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A Half-Century of Pacific Salmon Saving Efforts: A Primer on Law, Policy, and Biology

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Cover Page Footnote

Elijah Cetas, J.D. expected 2024, Lewis & Clark Law School, provided helpful research on this article.

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ABSTRACT

Pacific salmon, the signature species of the Pacific Northwest, have declined across their range for well over a century, due to a myriad of human-caused effects on their habitat and the fish themselves. Restoration efforts—some successful, some halting—began in earnest in the late 20th century, with considerable attention focused on the Columbia Basin, where historically salmon runs were crippled by a large interconnected hydroelectric system of federal and non-federal dams. In the 1980 Northwest Power Act, Congress created an interstate agency, the Northwest Power and Conservation Council, with access to a substantial amount of ratepayer dollars; the agency has chosen to expend those dollars principally for habitat rehabilitation and hatchery production. Generic federal laws like the Clean Water Act and the Endangered Species Act have provided some levers to modify dam operations to benefit fish and driven better protections for salmon throughout the Northwest. The relicensing requirements of the Federal Power Act, coupled with that law's fish protection provisions, have led to several notable dam removals. Significant restoration in Puget Sound watershed is underway due to a judicial decision finding that barrier road culverts violate treaty fishing rights, an interpretation that holds potential to foster salmon habitat improvement measures throughout the Northwest.

Surveying events from Alaska's Bristol Bay in the north to the Klamath River along the Oregon-California border in the south, we explain how the law has —and must—play a key role in efforts to save salmon. Although the importance of particular laws varies from basin to basin—as does their effectiveness—some significant restoration is underway despite major unanswered questions such as the fate of the lower Snake River dams. The institution of tribal co-management programs, especially along the Oregon coast, provide an especially significant restoration tool if this

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development can be replicated across salmon country. The addition of tribal sovereigns into decision-making is likely to improve salmon protection and restoration wherever co-management programs exist.

Improved management will be a prerequisite if Pacific salmon are to recover in a climate-challenged world that threatens the existence of many runs. But to a large extent, restoring historic fish runs will require federal policies and leadership that have not always been present. As the first quarter of the 21st century draws to a close, salmon saving efforts are proceeding on a variety of fronts with some promising results, but the future of many salmon runs is clouded by the threat of climate change and a national ambivalence to confronting its challenges with a muscular response.

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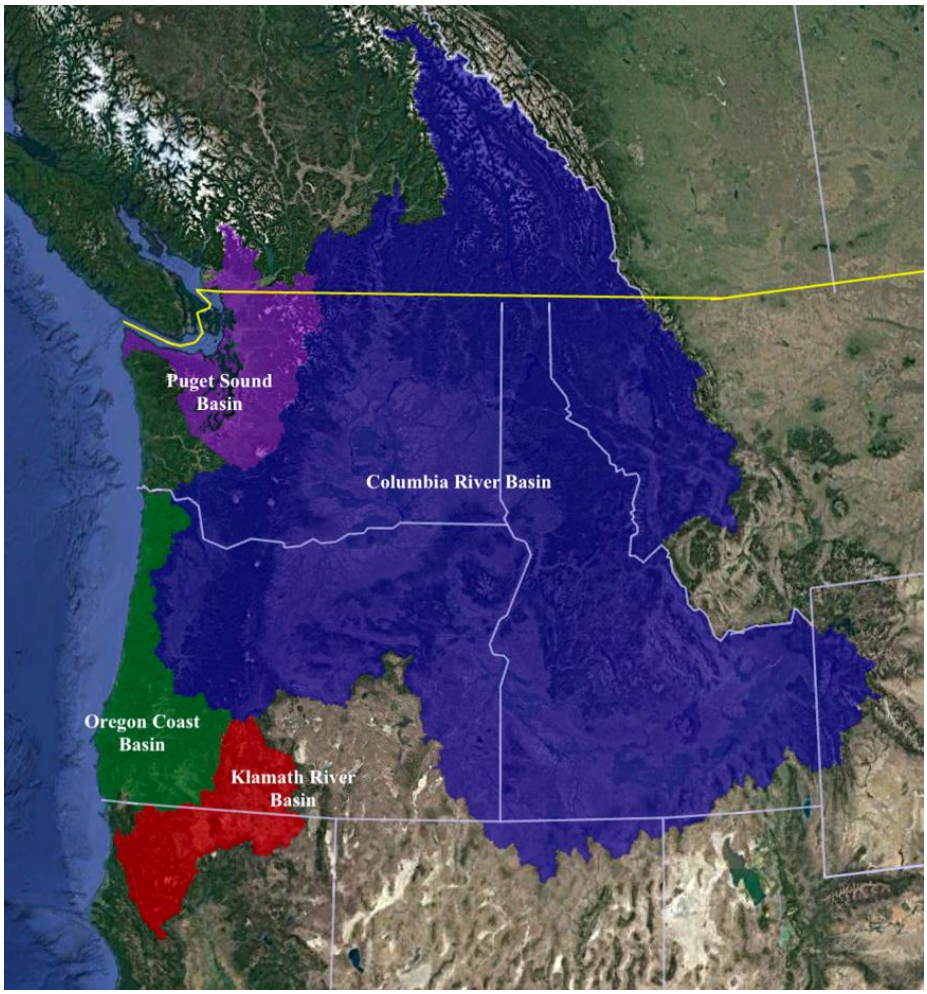

downloaded from *HydroBASINS*, HYDROSHEDS, https://www.hydrosheds.org/products/hydrobasins (last visited Aug. 13, 2023). Shapefile database credited to Bernhard Lehner & Günther Grill, (2013). *Global river hydrography and network routing: baseline data and new approaches to study the world's large river systems*, 27 HYDROLOGICAL PROCESSES 2171 (2013).

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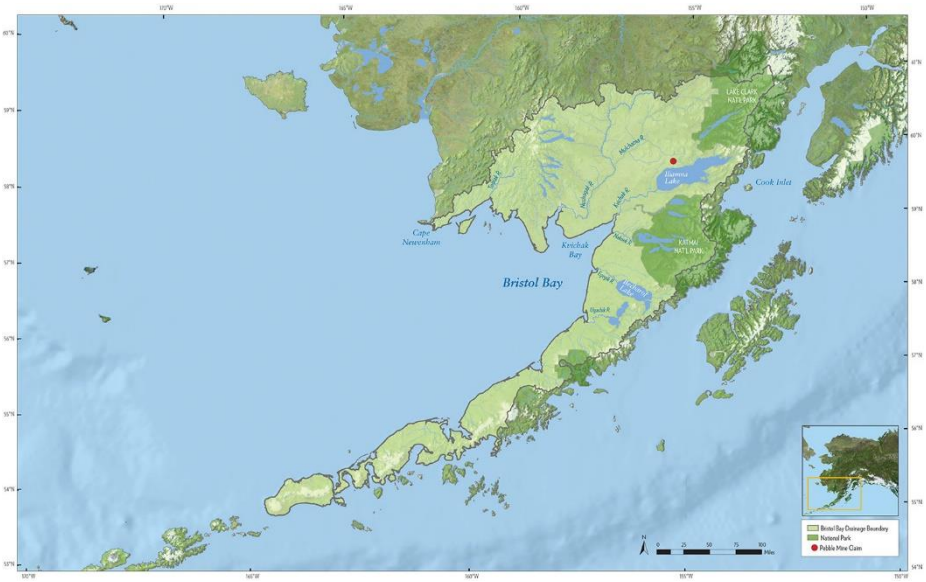

Source: Bristol Bay Map, WILD SALMON CTR., https://wildsalmoncenter.org/resources/bristol-bay-map/ (last visited Aug. 13, 2023).

INTRODUCTION

Over the past half-century, efforts to save salmon in the Pacific Northwest have grown from a few sporadic local projects into large-scale regional industry. But while this industry has churned out mountains of paper—studies on potential restoration efforts, ambitious legislative and policy initiatives, and reams of court documents—actual on-the-ground restoration efforts have often been halting and in some cases disappointing. Few, if any, salmon runs have recovered to historic levels, and many remain listed under the federal Endangered Species Act (ESA). No listed salmon are likely to be removed from the ESA list any time soon.

Salmon are anadromous, hatching in cold, freshwater rivers and streams, and eventually migrating to the ocean as young fish.[1] Although fish biologists are uncertain as to the precise migration patterns of salmon, most agree that Pacific salmon travel to nutrient-rich feeding grounds off the coast of Alaska and British Columbia.[2] After spending their adult lives at sea, salmon return to their natal streams, guided by their olfactory senses, to spawn and die.[3] Through this journey, salmon bring marine nutrients to freshwater streams, functioning as a keystone species.[4]

These fish once extended from Alaska to Northwestern Mexico, although human actions over the past two centuries have extirpated salmonids south of Central California.[5] Salmon populations in general have been in decline since the late nineteenth century due to overfishing and, more recently, habitat loss and ecological alterations driven by climate change.[6] Dam building has driven much of this habitat loss, blocking spawning areas that historically supported fish populations.[7] Federal, state, and tribal governments have sought to stem the loss of salmon stocks by constructing and operating fish hatcheries.[8] Hatchery programs pose thorny issues:

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1. In addition to Pacific salmon, Atlantic salmon and steelhead trout belong to the salmonid family. *See* MICHAEL C. BLUMM, PACIFIC SALMON LAW AND THE ENVIRONMENT: TREATIES, ENDANGERED SPECIES, DAM REMOVAL, CLIMATE CHANGE, AND BEYOND 3 (2022) [hereinafter PACIFIC SALMON LAW]. Pacific salmon include five species–chinook (also known as "kings"), coho, sockeye, pink, and chum–each with distinct lifecycles and physical characteristics. For a discussion on the different types of Pacific salmon species, *see id.* at 7–11. The immediacy of migration differs with each species. Chum and pink salmon migrate immediately, whereas sockeye and coho may spend up to three years in freshwater before swimming to the ocean. *Id.* at 5–6.

2. *Id.* at 7.

3. *Id.* at 4–5.

4. *See* Mary F. Wilson & Karl C. Halupka, *Anadromous Fish as Keystone Species in Vertebrate Communities*, 9 CONSERVATION BIOLOGY 489 (1995) (anadromous fish are critically important link between aquatic and terrestrial ecosystems, vital to the survival and reproduction of vertebrate hunters and scavengers); James M. Helfield & Robert Naiman, *Keystone Interactions: Salmon and Bear in Riparian Forests of Alaska*, 9 ECOSYSTEMS 167, 168–69 (2006) (salmon provide 18-26% of nitrogen to riparian plants adjacent salmon streams).

5. PACIFIC SALMON LAW, *supra* note 1, at 8, 13, 15–20.

6. *See* Cheri Anderson & Sean Connolly, *Salmon . . . A Pacific Northwest Icon*, U.S. FISH & WILDLIFE SERV. (Jun. 7, 2022), https://www.fws.gov/story/2022-06/salmona-pacific-northwest-icon.

