other major product of the Columbia River system, the hydroelectric power. The reallocation of this power was the driving force in the adoption of

the fishery managers are changing; the current questions increasingly involve inter-sovereign issues: state versus state, tribe versus tribe, and nation versus nation. While the courts have created a framework for resolving issues by ensuring that the relevant sovereigns must be involved in the decisionmaking, they are less well suited to such inter-sovereign allocations. Such issues are less amenable to judicial determination than the questions of rights which have thus far been the primary concern.

One example of these inter-sovereign issues is the ocean fishery. The past decade has witnessed a parallel reallocation of this fishery. This reallocation is part of the reallocation required by the recognition of the Indian rights since the entitlement is applicable to ocean as well as river fishers.[158] The reallocation is also traceable to increased foreign competition and to the failure of restrictions on the river fishery to stem the precipitous decline in the runs.[159] These factors led to the passage of the Magnuson Fishery Conservation and Management Act (FCMA) in 1976.[160]

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the PNEPPCA. *See* Goble, *supra* note 115. The commonality of interests which led to the PNEPPCA was based upon a lengthy history of cooperation — something not present in the fishery. The common element may finally spring from the recognition that all of the fishery managers and fishers want more fish. One hopeful indication was noted by Timothy Wapato, Executive Director of the Columbia River Inter-Tribal Fish Commission: the number of suits have dropped dramatically over the past three years, from 108 in 1983 to 60 in 1984 to 2 in 1985. Address by Timothy Wapato, *supra* note 137.

158. *E.g.*, Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979); United States v. Decker, 600 F.2d 733 (9th Cir.), *cert. denied*, 444 U.S. 855 (1979); PFMC MANAGEMENT PERSPECTIVE, *supra* note 5, at 10.

159. During the 1960s, domestic trollers were joined by the fishing fleets of several other countries which began to harvest fish immediately outside the territorial limits. The Soviet fishing fleet first began to fish off the west coast in 1965. By 1974, vessels from Japan, North Korea, East Germany, and Poland had joined them. The question of whether they were taking salmon was hotly debated. MARINE MANAGEMENT, *supra* note 138, at 32, 34; C. SMITH, *supra* note 70, at 90; Pruter, *supra* note 121, at 116-18 (1972); Pruter, *Soviet Fisheries for Bottomfish and Herring off the Pacific and Bering Sea Coasts of the United States*, MARINE FISHERIES REV., Dec. 1976, at 1, 11-12.

160. 16 U.S.C. §§ 1801-1882 (1982). The Act's basic provision is an assertion of the right to manage living marine resources — except such "highly migratory species" as tuna — within 200 nautical miles of the coast. *Id.* §§ 1802(14), 1811, 1821. It also claims exclusive jurisdiction over "sedentary species" such as crabs, lobsters, and other shellfish on the continental shelf where the shelf extends more than 200 miles from shore. *Id.* § 1802(3). Management is to be through plans prepared by the eight regional councils created by the FCMA. Two of these councils have the responsibility for preparing management plans for Pacific Coast anadromous fisheries, the North Pacific Fishery Management Council (consisting of Alaska, Oregon, and Washington) and the Pacific Fishery Management Council (consisting of California, Idaho, Oregon, and Washington). *Id.* §§ 1852(a)(6), (7). *See generally* Pontecorvo, *Fishery Management and the General Wel-*

Although the most dramatic provisions of the FCMA are those reordering the international fishery, the Act also markedly affected the domestic ocean trolling industry. In the Act, Congress closed the regulatory gap that had existed beyond the coastal states' territorial waters by creating a regional regulatory scheme with federal oversight and enforcement. The Act establishes eight regional fishery management councils with responsibility for preparing and amending management plans for the harvestable species within each council's jurisdiction.[161] Two of the regional councils have management authority over Pacific salmon: the North Pacific Fishery Management Council (NPFMC), composed of representatives from Alaska, Oregon, and Washington,[162] and the Pacific Fishery Management Council (PFMC), composed of representatives from California, Idaho, Oregon, and Washington.[163] The PFMC has responsibility for preparing a management plan governing commercial and recreational salmon fishing in the ocean waters off California, Oregon, and Washington. In preparing the plan, the PFMC analyzes the status of the various geographical stocks and sets both annual and long-term goals intended to provide sufficient fish to maintain a healthy run and to satisfy Indian treaty rights.[164] To