7. *Id.*

8. *Id.* Hatchery programs vary considerably. For example, tribal hatchery programs typically seek to allow for treaty-guaranteed harvest while supplementing wild stocks to boost recovery of naturally-

many wild salmon advocates argue that hatchery fish drive genetic changes that further imperil wild stocks, while others, like most Indigenous tribes, see hatcheries as the only viable solution to maintaining harvests and preventing salmon extinction.[9]

Pacific salmon live in a complex environment, including both freshwater and marine ecosystems, and declining run sizes often have multiple causes. There is no regulatory entity with anything close to control over the land and resources that support these fishes' wide-ranging salmon life cycle, and there likely never will be.[10] Instead, salmon saving is the collective responsibility of diverse authorities, including international entities, the federal government, and several states and tribal governments. These entities often have conflicting missions, such as working to increase salmon runs and protect their habitat, while at the same time facilitating harvest and generating electricity from fish-killing hydroelectric dams.

Although salmon saving is complex and fraught with causation problems, it is extremely important not only for the future of salmon but also for the Northwest and its inhabitants. Salmon's great sensitivity to the environmental conditions of their habitats makes them ideal indicator species.[11] Like the proverbial canary in a coal mine, salmon are barometers of the health of the environment. Fresh and salt water no longer habitable for salmon is often not suitable for other species as well, including humans.

The imperative of saving salmon has only become more prominent in the era of climate change. An art exhibit featured at the 2021 United Nations Climate Change Conference (COP26, the 26th annual UN climate change conference), spotlighted the critical importance of the links between salmon, climate change, and planetary health in its core message of promoting protection and restoration of "Clean, Cold Water."[12] Saving salmon encourages carbon sequestration, sustains ecological communities, bolsters a multi-billion dollar industry, and preserves

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spawning runs. Hatcheries operated by state governments, on the other hand, often focus on maximizing sport and commercial harvest. Restoring degraded spawning habitat and reopening historically accessible habitat by removing dams are among the steps toward eventually eliminating the need of hatcheries. Hatcheries produce fish that can and often do damage spawning salmon by flooding the environment with competition for food and habitat and damage genetics through interbreeding. On the adverse effects of hatcheries, *see infra* notes 15, 68, 70, 195–204, 214, 254–67, 339, 377.

9. *See infra* notes 15, 84–87 and accompanying text. *See also* Ben Goldfarb, *The Great Salmon Compromise*, HIGH COUNTRY NEWS (Dec. 8, 2014), https://www.hcn.org/issues/46.21/the-great-salmon-compromise (discussing the tension between some conservationists, concerned that hatcheries will damage wild stocks, and Tribes, who are among the most enthusiastic hatchery supporters).

10. Professor Rodgers once explored creation of a so-called "salmon czar." *See* William H. Rodgers, Jr., *What a Salmon Czar Might Hope For*, 74 WASH. L. REV. 518 (1999) ("[a] salmon czar would hope for reliable funding, relentless enforcement, enthusiastic compliance, regulatory stability, and good science"). Nothing has come of this proposal.

11. *See, e.g.*, James R. Irvine & Brian E. Riddell, *Salmon as Status Indicators for North Pacific Ecosystems*, 4 NORTH PAC. ANADROMOUS FISH COMM'N BULL. 285, 286–287 (2007) (explaining that salmon are commonly used as indicator species because they are highly sensitive to environmental change).

12. *See Salmon School, COP 26 and The Road Forward on Climate*, WILD SALMON CTR. (Nov. 18, 2021), https://wildsalmoncenter.org/2021/11/18/salmon-school-cop-26-and-the-road-forward-on-climate/.

culturally significant practices throughout the globe.[13] Protecting wild salmon as a climate-action measure would improve water quality, protect ecosystems that store carbon, and make communities more resilient to the effects of climate change.[14] Salmon saving should be a focal point of international, national, and local climate-change policy.

Yet efforts at salmon saving have been disjointed, inconsistent, and sometimes counterproductive.[15] The geography of salmon's immense life cycle spans a daunting array of jurisdictions, agencies, and commissions with some authority over certain aspects of salmon habitat, and often these entities have not been well connected with each other. Studies have proliferated; effective remedial actions have not.

But the fragmented jurisdictional overlay has produced numerous salmon saving efforts, and those are worth studying as the 21st century closes in on the end of its first quarter. We assess these variegated efforts in this article. Section I begins with 19th century Indian treaties, which in recent years have been interpreted to include habitat protection. Section II focuses on federal efforts, including the

13. *See* Giulia C.S. Good Stefani, *Salmon: A Natural Climate Solution*, NRDC (June 17, 2021), https://www.nrdc.org/bio/giulia-cs-good-stefani/salmon-natural-climate-solution (citing James M. Helfield & Robert J. Naiman, *Effects of Salmon-Derived Nitrogen on Riparian Forest Growth and Implications for Stream Productivity*, 82 ECOLOGY 2403, 2406 (2001)) (explaining that Sitka spruce growth more than triples when the trees are adjacent to salmon abundant rivers); *see also* Wilson & Halupka, *supra* note 4; Helfield & Naiman, *supra* note 4; *We are all Salmon People*, COLUMBIA RIVER INTER-TRIBAL FISH COMM'N, https://critfc.org/salmon-culture/we-are-all-salmon-people/ (last visited May 5, 2023) (salmon cultures occur throughout the northern hemisphere); U.S. ENV'T PROT. AGENCY, FINAL DETERMINATION OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY PURSUANT TO SECTION 404(C) OF THE CLEAN WATER ACT PEBBLE DEPOSIT AREA, SOUTHWEST ALASKA ES-3, January 2023, https://www.epa.gov/system/files/documents/2023-01/Pebble-Deposit-Area-404c-FD-Jan2023.pdf [hereinafter EPA 404(c) Final Determination] (the Bristol Bay commercial wild salmon fishery alone is a $2 billion dollar industry).

14. Geoffrey Poole et al., *Technical Synthesis: Scientific Issues Relating to Temperature Criteria for Salmon, Trout, and Char Native to the Pacific Northwest*, U.S. ENV'T PROT. AGENCY (Aug. 2001) https://nepis.epa.gov/Exe/ZyPDF.cgi/P1004J0T.PDF?Dockey=P1004J0T.PDF (outlining the water quality standards required to sustain anadromous fish populations in the Pacific Northwest); *see, e.g.*, Rosanne Blanchet et al., *An Indigenous Food Sovereignty Initiative is Positively Associated with Well-being and Cultural Connectedness in a Survey of Sylix Okanagan Adults in British Columbia, Canada*, 21 BMC PUB. HEALTH 10 (July 2021), https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-021-11229-2 (restoring Okanagan sockeye salmon may have led to increased well-being and cultural connectedness in Sylix adults).

15. On the pernicious effects of salmon hatcheries, *see* PACIFIC SALMON LAW, *supra* note 1, at 68 (discussing loss of genetic diversity through interbreeding, hybridization among hatchery and wild fish, disease outbreaks, and adverse effects on wild fish due to competition for food and habitat); *see also* Philip S. Levin, et al., *The Road to Extinction is Paved with Good Intentions: Negative Association of Fish Hatcheries with Threatened Salmon*, THE ROYAL SOC'Y 1153 (2001) (discussing the negative correlation between the survival rate of wild chinook and hatchery-raised chinook in the Snake River); Ricardo O. Amoroso et al., *Measuring the Net Biological Impact of Fisheries Enhancement: Pink Salmon Hatcheries Can Increase Yield, but with Apparent Costs to Wild Populations*, 74 CAN. J. FISHERIES & AQUATIC SCI. 1233, 1239 (2017) (concluding that the release of hatchery pink salmon likely reduced the productivity of the wild populations that interacting with hatchery stock); Michelle M. McClure et al., *Evolutionary Effects of Alternative Artificial Propagation Programs: Implications for Viability of Endangered Anadromous Salmonids*, 1 EVOLUTIONARY APPLICATIONS 356, 367 (2008) (explaining that because of evolutionary risks, artificial propagation programs are not a substitute for addressing other factors that limit salmonid viability such as habitat, passage, harvest, or other limiting factors); *infra* note 67.

Columbia River Treaty with Canada, now undergoing renegotiation, and federal statutes like the Northwest Power Act, the Endangered Species Act, the Clean Water Act, and the Federal Power Act. Section III turns to salmon saving efforts in select river basins, from Alaska to California. Section IV draws a variety of lessons from these diverse salmon saving endeavors, including the persistent role played by interest groups in making salmon policy, the continued importance of judicial review in resolving disagreements about treaty and statutory provisions, and the increasing role of tribes in Pacific salmon recovery. We conclude with an acknowledgement that to a large extent the success of salmon saving efforts—like many other environmental goals—may be a function of the effectiveness of national climate-change policies.

I. INDIAN TREATIES AND RIGHTS OF NATURE

The 19th century Indian treaties that promised Indigenous Tribes the right to harvest salmon (and other species) "in common with" settlers were more than a century old when in 1968 the Supreme Court (per Justice Douglas)—in its fourth interpretation of the salmon treaties— misguidedly authorized state regulation of tribal harvests if the regulation was aimed at conserving the salmon.[16] This result quickly prompted the Court, in its fifth interpretation of the treaties, to clarify that discriminatory regulation that unfairly restricted tribal harvests violated the treaty promise.[17] This so-called "conservation necessity" defense for state regulation remains largely undefined a half-century later.[18]

16. Puyallup Tribe v. Dep't of Game of Wash., 391 U.S. 392, 398 (1968) [hereinafter *Puyallup* I] (holding the "the manner of fishing, the size of the take, the restriction of commercial fishing, and the like may be regulated by the State in the interest of conservation"). The first Supreme Court interpretation of the meaning of the treaties was United States v. Winans, 198 U.S. 371, 384 (1905), in which the Court interpreted the "in common with" treaty language to recognize a right of tribal fishers to fish alongside settlers within their ceded territory. *See* Michael C. Blumm & James Brunberg, *"Not Much Less Necessary . . . Than the Atmosphere They Breathed": Salmon, Indian Treaties, and the Supreme Court—A Centennial Remembrance of* U.S. v. Winans *and Its Enduring Significance*, 46 NAT. RES. J. 489 (2006). The Court then extended the scope the treaty fishing right to areas outside ceded territory in its second interpretation, Seufert Bros. Co. v. United States, 249 U.S. 194 (1919). Then, in its third interpretation, Tulee v. Washington, 315 U.S. 681 (1942), the Court held that while a state could not qualify or condition a treaty right to fish, states could regulate the "time and manner of fishing . . . necessary for the conservation of fish." *See generally* PACIFIC SALMON LAW, *supra* note 1, at 31–41 (surveying treaty fishing rights litigation); *see also* Minnesota v. Mille Lacs Band of Chippewa Indians, 526 U.S. 172 (1999) (holding that the so-called "conservation necessity" standard announced in *Puyallup I* for state regulation accommodates both the state's interest in managing its natural resources and the Tribes' federally guaranteed treaty rights).

17. *See* Dep't of Game of the State of Wash. v. Puyallup Tribe, 414 U.S. 44 (1973) [hereinafter *Puyallup II*] (finding Washington State's regulations prohibiting net fishing for steelhead but allowing hook-and-line fishing for those same fish to be discriminatory because the state's ban affected only native fishers). Under the canons of treaty construction, "it is well established that treaties should be construed liberally in favor of the Indians with ambiguous provisions interpreted for their benefit." Cnty. of Oneida v. Oneida Indian Nation, 470 U.S. 226, 247 (1985). However, in *Puyallup III*, the Supreme Court rejected the tribe's claim to an exclusive right to fish on-reservation. Puyallup Tribe v. Dep't. of Game of State of Wash., 433 U.S. 165 (1977) [hereinafter *Puyallup III*].

18. A recent "conservation necessity" case was State v. McCormack, 321 Or. App. 551 (2022), in which the Oregon Court of Appeals held that the state failed to meet its burden of regulating treaty fishers

After the Supreme Court's 1979 affirmance of Judge George Boldt's historic decision in which he interpreted the treaties to reserve to the tribes the right to half of the salmon harvests,[19] the tribes turned to enforce the treaties' implicit promise that the treaty right "of taking fish" included a right to protect the habitat necessary to support salmon harvests.[20] The results were inconclusive for decades.[21] Then, in 2007, in response to a tribal suit concerning the effect of road culverts blocking salmon migration, Judge Ricardo Martinez decided that the 19th century treaties did in fact protect salmon habitat; six years later, Judge Martinez issued an injunction requiring the state to restore salmon access at barrier culverts by 2030.[22]

The Ninth Circuit affirmed the *Martinez* decision,[23] and the Supreme Court also affirmed without issuing an opinion.[24] State efforts to implement the injunction are ongoing, but the state is unlikely to fulfill the injunction's order by 2030 due to an alleged lack of funding.[25]

This so-called "road culverts decision" might have effects beyond the geographic bounds of Puget Sound and affect salmon-damaging activities beyond

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only for conservation purposes because it 1) had not demonstrated that tribal harvests had impeded the recovery of Columbia River fish populations, 2) failed to show that it was regulating non-treaty harvesters to the fullest extent possible, and 3) failed to show that the tribe's own conservation measures were insufficient. 321 Or. App. at 566. The Oregon Supreme Court accepted review of the case, but Oregon later dropped its prosecution. *See* Petition for Review at *6 n.2, State of Oregon v. Wagner, 323 Or. App. 369 (2022) (No. A175622) (explaining that the Oregon Supreme Court granted the state's motion to withdraw its petition for review in *State v. McCormack*).

19. *See* United States v. Washington, 384 F.Supp. 312 (E.D. Wash. 1974), *aff'd*, Washington v. Wash. State Com. Passenger Fishing Vessel Ass'n, 443 U.S. 658, 686 (1979) (upholding a 50% harvest share for treaty fishers, reasoning that "the central principle here must be that Indian treaty rights to a natural resource that once was thoroughly, and exclusively exploited by the Indians secures so much as, but not more than, is necessary to provide the Indians with a livelihood—that is to say, a moderate living").

20. *See also* PACIFIC SALMON LAW, *supra* note 1, at 49.

21. The case law is discussed in MICHAEL C. BLUMM, SACRIFICING THE SALMON: A LEGAL AND POLICY HISTORY OF THE DECLINE OF COLUMBIA BASIN SALMON 249–272 (2002) [hereinafter SACRIFICING THE SALMON].

22. U.S. v. Wash., 20 F.Supp.3d 828, 899 (W.D. Wash. 2007) (state's road culverts blocking salmon migration violate the treaty); U.S. v. Wash., 20 F.Supp.3d 986, 1023–24 (W.D. Wash. 2013) (establishing a schedule for the state to repair barrier road culverts).

23. U.S. v. Wash., 853 F.3d 946, 979 (9th Cir. 2017) (affirming the merits of Judge Martinez's decision, while denying Washington's petition for an *en banc* rehearing). *See* Michael C. Blumm, *Indian Treaty Fishing Rights and the Environment: Affirming the Right to Habitat Protection and Restoration*, 92 WASH. L. REV. 1, 21–33 (2017).

24. Wash. v. U.S., 138 S.Ct. 1832 (mem.) (2018). Justice Kennedy recused because of his participation as a Ninth Circuit judge in the 1985 phase of this case. Recusal Letter of Justice Kennedy, Wash. v. U.S., 138 S.Ct. 1832 (2018) (No. 17-269), https://www.supremecourt.gov/DocketPDF/17/17-269/39869/20180323153617321_Recusal%20Letter%20in%20No.%2017-269.pdf. Kennedy's recusal proved determinative.

25. By June 2023, the state had corrected 114 injunction barrier culverts, roughly 12% of 989 identified culvert barriers subject to the injunction. *See* WASH. STATE DEP'T OF TRANSP., FISH PASSAGE PERFORMANCE REPORT IX, 37 (2023), https://wsdot.wa.gov/sites/default/files/2022-07/Env-StrRest-FishPassageAnnualReport.pdf. Recent estimates suggest that the cost to repair these culverts is between $7.3 billion and $7.8 billion, a significant jump from the $3.8 billion already spent or earmarked by the state legislature. David Kroman & Mike Reicher, *Huge Spike in Costs to Help Salmon Could Derail WA Transportation Budget*, SEATTLE TIMES (Nov. 19, 2023), https://www.seattletimes.com/seattle-news/times-watchdog/huge-spike-in-costs-to-help-salmon-could-derail-wa-transportation-budget/.

road culverts such as dam construction and operation, forest and irrigation practices, and land development including mining, grazing, and industrial siting.[26] However, the tenuous nature of the Supreme Court's affirmance of the culverts decision and the Court's increasingly conservative direction after President Trump's appointments likely have restrained the tribes from aggressively pursuing these extensions in court.

Salmon saving would be considerably advanced by judicial extension of the culverts decision. But the current makeup of the Supreme Court suggests that the Court would not likely endorse the notion that the treaty promise included not only a right to equal salmon harvests but also right to a habitat suitable for salmon propagation.[27] Treaty rights as salmon protection seem an uncertain prospect, given the composition of the current Supreme Court.[28]

In the absence of near-term promise for remedies through their treaties, Northwest tribes have begun to look to more innovative legal theories in their efforts to save salmon. For example, the Sauk-Suiattle Tribe filed suit in early 2022 against the City of Seattle in tribal court, arguing that the city's dams on the Skagit River were interfering with the inherent rights of salmon to "exist, flourish, [and] regenerate."[29] The lawsuit echoed similar "rights of nature" cases filed by indigenous communities in the U.S. and around the world.[30] A little over a year later, the city reached a settlement with the tribe, agreeing to build, operate, and maintain fish passage facilities at city-owned dams on the Skagit, although Seattle did not acknowledge as part of the settlement the merits of the Tribe's rights-of-salmon claim.[31] An impending deadline for renewal of Seattle City Light's Federal Energy Regulatory Commission (FERC) license for the dams likely influenced the city's decision-making.[32]

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26. PACIFIC SALMON LAW, *supra* note 1, at 54.

27. The Court's hostility to environmental regulations was evident in West Virginia v. EPA, 142 S.Ct. 2587 (2022) (invoking the so-called "major questions doctrine" to hold that section 111(d) of the Clean Air Act did not authorize EPA to establish emissions caps on carbon dioxide emissions from power plants.); and Sackett v. EPA, 123 S.Ct. 1322 (2023) (restricting the jurisdiction of section 404 of the Clean Water Act to wetlands and other waterbodies with a surface connection to navigable water, in a case brought by landowners seeking to fill wetlands within 30 feet from a tributary to Priest Lake in Idaho). In September 2023, EPA and the Army Corps of Engineers amended the 2023 Waters of the U.S. rule struck down in *Sackett*; *see* Revised Definition of "waters of the United States," 88 Fed. Reg. 61964 (September 8, 2023).

28. *See supra* note 27 and accompanying text.

29. *See Press Release: Sauk-Suiattle Indian Tribe Brings First "Rights of Salmon" Case*, CTR. FOR DEMOCRATIC & ENV'T RIGHTS (Jan. 16, 2022), https://ecojurisprudence.org/wp-content/uploads/2022/02/US_Sauk-Suiattle-Indian-Tribe-of-Washington_Rights-of-Salmon-case_434.pdf [hereinafter *Rights of Nature Press Release*]. After being dismissed by a lower tribal court, the case was settled while on appeal before the Sauk-Suiattle Tribal Court of Appeals. *See* Second Order on City of Seattle's Motion to Dismiss at 2, Sauk-Suiattle Tribe *ex rel* Tsuladx^{W} v. City of Seattle, SAU-CIV-01/22-001 (Sauk-Suiattle Tribal Ct. 2022).

30. See Ruby Russell, *Rights of Nature: Indigenous Traditions Become Law*, DEUTSCHE WELLE (Feb. 5, 2020), https://www.dw.com/en/environment-nature-rights-indigenous-activism-legal-personhood/a-52186866; *Rights of Nature Timeline*, CTR. FOR DEMOCRATIC & ENV'T RTS., https://www.centerforenvironmentalrights.org/timeline (last visited July 7, 2023). *See also infra* notes 33–36 and accompanying text.

31. *See generally Rights of Nature Press Release*, *supra* note 29.

32. *See generally infra* notes 190–93 and accompanying text.

Other tribes have taken up the rights of nature mantle in an effort to leverage salmon restoration. In 2019, the Yurok Tribe conferred personhood status on the Klamath River under tribal law,[33] and the Nez Perce Tribal General Council in 2020 adopted a resolution declaring the Snake River "is a living entity that has fundamental rights."[34] Although it took no legal action based on the river's personhood status under tribal law, Yurok Tribal advocacy was a key element of the successful drive to remove dams on the Klamath.[35] The Nez Perce Tribe likewise has for years campaigned to remove the four lower federal dams on the Snake, although it has yet to pursue its recognition of the personhood rights of the Snake River through legal action.[36]

Unlike tribes in the contiguous U.S., Alaska Native tribes do not possess treaty rights to harvest salmon; these rights were terminated by Congress in the Alaska Native Claims Settlement Act.[37] However, this termination has not stopped Alaska Natives from advocating for salmon conservation, actions they have carried out in many settings. Among the most high-profile and successful such efforts were the Bristol Bay Native Corporation's battle against the Pebble Mine,[38] and Alaska Natives' efforts to convince the federal government to address declining salmon in the Yukon-Kuskoskim Delta.[39]

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33. *See* Michael C. Blumm & Dara Illowsky, *The World's Largest Dam Removal Project: The Klamath River Dams*, 101 OR. L. REV. 1, 56 (2022).