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fare: Implications of the New Structure, 52 WASH. L. REV. 641 (1977). The first assertion of extraterritorial authority occurred in 1966 when Congress claimed jurisdiction over a zone extending twelve miles from shore in The Contiguous Fisheries Zone Act, Pub. L. No. 89-658, 80 Stat. 908 (1960).

161. 16 U.S.C. § 1852(h) (1982). The Act requires the management plans to be consistent with seven national standards, *id.* § 1851(a), to contain certain provisions, *id.* § 1853, and to be adopted in accordance with certain procedural requirements intended to open the decisionmaking to public scrutiny. *Id.* §§ (h)(3), (i). After a plan has been developed by a regional council, it is submitted to the Secretary of Commerce who is to review it for consistency with the Act's requirements. *Id.* § 1854. If it is determined to be consistent, the plan's regulatory provisions are enforced by the Coast Guard, *id.* § 1861, under the threat of both civil and criminal sanctions. *Id.* §§ 1857-1860.

162. *Id.* § 1852(a)(7) (1982). The NPFMC has eleven voting members: the principal state officials with responsibility for marine fishery management in each member state (3), the regional director of the National Marine Fisheries Service (1), and individuals appointed by the Secretary of Commerce from a list provided by the Governors of Alaska (5) and Washington (2). *Id.* § 1852(b). The council also has four nonvoting members who serve as liasons to relevant federal agencies. *Id.* § (c).

163. *Id.* § 1852(a)(6) (1982). The PFMC has thirteen voting members: the four chief state officials with responsibility for marine fisheries, the regional director of the National Marine Fisheries Service, and eight individuals appointed by the Secretary of Commerce, at least one of whom must be from each state. *Id.* §§ (a)(6), (b). In addition to the four nonvoting members representing various federal agencies, the council also has a nonvoting representative from Alaska. *Id.* § (c).

164. PFMC MANAGEMENT PERSPECTIVE, *supra* note 5, at 14-23.

achieve these goals, the plan imposes catch, gear, and season restrictions.[165]

The past decade thus has witnessed a dramatic reallocation of the right to take salmon. In large measure this reallocation has resulted from the recognition of the Indians' federally protected entitlement to half the runs. The need to satisfy these entitlements has promoted increased interjurisdictional cooperation with a concomitant increase in regulation.[166] Thus the ocean trollers, who were essentially unregulated a decade ago, are now subject to detailed catch, gear, and seasonal restrictions. One seeming irony is that the trollers actually supported FCMA and its regulatory scheme because of the Act's international provisions.[167]

2. *The International Reallocation*

While the FCMA restructured domestic fishing, its boldest strokes were its international provisions. Congress asserted "exclusive fishery management authority" over a fishery conservation zone extending 200 miles offshore[168] and claimed management authority over anadromous

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165. *Id.* at 17-23.

166. *See, e.g.*, Wilkinson & Conner, *supra* note 4, at 76 n.306.

167. *Id.* at 95.

168. 16 U.S.C. §§ 1811-1812 (1982). Foreign fishers are allowed to fish within the fishery conservation zone only if there is a governing international fishery agreement between the foreign nation and the United States, the foreign nation provides reciprocal fishing rights to United States nationals, and the fisher has obtained a permit. *Id.* §§ 1821(a)-(c), (g), 1824.