34. Nez Perce General Council Resolution SPGC20-02, ECO JURIS. MONITOR, https://ecojurisprudence.org/wp-content/uploads/2022/02/US_Nez-Perce_Snake-River-Resolution_203.pdf (last visited Aug. 10, 2023).

35. *See infra* notes 371–77 and accompanying text.

36. *See generally* Elizabeth Kronk Warner & Jensen Lilliquist, *Laboratories of the Future, Tribes and Rights of Nature*, 111 CAL. L. REV. 325 (2023) (discussing personhood rights recognized by Ponca, Yurok, Menominee, Nez Perce, and Ojibwe tribes); Bethany R. Berger, *The Promise of Intertribal Wildlife Management*, in WILDLIFE STEWARDSHIP ON TRIBAL LANDS: OUR PLACE IS IN OUR SOUL (Serra J. Hoagland & Steven Albert, eds. 2023). One perhaps overlooked development is the recent role of federal agencies, states, and localities in protecting treaty fishing rights from developments like new fossil-fuel facilities. *See generally* Michael C. Blumm & Jeffrey B. Litwak, *Democratizing Treaty Fishing Rights: Denying Fossil-Fuel Exports in the Pacific Northwest*, 30 COL. NAT. RES., ENERGY & ENV'T L. REV. 1 (2019) (discussing permit denials, partly on treaty rights grounds, of the Tesoro Petroleum Terminal, the Millennium Coal Terminal, the Coyote Island Coal Terminal, the Gateway Pacific Coast Coal Terminal, and the Union Pacific Second Mainline Railroad Track).

37. *See generally* Robert T. Anderson, *Sovereignty and Subsistence: Native Self-Government and Rights to Hunt, Fish, and Gather After ANCSA*, 33 AK. L. R. 187, 204 (2016).

38. *Pebble Mine*, BRISTOL BAY NATIVE CORP., https://www.bbnc.net/about/pebble-mine/ (last visited Nov. 11, 2023).

39. Evan Erickson, *Dozens Testify in Bethel During Federal Hearing on Salmon: 'We Bear the Brunt of the Conservation'*, KYUK (Nov. 11, 2023), https://www.kyuk.org/public-safety/2023-11-11/dozens-testify-in-bethel-during-federal-hearing-on-salmon-we-bear-the-brunt-of-the-conservation. This public pressure resulted in the Alaska Salmon Research Task Force Act, which, as its name suggests, funds research on the causes of declining Yukon-Kuskokwim salmon and other areas throughout the state. *See* Press Release, Lisa Murkowski, *Murkowski, Sullivan, Peltola Congratulate Appointees to New Salmon Research Task Force and Yukon-Kuskokwim-Focused Working Group* (Aug. 31, 2023), https://www.murkowski.senate.gov/press/release/murkowski-sullivan-peltola-congratulate-appointees-to-new-salmon-research-task-force-and-yukon-kuskokwim-focused-working-group. *See also* Alaska Research Task Force Act, Pub. L. 117-328, 136 Stat. 5271 (2022).

II. FEDERAL TREATIES AND STATUTES

Long before the era of federal environmental statutes of the last half-century, the Pacific Northwest embarked on a vigorous dam construction campaign, aimed at "conserving" water supplies and producing hydroelectricity.[40] Later, flood control became a motivating force for more dam building.[41] By the time the dam-building era subsided in the 1970s, the region had the largest integrated system of dams in the world, consisting of both federal and nonfederal dams but largely operated by federal agencies: the Bonneville Power Administration, the U.S. Army Corps of Engineers, and the Bureau of Reclamation.[42]

A. The Columbia River Treaty

Dam building in Columbia Basin in the U.S. could not take advantage of considerable storage on the Canadian side of the basin.[43] For decades, the U.S. and Canada negotiated a Columbia River Treaty that would call for development of Canadian storage to both improve flood control and to increase hydroelectric production downstream.[44] However, agreement remained elusive, as Canada wanted the treaty to provide it with an unprecedented share of the downstream benefits that

40. Completed during Franklin Delano Roosevelt's New Deal, the Grand Coulee dam created an impenetrable barrier to the salmon runs that historically migrated into the Upper Columbia Basin. *See* PACIFIC SALMON LAW, *supra* note 1, at 62. Salmon were only as an afterthought by the federal government during the dam-building era. Instead, the focus was on developing the Columbia Basin's hydroelectric potential. *See also id.* at 61–63; Michael C. Blumm, *Hydropower vs. Salmon: The Struggle of the Pacific Northwest's Anadromous Fish for a Peaceful Coexistence with the Columbia River Hydroelectric System*, 11 ENV'T L. 211 (1981) [hereinafter *Hydropower vs. Salmon*] (discussing the evolution of the Federal Columbia River Supply System).

41. In 1948, Columbia River flooding destroyed the city of Vanport—at the time Oregon's second largest city with a population of 18,500 residents. *See* Natasha Geiling, *How Oregon's Second Largest City Vanished in a Day*, SMITHSONIAN MAG. (Feb. 18, 2015), https://www.smithsonianmag.com/history/vanport-oregon-how-countrys-largest-housing-project-vanished-day-180954040/ (explaining that Vanport was originally developed as a housing project during World War II and housed much of Oregon's Black population). *See* Flood Control Act of 1944, ch. 665, 58 Stat. 887 (current version at 16 USC §§ 460d, 825s; 33 USC §§ 701-1, 701a-1, 708, 709; 43 USC § 390).

42. *See Bonneville Power Administration: Electricity*, NW. POWER & CONSERVATION COUNCIL, https://www.nwcouncil.org/reports/columbia-river-history/bpaelectricity/ (last visited Apr. 9, 2023) (detailing the operation and the power producing capabilities of the Columbia River dams); and Frank Riley, *Bonneville Dam Prepares for 50-Year Celebration*, L.A. TIMES (Mar. 1, 1987), https://www.latimes.com/archives/la-xpm-1987-03-01-tr-6768-story.html (extolling the Bonneville Lock and Dam as the "master key to the largest hydroelectric system in the world").

43. *See* Thomas G. Bode, *A Modern Treaty for the Columbia River*, 47 ENV'T L. 81, 94 (2017) (explaining that the majority of storage capacity in the Columbia River basin exists within Canada); *see generally* PACIFIC SALMON LAW, *supra* note 1, at 75–79.

44. The Columbia River Treaty negotiations took twenty years. The Canadian reservoirs called for by the treaty increased the storage capacity of the Columbia Basin an additional 15.5 million acre-feet, providing both flood control benefits and storage for on-demand releases for hydroelectric energy generation. *Hydropower vs. Salmon*, *supra* note 40, at 243–44; SACRIFICING THE SALMON, *supra* note 21, at 99–102; PACIFIC SALMON LAW, *supra* note 1, at 75–79. *See also* Albert E. Utton, *The Columbia River Treaty and Protocol*, 1 LAND & WATER L. REV. 181, 182–85 (1966) (describing the prolonged treaty negotiations).

the treaty projects would produce.[45] Finally in 1961, when the U.S.—in a pathbreaking concession—consented to an equal share of downstream benefits, the countries agreed to a treaty, although due to federal-provincial disagreements in Canada, it took another three years for it to be ratified.[46]

The treaty authorized construction of four large storage projects, one of which would inundate U.S. lands.[47] Together, the four projects would double the basin's storage capacity and materially increase the hydropower generation of the Columbia River projects downstream.[48] The treaty projects had a significant adverse effect on salmon because they substantially changed the river's hydrograph, reducing peak flows in the spring, increasing flows later in the year, and reducing the river's ability to flush migrating juvenile salmon downstream to the ocean.[49] With this seasonal change of a diminished freshet, the average migration period more than doubled,[50] increasing mortalities of juvenile salmon.[51] Moreover, the new storage capacity encouraged downstream projects to install additional power generators, which made them ideal for meeting the region's daily peak power loads, but also producing "pulse flows" that made it difficult for migrating salmon to pass the dams and their reservoirs.[52]

For years the federal agencies operating what became known as the Federal Columbia River Power System (FCRPS) interpreted the treaty to sanction power operations over salmon migration, a view that was arguably inconsistent with the

45. The eventual agreement included a share of the downstream benefits to Canada, setting international precedent. *See* Rachael Paschal Osborn, *Climate Change and the Columbia River Treaty* 2 WASH. J. OF ENV'T L. & POL'Y 75, 98 (2012) (explaining that because of the Columbia River Treaty's novel downstream benefits sharing provisions, the treaty has been heralded as "a pinnacle of international water agreements").

46. Treaty relating to Cooperative Development of Water Resources of the Columbia River Basin, Can.-U.S., Sept. 16, 1964, 15 U.S.T. 1555, T.I.A.S. No. 5,638.

The British Columbia provincial government and the Canadian federal government disputed which government was to pay for construction costs, and where the power would be marketed. This internal dispute delayed treaty ratification until 1964. *See* SACRIFICING THE SALMON, *supra* note 21, at 99.

47. Justin Franz, *Lost to the Lake*, FLATHEAD BEACON (May 1, 2019), https://flatheadbeacon.com/2019/05/01/lost-to-the-lake/.

48. *See* CHARLES V. STERN, CONG. RSCH. SERV., COLUMBIA RIVER TREATY REVIEW 4 (2023).

49. To meet seasonal peak electric loads, dam operators in the Columbia Basin altered the natural flow regime of the Columbia and Snake Rivers, withholding the spring and early summer runoff flows, then releasing those flows during the winter when demand to space heating is high. This change in the Columbia River's hydrograph negatively affects young salmon, dependent on higher spring and summer flows for transport to the ocean. *See* SACRIFICING THE SALMON, *supra* note 21, at 100.

50. *See* Jo Beth Mullens, *Shifting River Management Toward Salmon Restoration in the Columbia River Basin*, 59 ASS'N PAC. COAST GEOGRAPHERS Y.B. 68, 74 (1997) (noting that, for salmon migrating from the upper Columbia River tributaries to the ocean, historic migration times averaged 22 days, whereas scientists recorded contemporary migration times of up to two months).

51. *See* Philip R. Wandschneider, *Control and Management of the Columbia-Snake River System*, AGRIC. RSCH. CTR. WASH. STATE UNIV. 32 (1984) (explaining that reservoirs on the Columbia River increase the migration time of salmon smolt by reducing spring and early summer flows, and by dramatically widening the river cross section).

52. Some recent studies have suggested that pulse flows in the Columbia are not significant factors affecting fish migration. *See, e.g.*, Allison Goodwell & Nicholas Campbell, *An Information Theory-based Approach to Characterize Drivers of Upstream Salmon Migration*, PLOS ONE 1, 18 (2022).

text of the treaty.[53] Those operations damaged the salmon runs to such an extent that as early as 1978 there were serious proposals to list the salmon runs under the federal Endangered Species Act.[54] Listings would come a decade or so later, after Congress authorized legislation to improve Columbia Basin salmon migration despite the operation of the FCRPS.[55]

The treaty's provisions concerning flood control expire in 2024, prompting ongoing, decades-long negotiations to consider a revised treaty.[56] Indigenous Tribes in the U.S. successfully convinced the U.S. negotiators to argue for an amended treaty that would include a third "ecological function" purpose that would temper the treaty's flood control and hydropower generation purposes.[57] Although the Tribes' success in helping to formulate the U.S. position is notable, Canada has proved reluctant to agree to revised treaty purposes, maintaining that the chief damage to the Columbia's salmon in the upper basin was caused by impassable U.S. dams like the giant Grand Coulee dam, not the treaty's storage projects.[58] After years of considerable pressure, Canada acquiesced in allowing representatives of three

53. *See Hydropower vs. Salmon*, *supra* note 40, at 245 (explaining that none of the treaty provisions expressly authorize FCRPS operations to prioritize hydropower generation; although the treaty lists hydroelectric power generation and flood control as primary purposes, it also mentions "other benefits," which could presumably include salmon migration).

54. *See* F. Lorraine Bodi, *Protecting Columbia River Salmon Under the Endangered Species Act* 10 ENV'T L. 349, 349–50 (1980) (explaining that in 1978 the National Marine Fisheries Service and the U.S. Fish & Wildlife Service began review of the biological status of upriver Columbia Basin salmon populations).

55. *See infra* notes 67–69, 81–84 and accompanying text.

56. U.S, ARMY CORPS OF ENG'R, NW. DIV., WHITE PAPER ON COLUMBIA RIVER POST-2024 FLOOD RISK MANAGEMENT PROCEDURE i (2011), https://www.critfc.org/wp-content/uploads/2019/07/Post-2024-White-Paper-09-11_FINAL.pdf.

57. *See Columbia River Treaty*, COLUMBIA RIVER INTER-TRIBAL FISH COMM'N, https://critfc.org/tribal-treaty-fishing-rights/policy-support/columbia-river-treaty/ (last visited Mar. 12, 2023) (explaining that the Columbia Basin Tribes convinced the U.S. to advocate for the inclusion of the ecological function of the river as a treaty purpose coequal with flood control and power production).

58. *See* Nigel Bankes, *Environment: Garrison Dam, Columbia River, the IJC, NGOs*, 30 CAN.-U.S. L. J. 117, 123 (2004) (asserting that the Grand Coulee dam eliminated upper Columbia fish passage). Tribal efforts to restore salmon above in the upper Columbia Basin above Grand Coulee are ongoing. *See, e.g.*, Courtney Flatt, *Tribes Say Fish Passage Above Grand Coulee Is Possible*, NW. PUB. BROAD. (June 12, 2019), https://www.nwpb.org/2019/06/12/tribes-say-fish-passage-above-grand-coulee-dam-is-possible/ (noting that projections are that possibly 24,000 harvestable chinook and 21,000 sockeye are possible, with 14,000 chinook and 26,000 escaping to spawn in the upper Columbia); Courtney Flatt, *Colville Tribes Encouraged by Young Salmon Spawning Behind Grand Coulee Dam*, NW. PUB. BROAD. (June 12, 2021), https://www.spokanepublicradio.org/2021-06-14/colville-tribes-encouraged-by-young-salmon-spawning-behind-grand-coulee-dam# (reporting that after releasing 100 salmon above Grand Coulee last August, biologists with the Confederated Tribes of the Colville Reservation's Fish & Wildlife Department documented around 30 redds (nests), where salmon lay their eggs, and some 70 juvenile fish).

Canadian Indigenous Nations to be official observers to the Treaty renegotiation process.[59] The details of an amended treaty remain uncertain as of this writing.[60]

B. The Northwest Power Act (NPA)

The mature, post-treaty hydroelectric system did not, however, meet forecasted electric needs, so the region embarked on what turned out to be a disastrous "hydro-thermal power program" that aimed to blend some 26 coal and nuclear power plants into the hydroelectric system. The program included five planned nuclear plants, most of which were still-born and whose costs bankrupted its sponsor, the Washington Public Power Supply System, leaving the region short of projected electric demand.[61] The anticipated power shortages led to significant interest, especially in the utility world, in having a congressional resolution. Congress responded by enacting the Northwest Power Act in 1980.[62]

The act authorized an interstate compact agency, which the Northwest states quickly created, now known at the Northwest Power and Conservation Council (Northwest Council), to develop a regional electric plan to meet the forecasted power shortages.[63] The plan, now in its 8th edition,[64] has proved to be a spectacular success in promoting conservation measures, renewable energy projects, and avoiding construction of costly large-scale fossil-fuel plants.[65] Also authorized was a

59. *See* Press Release, Government of Canada, Federal Government Announces Columbia River Basin Indigenous Nations to Participate as Observers in Columbia River Treaty Negotiations (Apr. 26, 2019); Trevor Crawley, *Agreement Reached to Share Columbia River Treaty Revenues with First Nations*, HAIDA GWAII OBSERVER (Jun. 8, 2023), https://www.haidagwaiiobserver.com/news/agreement-reached-to-share-columbia-river-treaty-revenues-with-first-nations-6385104 (mentioning that the treaty process had "been criticized for a complete lack of consultation with Columbia Basin Indigenous nations").

60. *See, e.g.*, Christian Paas-Lang, *Money, Power and an Ecosystem Are All at Stake in Canada-U.S. Negotiations Over a Massive River*, CBC (Sep. 24, 2023), https://www.cbc.ca/news/politics/columbia-river-treaty-negotiation-1.6975849 (describing the negotiations as being locked in a stalemate).

61. *See Hydrothermal Power Program*, NW. POWER & CONSERVATION COUNCIL, https://www.nwcouncil.org/reports/columbia-river-history/hydrothermal/ (last visited Mar. 12, 2023). *See* SACRIFICING THE SALMON, *supra* note 21, at 103–06; PACIFIC SALMON LAW, *supra* note 1, at 81–83.

62. Pacific Northwest Electric Power Planning and Conservation Act, PUB. L. NO.96–501, 94 Stat. 2697 (1980) (codified at 16 U.S.C. §§ 839-839h); *see* Michael C. Blumm, *The Northwest's Hydroelectric Heritage: Prologue to the Pacific Northwest Electric Power Planning and Conservation Act*, 58 WASH. L. REV. 175, 228, 230 (2017) (explaining that congressional action to formulate the Northwest Power Act was prompted by power shortages and rate inequities resulting from BPA's failed Hydro-Thermal Program); SACRIFICING THE SALMON, *supra* note 21, at 129–60; PACIFIC SALMON LAW, *supra* note 1, at 85–93.

63. 16 U.S.C. § 839b; on the Northwest Power Planning Council (now Northwest Power and Conservation Council), see Roy Hemmingway, *The Northwest Power Planning Council: Its Origins and Future Role*, 13 ENV'T L. 673 (1983).

64. *See* THE 2021 NORTHWEST POWER PLAN, NW. POWER & CONSERVATION COUNCIL (Mar. 10, 2022), https://www.nwcouncil.org/fs/17680/2021powerplan_2022-3.pdf.

65. One of the chief innovations of the NPA was to revolutionize regional electric power forecasting with publicly reviewable demand estimates, instead of merely summing up utility forecasts. *See* Kai N. Lee, *The Path Along the Ridge: Regional Planning in the Face of Uncertainty*, 58 WASH L. REV. 317, 323 (1983) (the Northwest Power Act requires the power plan it authorized to prioritize conservation measures first and renewable resources second). Through conservation alone, the Council's power plan resulted in the avoidance of more than 24 million metric tons of CO2. *See* Kevin Smit, *2021 Regional*

Columbia Basin Fish and Wildlife Program that promised to restore the basin's beleaguered salmon runs.[66]

The fish and wildlife program proved to be much less successful than the power plan. While it has funneled a considerable amount of funding for habitat restoration, it also supported salmon hatcheries, which have proved to be detrimental to wild fish propagation.[67] Moreover, the program was able to make only incremental changes to the operation of the dams, despite one federal judge's call for "a major overhaul" in system operations.[68] Instead, the program concentrated on funding hatchery and habitat measures.[69]

The disappointing record was challenged in court, but the challengers won only a procedural victory, requiring the Northwest Council to explain in writing the reason for any program amendments that deviated from the recommendations of a coalition of federal and state fishery agencies and Indian tribes.[70] Other lawsuits,

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Conservation Progress Survey Results, NW. POWER & CONSERVATION COUNCIL 27 (Sept. 14, 2022), https://www.nwcouncil.org/fs/18025/2022_09_1.pdf.

66. 16 U.S.C. § 839b(h); *see* Michael C. Blumm & Brad L. Johnson, *Promising a Process for Parity: The Northwest Electric Power Planning and Conservation Act and Anadromous Fish Protection*, 11 ENV'T L. 497, 499 (1981) (an early view of the Northwest Power Act).

67. On the detrimental effects of hatcheries, see *supra* note 15, *infra* notes 194–206, 213, 253–66, 338, 374 and accompanying text; PACIFIC SALMON LAW, *supra* note 1, at 65–73 (referring to hatcheries as a "Faustian bargain"); SACRIFICING THE SALMON, *supra* note 21, at 109–28 (calling hatcheries a "false hope"). *See generally* JIM LICHATOWICH, SALMON WITHOUT RIVERS: A HISTORY OF THE PACIFIC SALMON CRISIS (1999). For a review of the fish and wildlife program, see also Richard N. Williams & James A. Lichatowich, *Science and Politics—an Uncomfortable Alliance: Lessons Learned from the Fish and Wildlife Program of the Northwest Power and Conservation Council*, 70 AM. FISHERIES SOC'Y 1021 (2009) (describing the hatchery component of the program as being scientifically outdated and unsound).

68. Idaho Dep't of Fish & Game v. Nat'l Marine Fisheries Serv., 850 F. Supp. 886, 900 (D. Or. 1994) (Marsh, J.), *vacated as moot*, 56 F.3d 1071 (9th Cir. 1995). *See infra* notes 88–89 and accompanying text. *See also* Michael C. Blumm, Michael A. Schoessler & Christopher Beckwith, *Beyond the Parity Promise: Struggling to Save Columbia Basin Salmon in the Mid-1990s*, 27 ENV'T L. 21, 36–49 (1999) [hereinafter *Beyond Parity*].