The fishery conservation zone is echoed in the United Nations Law of the Sea Convention which authorizes an "exclusive economic zone" (EEZ) within which the coastal Nation "has sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the sea-bed and of the sea-bed." United Nations Convention on the Law of the Sea, art. 56, para. 1(a), opened for signature Dec. 10, 1982, 21 I.L.M. 1261 (1982). The Nation's rights specifically include the right to "determine the allowable catch of living resources" within the EEZ. *Id.* art. 61, para. 1. The EEZ is to extend no more than 200 miles. *Id.* art. 57. The Convention recognizes that "Nation's in whose rivers anadromous stocks originate shall have the primary interest in and responsibility for such stocks." *Id.* art. 66, para. 1. It provides that fishing for such stocks shall occur only within the EEZ except where this would cause "economic dislocation for a Nation other than the Nation of origin." *Id.* para. 3(a). As applied to Columbia Basin salmon, this provision applies to the Japanese high-seas fishery. The Convention provides for consultations between the affected Nation and the Nation of origin, "giving due regard to the conservation requirements and the needs of the Nation of origin." *Id.* The provisions of article 66 on anadromous species largely represent the position of the United States and other Nations of origin. There is some concern, however, that the provisions of the Convention will actually lead to increased high seas salmon fishing as countries such as Japan, South Korea, and Taiwan are precluded from fishing within other Nations' EEZs and turn to salmon

fish throughout their migratory route.[169] This provision on anadromous fish was intended to reduce the harvest of the Japanese high seas salmon fishers in the North Pacific who took a significant number of North American salmon.[170] Since the migratory ranges of Asian salmon — which the Japanese may take — and North American salmon overlap in this area, American jurisdiction is controversial and difficult to enforce.[171]

Exclusive American allocational authority over the anadromous fish which spawn within its borders does not apply when such fish are "within any foreign nation's territorial sea or fishery conservation zone."[172] This limitation is important since a large percentage of Columbia River salmon feed off Alaska and thus migrate through Canadian waters.[173] Until 1978, the harvest of salmon by Canadian and United States fishers was managed under a series of reciprocal agreements.[174] In that year, ongoing negotiations on several fishery issues broke down and both nations closed their waters to fishers from the other nation.[175] Negotiators for the two countries did not reach agreement until January, 1985, when a proposed treaty was submitted to the two governments. The United States adopted the treaty on March 7, 1985, along with implementing legislation.[176] It is founded upon two basic principles: the need to prevent overfishing and the conclusion

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as a substitute. *E.g.*, Copes, *The Law of the Sea and Management of Anadromous Fish Stocks*, 4 OCEAN DEV. & INT'L L. 233, 247-50 (1977). *But see* Clingan, *An Overview of Second Committee Negotiations in the Law of the Sea Conference*, 63 OR. L. REV. 53, 60-61 (1984). Where anadromous fish migrate into or through another Nation's EEZ, that Nation is to cooperate with the Nation of origin "with regard to the conservation and management of such stocks." *Id.* art. 4. *See generally* Burke, *The Law of the Sea Convention Provisions on Conditions of Access to Fisheries Subject to National Jurisdiction*, 63 OR. L. REV. 73, 109-111 (1984). For a dissenting view on the extension of a "land-oriented system" to a "fluid medium," *see* Smith, *What Are the Metes and Bounds of a Wave?*, 4 OCEAN DEV. & INT'L L. 369 (1977).

169. 16 U.S.C. § 1812(2) (1982).

170. *See generally* MARINE MANAGEMENT, *supra* note 138, at 170-73; PACIFIC SALMON, *supra* note 8, at 62-140.

171. *See* MARINE MANAGEMENT, *supra* note 138, at 56, 61-62; PACIFIC SALMON, *supra* note 8, at 1-2, 9-29.

172. 16 U.S.C. § 1812(2) (1982).

173. *See generally supra* notes 10-11 and accompanying text. Canada faces an even more extreme problem since all of its stocks spend at least a portion of their life cycle within United States fishery zones. *See* Copes, *supra* note 168, at 241.

174. *See supra* note 140.

175. MARINE MANAGEMENT, *supra* note 138, at 173-76; PFMC MANAGEMENT PERSPECTIVE, *supra* note 5, at 12.

176. *See* Pacific Salmon Treaty Act of 1985, Pub. L. No. 99-5, 99 Stat. 7 (1985) (to be codified at 16 U.S.C. §§ 3631-3644).

that each nation should receive benefits equivalent to the salmon produced in its waters.[177] To meet these goals, the treaty created an international commission[178] to recommend regulatory measures which, if approved by the parties, are to be implemented through the adoption of necessary domestic rules.[179]

Thus, one significant thread in the history of the Columbia Basin fisheries is the increasing interjurisdictional coordination and management of the resource. Oregon and Washington initially agreed to concurrent management of the runs in the Columbia River and its tributaries. They were subsequently joined by California in managing their territorial waters. Most recently, two federal statutes — the Magnuson Fishery Conservation and Management Act and the Pacific Northwest Electric Power Planning and Conservation Act — have created regional planning and management agencies for both the ocean and river fisheries. International developments, beginning with the Sockeye Treaty with Canada, have progressively been expanded to cover additional species and larger geographical areas. Columbia River salmon are now subject to some managing authority throughout their migratory wanderings.

C. The Unfinished Agenda

The federal statutes which established the Pacific Fisheries Management Council and the Pacific Northwest Power Planning Council are interesting for an additional reason: Idaho has been accorded a voice in the fish allocation process. Two of the eight members of the Power Council and at least two of the thirteen members of the Fisheries Council are representatives of the state.[180] Inclusion of the state on such regional planning bodies has, however, been sporadic. Idaho was not accorded representation on the Salmon and Steelhead Advisory Commission, which Congress created to propose a structure for managing the anadromous salmon and steelhead resource within the Columbia River Basin and the Pacific Fishery Conservation Zone off the California, Oregon, and Washington coasts.[181] Similarly, when Congress

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177. 131 CONG. REC. S2671 (daily ed. Mar. 7, 1985) (statement of Sen. Gorton).

178. Treaty Concerning Pacific Salmon, Jan. 16, 1985, United States-Canada, art. II, U.S.T. , T.I.A.S. No.

179. *Id.* art. III. Implementation of the treaty's provisions was examined by Sue Hvalsoe at the Idaho Law Review Symposium, *Legal Management of Pacific Northwest Salmon and Steelhead*, in Boise, Idaho (March 1, 1986).

180. Magnuson Fisheries Conservation and Management Act, 16 U.S.C. § 1852(a)(6) (1982); PNEPPCA § 4(a), 16 U.S.C. § 839b(a) (1982).

181. The Salmon and Steelhead Conservation and Enhancement Act of 1980, 16 U.S.C. §§ 3301-3345 (1982), created the Salmon and Steelhead Advisory Commission

adopted legislation to implement the Canada/United States salmon interception treaty, Idaho was denied a seat on the Pacific Salmon Commission established by the treaty.[182]

Despite the obvious importance to Idaho of the downriver fishing regulations and the equally apparent importance of Idaho's spawning habitat to the health of the runs, the state continues to be "the odd man out" in the interjurisdictional management of the fishery.[183] Idaho's frequent exclusion from the management process can be traced to two factors: the state's failure to assert its interests coupled with Washington's and Oregon's active efforts to exclude Idaho.

The state's ambivalence toward the salmon and steelhead stocks which spawn within the state has a long history; early reports tell of farmers slaughtering salmon with pitchforks as sport.[184] This disdain for the salmon and steelhead runs was shared by the legislature. Despite the presence of a commercial fishery through the first decades of this century,[185] the legislature frequently promoted all other habitat

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composed of six members, one each from the states of Oregon and Washington, two tribal representatives, and a representative from both the Pacific Fishery Management Council and the National Marine Fisheries Service. *Id.* § 3311(a).