69. For example, in 2021, Bonneville spent approximately $253.6 million on direct expenditures for habitat improvements, research, monitoring, and fish hatcheries. 2021 COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM COSTS REPORT, NW. POWER & CONSERVATION COUNCIL 4 (May 18, 2022), https://www.nwcouncil.org/media/filer_public/56/ba/56babcce-8c1a-4543-b2f9-40c5bb812e8e/2022-1.pdf. Hatcheries continue to receive substantial financial backing from the Council. For example, the Council recently approved funding for Financial Year 2024, allocating approximately $1.5 million to fish screens and $23 million to hatcheries. Carol Winkel, *Council Approves Funding to Maintain Fish Screens and Hatcheries*, NW. POWER & CONSERVATION COUNCIL (June 22, 2023) https://www.nwcouncil.org/news/2023/06/22/council-approves-funding-to-maintain-fish-screens-and-hatcheries/. According to an Oregon Department of Fish and Game report, over the years of 2014 to 2018, fish screen projects cost approximately $13,000 per cubic foot per second (CFS) diverted. *Fish Screening Costs 2014-2018*, OR. DEP'T OF FISH & GAME (Jan. 17, 2020), https://www.dfw.state.or.us/agency/commission/minutes/20/01_Jan/B/Attachment%208_Fish%20Screening%20Costs%202014-2018.pdf.

70. Nw. Res. Info. Ctr., Inc. v. Nw. Power Plan. Council, 35 F.3d 1371, 1395 (9th Cir. 1994), *cert. denied*, 516 U.S. 806 (1995). The so-called fishery coalition of fishery agencies and tribes was an early example of cooperative efforts between state and federal agencies and tribes. Those efforts have evolved over the years and were a harbinger of the kind of co-stewardship which is now a policy priority of the Biden administration. *See* Michael C. Blumm & Cari Baermann, *The Belloni Decision and Its Legacy: United States v. Oregon and Its Far-Reaching Effects After a Half-Century*, 50 ENV'T L. 347, 378–83 (2020) (explaining the importance of the court's continuing jurisdiction to promote a "three sovereigns"

based on the NPA's mandate that federal dam managers give salmon conservation "equitable treatment" with hydropower production and other uses of the dams, produced court opinions that seemed to dismiss the potential of this provision to make any meaningful change in project operations.[71]

The Northwest Council's program did establish a system of "protected areas" in an effort to foreclose hydroelectric development on some 44,000 stream miles important to salmon migration and spawning in 1988.[72] These areas now enjoy some protection from federal hydroelectric licensing by the Federal Energy Regulatory Commission (FERC),[73] and the Bonneville Power Administration (BPA) may not purchase their hydropower.[74] Protected areas have not generated

approach to managing modern Columbia River salmon harvests); *Fact Sheet: Biden-Harris Administration Announces New Actions to Support Indian Country and Native Communities Ahead of the Administration's Second Tribal Nations Summit*, THE WHITE HOUSE (Nov. 30, 2022), https://www.whitehouse.gov/briefing-room/statements-releases/2022/11/30/fact-sheet-biden-harris-administration-announces-new-actions-to-support-indian-country-and-native-communities-ahead-of-the-administrations-second-tribal-nations-summit/ [hereinafter Biden Administration Co-management Initiatives] (fact sheet discussing Biden Administration initiatives to increase funding to tribes, as well as enhance tribes' influence with federal agencies and decision-makers). On Tribal co-management, see generally Kevin K. Washburn, *Facilitating Tribal Co-Management of Federal Public Lands*, 2022 WIS. L. REV. 263 (2022).

71. The Ninth Circuit first examined the NPA's "equitable treatment" mandate in Northwest Environmental Defense Center v. Bonneville Power Administration, 117 F.3d 1520 (9th Cir. 1997). The case involved use of reservoir storage capacity, which the court found had not been definitively allocated at the time the defendant Bonneville Power Administration signed the agreement that made the capacity available. *See id.* at 1533. The court instructed BPA to "develop a mechanism for fulfilling its obligation" to give salmon equitable treatment and noted that when Bonneville made allocation decisions it would have to "demonstrate, by means that allow for meaningful review, that it has treated fish and wildlife equitably." *Id.* at 1534. However, five years later the Ninth Circuit backed away from its admonition that BPA develop a "mechanism" for demonstrating that it gives fish equitable treatment, noting that "we cannot impose this procedural requirement ourselves." Confederated Tribes of the Umatilla Indian Rsrv. v. Bonneville Power Admin., 342 F.3d 924, 931 (9th Cir. 2003). Completing its about-face, the court instead emphasized that plaintiffs mounting a challenge to BPA under this provision must surmount a high hurdle – "[t]hey must show that, overall, BPA treats fish second to power." *Id.* Pointing to Bonneville's broad recitations of programmatic measures the agency takes to benefit salmon, the court concluded that Bonneville provided a reasoned explanation of its assertion that it gave fish equitable treatment. *Id.* at 933. In 2022, salmon advocates once again cited the Northwest Power Act's equitable treatment mandate in challenging BPA's 2021 power ratemaking decision. The advocates argued that the agency's decision to allocate the vast majority of a larger-than-expected revenue windfall to ratepayers, rather than dedicating more of the funds to salmon conservation, failed to put power and fish on an equitable footing. *See* Petitioner's Opening Brief, Idaho Conservation League v. Bonneville Power Admin., 83 F.4th 1182 (9th Cir. 2023) (No. 22-70122), 2022 WL 15526511. However, the Ninth Circuit rejected this argument. Idaho Conservation League v. Bonneville Power Admin., 83 F.4th 1182 (9th Cir. 2023).

72. NW. POWER & CONSERVATION COUNCIL, COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM 2014, at 52 (2015).

73. Section 4(h)(11)(A)(ii) of the Northwest Power Act stipulates that FERC must take the Council's program into account "to the fullest extent practicable" consistent with the agency's other directives. 16 U.S.C. § 839b(h)(11)(A)(ii). That provision has never been interpreted judicially.

74. Section 4(h)(10)(A) of the Northwest Power Act, 16 U.S.C. § 839b(h)(10)(A), requires BPA to act consistently with the Council's program. The program forbids BPA from acquiring the power from facilities operating in protected areas. COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM 2014, *supra* note 72, at 53.

controversy, perhaps because it is easier to affect future actions than to correct past mistakes.[75]

Also in 1988, federal and state fish agencies and the FERC licensees on the mid-Columbia, reached an agreement outside the program that changed dam operations. In what was known as the Vernita Bar agreement, these changes provided sustainable fish flows on the Hanford Reach, the last undammed reach of the Columbia and home to 70 percent of chinook spawning in the Columbia.[76] Amended in 2004, the agreement has played an important role in enhancing salmon spawning as much as any operational changes the Council's program was able to institute.[77]

Dissatisfaction with the ability of the program to affect hydroelectric operations has fueled widespread interest in removing four lower Snake River dams, whose marginal economic benefits are replaceable, and whose operational effects on Snake River salmon—once the largest of the Columbia Basin runs—have devastated the salmon.[78] The failure to reverse run-size declines would lead to ESA listings and

75. For more information regarding the Northwest Council's protected areas, see *Protected Areas*, NW. POWER & CONSERVATION COUNCIL, https://www.nwcouncil.org/fish-and-wildlife/fw-topics/protected-areas/ (last visited Nov. 11, 2023). Protected areas have apparently generated little to no controversy, as no party has challenged these areas in court.

76. *See* Carol Winkel, *The Hanford Reach: A Stretch of River Reborn and a Salmon Run Preserved*, NW. POWER & CONSERVATION COUNCIL (May 24, 2023), https://www.nwcouncil.org/news/2023/05/24/the-hanford-reach-a-stretch-of-river-reborn-and-a-salmon-run-preserved/. No dams were constructed on the Hanford Reach because of the nearby Manhattan nuclear weapons project during World War II and the ensuing Cold War. *Id.*

77. *Id.* The 2004 amendments were labeled the Hanford Reach Fall Chinook Protection Program, providing flow protection for fall chinook emerging in the late spring. *See id.*

78. *See* Michael C. Blumm, et al., *Saving Snake River Water and Salmon Simultaneously: The Biological, Economic, and Legal Case for Breaching the Lower Snake River Dams, Lowering John Day Reservoir, and Restoring Natural River Flows*, 28 ENV'T L. 997, 999 (1998) [hereinafter *Saving Salmon and Water Simultaneously*]; *see also* Michael C. Blumm & Doug DeRoy, *The Fight over Columbia River Basin Salmon Spills and the Future of the Lower Snake River Dams*, 9 WASH. J. ENV'T L. & POL'Y 1 (2019) [hereinafter *Fighting Over Spills*]; Michael C. Blumm, *The Mistake on the Snake: The Lower Snake River Dams*, 58 IDAHO L. REV 1, 19–28 (2022) [hereinafter *The Mistake on the Snake*] (discussing the proposal of Congressman Mike Simpson (R-Id.) to breach the lower Snake Dams for compensation of roughly $31 billion to affected parties). Washington politicians have embraced something similar. *See* Associated Press, *Report: Benefits of Dams Must Be Replaced Before Breaching*, U.S. NEWS & WORLD REP. (Aug. 25, 2022, 7:16 PM), https://www.usnews.com/news/us/articles/2022-08-25/report-benefits-of-dams-must-be-replaced-before-breaching (discussing a report by Washington Gov. Jay Inslee (D-Wash.) and Sen. Patty Murray (D-Wash.) estimating the costs of dam removal at between $10.3 and 27.2 billion and suggesting that any removal be preceded by compensation to those affected); *see also* Nick Gibson, *Inslee-Murray Report on Cost of Breaching Snake River Dams Could Signify a Shift in Decades of Debate*, THE SPOKESMAN-REVIEW (June 10, 2022,), https://www.spokesman.com/stories/2022/jun/10/inslee-murray-report-on-cost-of-breaching-snake-ri/ (discussing the positions of both proponents and opponents of breaching the lower Snake dams).

Both the Simpson and the Inslee-Murray proposals assumed that anyone with an affected activity would have a right to full compensation for any alleged adverse effects due to dam breaching. That sort of compensation is more than the takings clause of the Constitution would require. In an earlier era, Congress demanded that regulators force polluters to adopt new technologies to reduce the damage they were causing without compensation. *See, e.g.*, Thomas O. McGarity, *Radical Technology-Forcing in Environmental Regulation*, 27 LOY. L.A. L. REV. 943 (1994).

eventually ESA injunctions.[79] In response to critics citing the fact that the program had spent billions of dollars over 40 years without recovering any ESA-listed species, the Council promised to embark on a comprehensive review of its effectiveness in 2021, the results of which remain pending as of this writing.[80]

C. Endangered Species Act (ESA)

Listing salmon for protection under the ESA followed from a 1991 study by the American Fisheries Society's Endangered Species Committee, which concluded that there was a Pacific-Coast wide salmon-crisis.[81] According to the study, there were 101 salmon species that faced a high risk of extinction, 58 had a moderate risk, while 54 were species of concern.[82] By the end of 1992, the federal government, prompted by citizen petitions, had listed several species under the ESA.[83] The ESA ushered in a new era where salmon saving was informed by scientific knowledge and backed up by clearer legal mandates, which began to influence not only hydroelectric operations but also hatchery and harvest management and habitat restoration projects.[84]

The primary way that listings influence salmon saving is through the ESA's section 7(a)(2) consultation process, which culminates in biological opinions (BiOps) issued by the National Marine Fisheries Service (NMFS, also known as

79. *See infra* notes 297–99, 344 (discussing listing petitions); 215–16, 286–92, 374 (describing the dire state of salmon populations); 83, 91–98, 231–35, 305–11 (discussing ESA injunctions), and accompanying text.

80. *See Draft Report Pegs BPA's 2019 Fish/Wildlife Costs at $788 Million, $17 Billion Since 1981; 25 Percent of Wholesale Power Rate*, COLUMBIA BASIN BULL. (Mar. 19, 2020), https://cbbulletin.com/draft-report-pegs-bpas-2019-fish-wildlife-costs-at-788-million-17-billion-since-1981-25-percent-of-wholesale-power-rate/ (the cumulative expenses of the Council's Fish and Wildlife Program totaled $17.659 billion by 2019). Adding the annual expenses of the program for years, 2020 ($611.4 million), 2021 ($744.5 million), and 2022 ($931.8 million), the cumulative costs of the program now total $19.936 billion. 2020 COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM COSTS REPORT, NW. POWER & CONSERVATION COUNCIL 9, Figure 1A (2021); 2021 COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM COSTS REPORT, NW. POWER & CONSERVATION COUNCIL 9, Figure 1A (2022); 2023-3_FY22ANNUALREPORT, NW. POWER & CONSERVATION COUNCIL, Figure 1A (2023), https://www.nwcouncil.org/f/18354/2023-3_FY22AnnualReport.xlsx. Forgone hydropower sale revenue accounted for $475.9 million of the costs over that three-year period. *Id.* These are funds that could have come from the sale of electric power but were not generated due to modifying dam operations benefitting salmon, such as increasing spill to assist fish passage. 2020 COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM COSTS REPORT, NW. POWER & CONSERVATION COUNCIL 4 (2021). Including these costs is controversial, and to fish advocates, disingenuous. *See infra* note 380 and accompanying text; Carol Winkel, *Measuring Impact: Evaluating the Performance of the Columbia River Basin Fish and Wildlife Program*, NW. POWER & CONSERVATION COUNCIL (July 19, 2021), https://www.nwcouncil.org/news/measuring-impact/.

81. *See* Willa Nehlsen et al., *Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, and Washington*, 16 FISHERIES 4 (1991).

82. *Id.* at 10.

83. Endangered and Threatened Species; Endangered Status for Snake River Sockeye Salmon 56 Fed. Reg. 58619, 58622 (Nov. 20, 1991); Endangered and Threatened Species; Threatened Status for Snake River Spring/Summer Chinook Salmon, Threatened Status for Snake River Fall Chinook Salmon 57 Fed. Reg. 14653–60 (Apr. 22, 1992) (salmon listings); *Id.* § 1553(b)(3) (citizen petition process); *Id.* § 1532(6) (definition of endangered species); 16 U.S.C. § 1532(20) (definition of threatened species).

84. Salmon management included the so-called "4 H's": hydropower, hatcheries, harvest, and habitat. *See* SACRIFICING THE SALMON, *supra* note 21, at 186.

"NOAA Fisheries").[85] These BiOps evaluate proposed federal agency actions, aiming to ensure that they do not jeopardize the continued existence of listed salmonids as well as minimizing the associated "taking" of these fish, resulting in their death or injury.[86]

NMFS has issued numerous BiOps on federal Columbia Basin hydroelectric operations during the thirty-plus years since the listings. Only one of these BiOps has passed judicial muster.[87] In 1994, the first court to overturn a NMFS BiOp declared that the hydropower system "literally cries out for a major overhaul" to meet the needs of listed salmon and steelhead—a result still not yet realized.[88]

For many years, federal hydropower managers responded to judicial orders to improve BiOps by making only incremental changes to dam operations.[89] However, in 2016 federal district court judge Michael Simon issued a far-reaching opinion both overturning NMFS' 2014 BiOp[90] and declaring that federal hydropower management agencies had a duty under NEPA to produce an up-to-date environmental impact statement (EIS) assessing federal dam operations.[91] The court concluded that NMFS employed faulty definitions of what constitutes "jeopardy" to protected fish and the "adverse modification" of their critical habitat, as well as for ignoring important factors such as the effects of climate change on future runs.[92]

Judge Simon was particularly skeptical of promises that "off-site mitigation measures," such as habitat restoration and hatchery production, would produce "immediate and substantial" salmon survival benefits, since the federal agencies could not demonstrate that the mitigation efforts were "reasonably certain to occur."[93] The repeated failure of the earlier BiOps to satisfy the statute was also a significant factor in the court's unwillingness to defer to agency claims about the effectiveness of planned mitigation.[94] In short, the track record of the federal dam operators caught up to them. The court also broke new ground by expressing doubt

85. Endangered Species Act of 1973, 16 U.S.C. § 1537 (§ 7, authorizing a federal consultation process, including biological opinions by federal consulting agencies); *Id.* § 1538 (§ 9, prohibiting takes of listed species without federal permission).

86. *Id.*

87. A federal district court as well as the Ninth Circuit upheld NMFS' 1995 BiOp; *see* Am. Rivers v. Nat'l Marine Fisheries Serv., No. Civ. 96–384–MA, 1997 WL 33797790, at *1, *14 (D. Or. Apr. 3, 1997), *aff'd*, No. 97-36159 (9th Cir., Mar. 8, 1999).

88. Idaho Dep't of Fish & Game v. Nat'l Marine Fisheries Serv., 850 F.Supp. 886, 900 (D. Or. 1994).

89. For a discussion of the hydroelectric system BiOps between 1993-2008, including six that failed to satisfy the ESA, see Michael C. Blumm et al., *Still Crying Out For a "Major Overhaul" After All These Years—Salmon and Another Failed Biological Opinion on Columbia Basin Hydroelectric Operations*, 47 ENV'T L. 287, 293–302 (2017) [hereinafter *Still Crying Out*].

90. Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 184 F.Supp.3d 937 (D. Or. 2016); *See* PACIFIC SALMON LAW, *supra* note 1, at 99–103 (discussing the Simon opinion and its results).

91. PACIFIC SALMON LAW, *supra* note 1, at 99–103.

92. Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 184 F.Supp.3d at 875 (finding that although NMFS applied an incorrect standard to the adverse modification inquiry, that error was harmless); *Id.* at 872 (raising issue with NMFS's "trending towards recovery" standard for failing to account for "whether a population is at precariously low level of abundance"); *Id.* at 874 (finding that NMFS's climate change considerations inadequate).

93. Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 184 F.Supp.3d at 876, 903–04, 949.

94. *See Still Crying Out*, *supra* note 89, at 328–29 (noting that the 2014 BiOp deviated from the recommendations of a number of advisory committees).

that the EIS ordered by the opinion would pass legal muster unless it examined as one of its alternatives the removal of the four federal dams on the lower Snake River.[95]

A year after his 2016 decision rejecting the latest BiOp, Judge Simon provided the most significant court-ordered relief for Columbia Basin salmon affected by hydroelectric operations since their ESA listings. Simon ordered federal project operators to substantially increase the amount of water routed around the dams' power turbines and instead through the spillways at the dams in order to improve survival of juvenile salmonids migrating downstream.[96] In his order, the judge declared that he was unwilling to continue to give judicial imprimatur to federal efforts to "kick the can down the road," while delaying changes to the operational status quo.[97]

Salmon advocates have also used the ESA in an effort to stem harmful urban and suburban development within floodplains, which make up much of salmon habitat in the Northwest. In 2004, a federal district court in Washington agreed with environmental plaintiffs that the Federal Emergency Management Agency (FEMA) had violated the ESA by failing to complete section 7(a)(2) consultation under the ESA regarding the effects of FEMA's implementation of the National Flood Insurance Program on listed salmon.[98] The court determined that "FEMA's promulgation of minimum eligibility criteria and its sale of flood insurance both enable development in the floodplain that negatively impacts salmon."[99] FEMA and NMFS ultimately created an implementation strategy that failed to satisfy the plaintiffs' concerns—but which passed muster in court.[100] Other salmon advocates, however, have made similar arguments to force FEMA to initiate section 7(a)(2) consultation on its implementation of the flood insurance program in Oregon.

In 2016, NMFS issued a biological opinion concluding that FEMA's actions jeopardized the continued existence of all listed salmon in Oregon, as well as destroyed or adversely modified these ESUs' designated critical habitat.[101] The

95. *See id.* at 318–23. In the ensuing EIS, the federal agencies rejected an environmentally preferred alternative that would have produced substantial operational changes in favor of largely continued the operational status quo on socio-economic grounds. *See* Record of Decision; Columbia River System Operations Environmental Impact Statement, 85 Fed. Reg. 63834 (Oct. 8, 2020). Earlier, speaking extrajudicially, retired Judge James Redden—Judge Simon's predecessor—called for breaching the lower Snake River dams. *See* Scott Learn, *Judge James Redden: 'We Need to Take Those (Snake River) Dams Down'*, OREGONIAN (Apr. 25, 2012), https://www.oregonlive.com/environment/2012/04/judge_james_redden_we_need_to.html.

96. *See Still Crying Out*, *supra* note 89, at 324–26 (discussing Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., No. 3:01-cv-o640-SI, 2017 WL 1289588 (D. Or., Apr. 3, 2017).

97. *See id.* at 326 (quoting Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 2017 WL 1289588 at *8). The Ninth Circuit upheld Judge Simon's injunction with unusual speed, Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Service, 524 F.3d 917 (9th Cir. 2018). *See Fighting Over Spills*, *supra* note 78, at 9.

98. Nat'l Wildlife Fed'n v. FEMA, 345 F. Supp. 2d 1151, 1163 (W.D. Wash. 2004).

99. *Id.* at 1164.

100. *See* Nat'l Wildlife Fed'n v. FEMA, 2014 WL 5449859 at *21 (W.D. Wash. 2014).