182. Pacific Salmon Treaty Act of 1985, Pub. L. No. 99-5, § 3, 99 Stat. 7 (to be codified at 16 U.S.C. § 3632). *See also* 131 CONG. REC. H990 (daily ed. Mar. 5, 1985) (statement of Rep. Craig).

183. Comment, *Odd Man Out: Idaho's Bid for a Share of Columbia River Upriver Anadromous Stocks*, 10 ENVTL. L. 389 (1980). In addition, the effect of Idaho's geographical isolation from the center of decisionmaking on its ability to participate actively in the management process is often underestimated. Telephone Interview with Clive Strong, Idaho Attorney General's Office (Jan. 29, 1986).

184. As one early reporter noted:

> Great numbers [of chinook] are . . . annually killed through mere love of destruction. The advent of the salmon brings out from every town men and boys with pitchforks or other weapons, curious to see how many fish they can destroy. It is to be held in mind that these localities in Idaho and in the eastern portions of Oregon and Washington are so remote from canneries that the people have no interest whatever in the preservation of the salmon. We can not, therefore, depend upon public sentiment to enforce protective legislation.

Gilbert & Evermann, *supra* note 17, at 198. Not even the Fish and Game Warden seemed concerned with the anadromous fishery; it was not until 1913 that his biennial reports even mention salmon.

185. From about 1870 until shortly after 1900, there was "considerable" seining done on the Snake River from the mouth of the Boise River downstream for approximately 70 miles. J. CRAIG & R. HACKER, *supra* note 50, at 174. Additional commercial fishing occurred along the Snake River west to Shoshone Falls; in the early 1890s several fishers reported catches of eight to ten tons of chinook or steelhead in a season. There were also major sockeye salmon fisheries on the North Fork of the Payette River and in the headwaters of the Salmon River in Alturas, Petit, Redfish, and Stanley Lakes. *See* Ortmann, *Idaho Salmon vs. Dams*, IDAHO WILDLIFE REV., Mar.-Apr., 1970, at 12. *See generally* Evermann, *supra* note 17, at 262-63, 265-66, 279-80; Gilbert & Evermann,

uses at the expense of the fishery. The legislature, for example, specifically exempted dams used for milling, mining, or agriculture from any fish-passage requirements;[186] the state did nothing as the major runs were exterminated or seriously depleted by dams.[187] When the state did enact laws to protect fish from such habitat destruction, they were not enforced.[188] The problem is not of purely historical interest. In both the 1982 and 1986 sessions, the Idaho legislature sought to weaken the state's water pollution controls to benefit the timber industry.[189] The fish continue to lack an effective voice in competition with agricultural, mining, and power interests.

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supra note 17, at 176, 177. There was a small commercial seine fishery on the Snake River near Lewiston as late as 1921. J. COBB, *supra* note 8, at 75.

186. In 1871, the Idaho Territorial Legislature declared that any "weir dam, fence or stop net, or other obstruction to the run of fish" in any stream or other body of water was a public nuisance and a misdemeanor if it obstructed more than half the width of the water body. Act of Jan. 7, 1871, §§ 1-2, 1870 Idaho Terr. Sess. Laws 68. The Act, however, specifically exempted any dam "erected for mill, mining or agricultural purposes." Id. § 7. Similarly in 1883, the legislature adopted a general fish and game code. While dropping the express exemption for mill, mining, and agricultural dams, the Act prohibited the construction of "dams, or use of any nets, seines, fish-traps, or similar devices . . . *for catching fish.*" Act of Feb. 8, 1883, § 9, 1882 Idaho Terr. Sess. Laws 55 (emphasis added). The Acts thus served to allocate fish among fishers by imposing gear restrictions and among competing habitat uses by giving precedence to nonfishery resources.

187. The chinook salmon runs into the middle Snake River and its tributaries were destroyed by the construction of Swan Falls Dam in 1901. The sockeye salmon runs into the Payette River were exterminated in the early 1900s by a small irrigation dam just below Horseshoe Bend. Similarly, the sockeye runs into the lakes at the headwaters of the Salmon River were destroyed in 1913 when the Sunshine Dam was constructed below Stanley. The runs on the Boise River were depleted by a series of low dams before Diversion Dam above Boise ended the runs. The Lewiston Dam hindered the runs on the Clearwater, Lochsa, and Selway Rivers. The litany is lengthy. *See* L. FULTON, *supra* note 15; Gilbert & Evermann, *supra* note 17, at 178, 199; REVISED DRAFT LOSSES, *supra* note 100, App. D at D-70 to 112; Ortmann, *supra* note 185. Idaho was not alone; Washington also has a less-than-exemplary record of enforcing similar statutory requirements. B. BROWN, *supra* note 7, at 61-74.

188. The early reports of the State Fish and Game Warden iterate the problems associated with reliance upon local officials to enforce fish and game laws. One report bluntly noted that "[e]lective officers make inefficient game wardens." STATE FISH & GAME WARDEN, FIFTH BIENNIAL REPORT, 1913-1914, at 12 (1915). *See also State* FISH & GAME WARDEN, SIXTH BIENNIAL REPORT, 1915-1916, at 7-8 (1917).

189. S. Con. Res. 133, 1982 Idaho Sess. Laws 943. The 1986 bill was vetoed by the Governor. *Evans Vetoes Hastily-passed Bill to Weaken Water Quality Rules,* Lewiston Morning Tribune, Apr. 4, 1986, at 1, col. 1. John Hockberger discusses the 1982 legislative action. *See* Hockberger, *Limitations on the Effectiveness of the Idaho Water Quality Standards in Controlling Nonpoint Source Impacts on Anadromous Fish Spawning and Rearing Habitat, infra. See also* S. Con. Res. 134, *id.* at 944 (amending a state policy

The state also was slow to regulate fishing effectively.[190] Although the legislature initially adopted statutory limitations in 1871,[191] in 1893 all gear restrictions were removed.[192] While restrictions were gradually imposed beginning in 1909,[193] it was not until 1945 that spearing salmon was made illegal.[194] Catch and possession limitations were instituted in 1931,[195] but no detailed harvest data was collected until 1960.

Idaho's ambivalence, however, is only part of the story and, in itself, insufficient to justify the current situation.[196] Through the Colum-

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on anadromous fish by changing the goal from "to preserve and enhance" to "preserve and protect," and striking the objective of maintaining "free-flowing stream habitat").

190. The Oregon and Washington laws applicable to the anadromous fishery are catalogued at REVISED DRAFT LOSSES, *supra* note 100, at 68-72. Regulation on the Columbia River began in 1866 when Washington prohibited construction of fish traps which extended more than two-thirds of the way across a stream or which wholly prevented fish passage. *Id.* at 68. Closed seasons were introduced by Washington in 1877 and Oregon in 1878. *Id.* at 70.

191. The 1871 Act declared dams, weirs, and fences which obstructed more than half the width of a stream to be a public nuisance and a misdemeanor. Act of Jan. 7, 1871, §§ 1-2, 1870 Idaho Terr. Sess. Laws 68. The Act specifically exempted dams erected for "mill, mining or agricultural purposes." *Id.* § 7. In 1883, the legislature prohibited taking of salmon except with rod and reel, seines, and spears. Act of Feb. 8, 1881, §§ 7-9, 1882 Idaho Terr. Sess. Laws 55. Despite the prohibition, shooting salmon remained a common practice — so common, in fact, that it was openly reported to federal fishery investigators. *See, e.g.*, Evermann, *supra* note 17, at 260. In addition, since seining was the prevailing commercial harvesting method, the Act had little effect. One report concludes that "since most of the seining sites were located at places where the fish were spawning and where conditions were such that practically every salmon which reached those spawning grounds could be caught, it would not be surprising if the races supporting those runs were practically exterminated." J. CRAIG & R. HACKER, *supra* note 50, at 174.

192. Act of Mar. 6, 1893, § 12, 1893 Idaho Sess. Laws 157. The 1893 Act's provisions were reenacted repeatedly until 1909 when the legislature prohibited taking salmon except with spears, snag hooks, seines, nets, and hook and line. Act of Mar. 11, 1909, § 5, 1909 Idaho Sess. Laws 85.

193. The 1909 Act prohibited the use of any device other than spears, snag hooks, hook and line, and seines to take salmon. Act of Mar. 11, 1909, § 5, 1909 Idaho Sess. Laws 85. Snag hooks and spears were outlawed in 1923. Act of Mar. 13, 1923, ch. 129, § 14, 1923 Idaho Sess. Laws 178. Spearing was made legal again in the following legislative session. Act of Mar. 10, 1925, ch. 179, § 5, 1925 Idaho Sess. Laws 325.

194. Act of Mar. 20, 1945, ch. 199, § 4, 1945 Idaho Sess. Laws 316.

195. A catch limit of two fish per day and a bag limit of three fish was established. Act of Mar. 17, 1931, ch. 211, § 6, 1931 Idaho Sess. Laws 404. *See also* M. RICHARDS, THE CHINOOK SALMON SPORT FISHERY OF THE SOUTH FORK SALMON RIVER DRAINAGE 8 (1960); Gebhards, *Salmon . . . Steelhead and the Law*, IDAHO WILDLIFE REV., Nov.-Dec. 1966, at 6, 6.

196. In the litigation seeking an equitable apportionment of the upriver anadromous fish runs, Oregon did cite as an affirmative defense Idaho's failure to take steps to

bia River Compact,[197] Oregon and Washington allocate fish originating in and returning to Idaho; they do so without formal input from Idaho, whose repeated attempts to join the Compact have been rejected.[198] When negotiations failed in 1975, the state turned to litigation, filing an original action in the United States Supreme Court. The state sought an order compelling membership in the Compact and an equitable apportionment of the upriver anadromous fish runs.[199] The Court rejected the state's request for membership in the Compact,[200] but did entertain the claim for an equitable apportionment.[201] After trial before a special master, the Court concluded that the evidence failed to demonstrate "that Oregon and Washington are now injuring Idaho by overfishing the Columbia or that they will do so in the future."[202]

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conserve the runs. Answer of Defendant State of Oregon, 7th & 8th Defense, Idaho ex rel. Evans v. Oregon, 444 U.S. 380 (1980).

197. *See supra* note 133 and accompanying text.

198. As the Supreme Court noted: "Idaho has sought entry into the Compact on several occasions, but has been rebuffed." Idaho *ex rel.* Evans v. Oregon, 462 U.S. 1017, 1022 (1983). The most recent attempt to become a member began in May, 1968, at a meeting of the three states' governors. This meeting produced language for a proposed Columbia River Compact which included Idaho. The Idaho legislature adopted the Compact in 1969. Act of Feb. 4, 1969, ch. 6, 1969 Idaho Sess. Laws 9. In 1975, Oregon amended its statute to allow Idaho membership, though its language differed from the agreed terms. 1975 Or. Laws § 709(2). A similar bill passed the Washington House of Representatives but failed to pass the Senate. *See generally* Ortmann, *Systems for Decision Making*, in INVESTIGATIVE REPORTS OF THE COLUMBIA RIVER FISHERIES PROJECT at T-2 to 14 (1976); Comment, *supra* note 183, at 393 n.22.

199. Complaint at 21, Idaho *ex rel.* Andrus v. Oregon, 429 U.S. 163 (1976) (per curiam).

200. Idaho *ex rel.* Andrus v. Oregon, 429 U.S. at 164.

201. The Court accepted jurisdiction over the case in December, 1976. Idaho *ex rel.* Andrus v. Oregon, 429 U.S. 163 (1976). The case was referred to a special master, 431 U.S. 952 (1977), who took testimony and heard oral arguments on a series of affirmative defenses offered by Oregon and Washington. The special master concluded (1) that the complaint did state a claim upon which relief could be granted, but (2) that the United States was an indispensible party which could not be joined without its consent. The master therefore recommended that the case be dismissed without prejudice. Report and Supplemental Report of Special Master on the Affirmative Defenses of Oregon and Washington, Idaho *ex rel.* Evans v. Oregon, 444 U.S. 380 (1980). The Court overruled the recommendation, concluding that the United States was not an indispensible party to the litigation. *Id.* The special master took evidence on the merits of the claim, concluding that Idaho failed to prove that it had suffered any actual injury as a result of Oregon's and Washington's actions. The Court subsequently agreed that Idaho had failed to prove "by clear and convincing evidence some real and substantial injury." 462 U.S. 1017, 1027 (1983).

202. Idaho *ex rel.* Evans v. Oregon, 462 U.S. at 1028. The Court did recognize that "Oregon and Washington may have harvested a disproportionate share of the anadromous fish over the long run." *Id.* at 1027-28. The Court, however, concluded (1) that

Following dismissal of its petition by the Supreme Court, Idaho sought to intervene in *United States v. Oregon*, the case that has served as the forum for resolving allocational issues on the Columbia River.[203] As the Ninth Circuit Court of Appeals noted, "[t]here is no serious dispute that Idaho has interests which may be affected by the dispostion of this litigation. Those interests are not being represented by the other parties."[204] Intervention allows the state to participate in the current negotiations on a new plan to manage the Columbia Basin salmon stocks. Thus there are some grounds for optimism that the new regional negotiations will provide a workable plan for managing the Basin's anadromous fish.

IV. CONCLUSION

The legal structures governing the Pacific salmon and steelhead during their migratory cycle have been completely reformulated in the past two decades. There has been an expanding awareness that the resource cannot be viewed in isolated, sequential fragments — the ocean fishery is not independent of the river fishery, and the downstream passage problems are inseparable from both. Continued biological survival of the fish and continued economic survival of the fishers require a unified approach.

This does not mean that all of the jurisdictional and insitutional problems have been resolved. FERC continues to license hydroelectric projects without sufficient attention to the biology of the fish; releases of water to meet downstream migration requirements remains problematic; habitat restoration projects continue to be delayed.

But there is a growing awareness of the interrelationship of all those who treasure the Pacific salmon and steelhead. Groups that once saw one another only in court have begun to talk; litigation has de-

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Idaho's share was increasing, *id.* at 1028 n.12, and (2) that the state's argument was based upon the untenable assumption that it "is entitled to those fish that originate in its waters." *Id.* The Court stated that the origin of the fish was only one factor in establishing an equitable decree: "[t]he Court must look to factors such as disproportionate reductions in Idaho's normal harvest, or reductions in the total fish in the runs caused by mismanagement or overfishing by Washington and Oregon." *Id.* Justice O'Connor, joined by Justices Brennan and Stewart, dissented, arguing with some logic that it was impossible to say that Idaho had received its fair share "without specifying the nature and extent of Idaho's entitlement." *Id.* at 1032. *See generally* 24 SANTA CLARA L. REV. 489 (1984); 45 U. PITT. L. REV. 949 (1984).

203. The district court denied the petition as untimely. That conclusion was, however, reversed by the Ninth Circuit Court of Appeals. United States v. Oregon, 745 F.2d 550 (9th Cir. 1984). The Court briefly traces the history of the litigation in reaching its conclusion.

204. *Id.* at 553.

creased. Power institutions are now listening — even if under duress — to biologists; fishers have standing to press their claims before agencies and courts. Such events are cause for cautious optimism.

The papers which follow spring from this recognition.