101. *See* NATL MARINE FISHERIES SERV., WEST COAST REGION, ENDANGERED SPECIES ACT (ESA) SECTION 7(A)(2) JEOPARDY AND DESTRUCTION OR ADVERSE MODIFICATION OF CRITICAL HABITAT BIOLOGICAL OPINION AND SECTION 7(A)(2) "NOT LIKELY TO ADVERSELY AFFECT" DETERMINATION FOR

biological opinion established extensive requirements for FEMA to take actions to improve protect salmon and their habitat, such as improving minimum floodplain protection criteria that local jurisdictions must include in their land use laws to be eligible for federal flood insurance and updating floodway maps to account for climate change.[102] The BiOp also included several "interim" measures to protect salmon while FEMA and local communities work to implement the BiOp's broader measures.[103] However, political intervention and bureaucratic foot-dragging,[104] including FEMA's decision to prepare a full EIS examining the economic effects of measures to better protect salmon and their habitat,[105] have thus far stalled any meaningful actions to stem ongoing federal subsidies for floodplain development in Oregon.[106]

D. The Clean Water Act

The Clean Water Act has not been at the center of salmon saving over the last half-century, but that is starting to change. The modern Clean Water Act appeared in 1972 and called for restoring and maintaining "the chemical, physical, and biological integrity of the Nation's waters."[107] The Act required all "point source discharges" (from discrete conveyances like pipes) into "waters of the U.S." to obtain a permit.[108] The permit system has made substantial progress in cleaning up waterways affecting by point source dischargers, but more than half of the nation's pollutant loadings are from nonpoint sources, which the federal law only indirectly regulates.[109]

Most pollution from dam operations, including heat, was exempted from federal permit requirements by the Environmental Protection Agency over a half-century ago, an exemption that survived judicial review.[110] However, the Clean

THE IMPLEMENTATION OF THE NATIONAL FLOOD INSURANCE PROGRAM IN THE STATE OF OREGON 273 (2016), https://www.fisheries.noaa.gov/resource/document/biological-opinion-implementation-national-flood-insurance-program-state-oregon (biological opinion dated April 14, 2016).

102. *See id.* at 324–25 (setting forth the terms and conditions that FEMA must abide by).

103. *Id.* at 278–80.

104. *See* Will Chappell, *Proposed FEMA Flood Insurance Updates Met With Harsh Criticism*, TILAMOOK HEADLIGHT HERALD (Apr. 10, 2023), https://www.tillamookheadlightherald.com/news/proposed-fema-flood-insurance-updates-met-with-harsh-criticism/article_e1ca1c5e-d55f-11ed-a6b2-b393536ada70.html (noting that Oregon House Rep. Peter DeFazio delayed FEMA's compliance with the BiOp's interim measures for three years).

105. *See National Flood Insurance Program – Endangered Species Act integration in Oregon*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/about/organization/region-10/oregon/nfip-esa-integration (last visited July 13, 2023) (discussing FEMA's EIS process).

106. *See, e.g.*, Press Release, Lawsuit Launched to Protect Oregon's Salmon, Orcas From Irresponsible Floodplain Development (June 28, 2023), https://biologicaldiversity.org/w/news/press-releases/lawsuit-launched-to-protect-oregons-salmon-orcas-from-irresponsible-floodplain-development-2023-06-28/.

107. 33 U.S.C. § 1251(a); *See generally* PACIFIC SALMON LAW, *supra* note 1, at 105–15.

108. 33 U.S.C. § 1342.

109. *See* William L. Andreen, *Success and Backlash: The Remarkable (Continuing) Story of the Clean Water Act*, 4 J. ENERGY & ENV'T L. 25, 28–30 (2013) (surveying the improvements of U.S. water quality since the enactment of the Clean Water Act).

110. The D.C. Circuit affirmed EPA's exemption for dam operations in Nat'l Wildlife Fed'n v. Gorsuch, 693 F.2d 156 (D.C. Cir. 1982), discussed in PACIFIC SALMON LAW, *supra* note 1, at 106–07.

Water Act does require setting ambient water quality standards for waterways "to protect the public health or welfare" and safeguard the propagation of fish and wildlife.[111] These ambient standards account for both point and nonpoint pollution, but their effect on the latter is indirect and complex. This cumbersome mechanism first requires identifying waterway segments that do not meet the standards; then, for these "impaired waters," states must set "total maximum daily loads" (TMDLs), which establish the maximum amount of pollution that each segment can absorb without violating the standards.[112] Once federally approved, TMDLs allocate permissible levels of pollution among specific sources in order to meet applicable water quality standards.[113]

Heat, or temperature pollution, is among the most intractable sources of pollution damaging salmon. Some 281 dams in the Columbia Basin—many creating large, unshaded reservoirs that become heat sinks during the summer—have significantly damaged salmon, most of which cannot effectively migrate at temperatures above 68 degrees F.[114] Oregon and Washington began to consider a TMDL for heat for the Columbia River beginning in the 1990s, and EPA signed a memorandum of agreement with the states anticipating an approved heat TMDL by 2002.[115] Fifteen years of inaction followed, inducing a suit by a coalition of fishing and environmental groups.[116] The reviewing court agreed with the plaintiffs that this long-term inaction imposed a mandatory on EPA to promulgate the TMDL.[117] EPA responded by issuing a TMDL in 2020, noting that water temperatures in the Columbia and Snake Rivers had increased by an average of 2.7 degrees F. since dam construction began.[118]

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111. Section 303 of the Act, 33 U.S.C. § 1313(c)(2)(A), requires states, subject to federal oversight, to establish and periodically upgrade water quality standards. The standards included 1) designated uses, 2) water quality criteria necessary to protect these uses, and 3) an antidegradation policy requiring protection of existing native fish to avoid reproductive impairment of resident species. *See* Dave Owen, *After the TMDLs*, 17 VT. J. ENV'T L. 845, 858 (2016).

112. *See* Owen, *supra* note 111, at 859–60.

113. *Id.*

114. *See* Craig N. Johnston, *Salmon and Water Temperature: Taking Endangered Species Seriously in Establishing Water Quality Standards*, 33 ENV'T L. 151, 153–54 (2003) (explaining the problems heat poses to Columbia River salmon).

115. *See* Michael C. Blumm & Michael Benjamin Smith, *Salmon and the Clean Water Act: An Unfinished Agenda*, 51 Env't L. Rep.10109, 10112 (2021) [hereinafter *Salmon and the CWA*].

116. *See* Columbia Riverkeeper v. Wheeler, 944 F.3d 1204 (9th Cir. 2019).

117. *Id.* at 1211–22 (concluding that a long-term failure of the states to take action constituted a "constructive submission" enabling judicial review).

118. *TMDL for Temperature in the Columbia and Lower Snake Rivers*, U.S. ENV'T PROT. AGENCY, *https://www.epa.gov/columbiariver/tmdl-temperature-columbia-and-lower-snake-rivers* (Jan. 19, 2024). One year later, EPA issued a revised Columbia and Lower Snake Rivers TMDL after soliciting and responding to public comments. ENV'T PROTECTION AGENCY, REGION 10, COLUMBIA AND LOWER SNAKE RIVERS TEMPERATURE TOTAL MAXIMUM DAILY LOAD 2 (2021), https://www.epa.gov/system/files/documents/2022-06/tmdl-columbia-snake-temperature-errata-update-05102022.pdf; *see also* Elizabeth McCormick, *EPA Reissues Temperature TMDL for Columbia and Lower Snake Rivers*, ENV'T L. & POL'Y MONITOR (Oct. 14, 2021), https://www.environmentallawandpolicy.com/2021/10/epa-reissues-temperature-tmdl-for-columbia-and-lower-snake-rivers/ (explaining that the major changes in the revised TMDL included updated tribal water quality standards, removal of references for states to use attainability analyses, and clarification that the target temperatures apply throughout the Columbia and Lower Snake rivers).

The TMDL did not, however, create any enforceable requirements because the dams' operations had been exempted from Clean Water Act pollution discharge permit requirements,[119] which provide the most viable legal path for enforcing requirements of TMDLs.[120] But since some dams routinely discharge hundreds of gallons of hydroelectric turbine oils and lubricants as a result of both their normal operation as well as common leaks and spills, environmentalists filed a series of lawsuits against federal dam operators.[121] Since these pollutants originate outside of the water flowing through the dam, their discharge triggers CWA permit requirements.[122] The federal government therefore agreed in a settlement with the plaintiffs that the Corps would apply for NPDES permits for these discharges.[123] This application in turn triggered state water quality certification requirements under section 401 of the Clean Water Act,[124] thus giving the state of Washington some legal leverage over federal dam operations.

The state proceeded to condition its permits for discharges at eight Columbia Basin dams on compliance with the TMDL for heat, reflecting the importance of the section 401 certification process as a source of state authority to add protective measures to CWA discharge permits.[125] Reluctant to allow the state of Washington to prescribe operating conditions that could limit power production, the Trump administration both filed an administrative appeal of Washington's certification and weakened the CWA regulations themselves to reduce states' section 401 authority to add conditions to federal discharge permits.[126] In the appeal, the Corps of Engineers claimed that the state's conditions conflicted with the Corps' statutory requirement to operate the dams for authorized purposes, which did not include managing for cooler temperatures for salmon migration.[127] The Pollution Control Hearings Board, Washington's administrative law adjudicatory body that

119. *See supra* note 110 and accompanying text; *Salmon and the CWA*, *supra* note 115, at 10113.

120. Were the dam operations not exempted from the Clean Water Act discharge permit requirements, EPA, Oregon, Washington, or private citizens could sue to enforce the permit provisions. *See* 33 U.S.C. § 1319 (EPA enforcement provisions); *also see* 33 U.S.C. § 1365(a)(1) (citizen suit provision).

121. *See* Sebastien Malo, *Lawsuits Says Army Corps Dams Driving Columbia River Pollution 'Crisis'*, REUTERS (Dec. 8, 2021), https://www.reuters.com/legal/litigation/lawsuit-says-army-corps-dams-driving-columbia-river-pollution-crisis-2021-12-08 (discussing Columbia Riverkeeper's 2021 lawsuit against the Corps and mentioning the 2014 settlement of a similar lawsuit Columbia Riverkeeper filed against the Corps).

122. *See Salmon and the CWA*, *supra* note 115, at 10113; *see also* Miles Johnson, *Legal Update: EPA Sets Pollution Limits Lower Snake River Dams*, COLUMBIA RIVERKEEPER (Sept. 30, 2021), https://www.columbiariverkeeper.org/news/2021/9/victory-army-corps-must-control-pollution.

123. Press Release, Columbia Riverkeeper, Army Corps Must Control Pollution (Sept. 30, 2021).

124. *See id*.; *see also* Michael Muskal, *Army Corps of Engineers to Monitor Dam Water Pollution in Northwest*, L.A. TIMES (Aug. 4, 2014), https://www.latimes.com/nation/nationnow/la-na-nn-army-corps-engineers-dam-pollution-20140804-story.html.

125. *See* PACIFIC SALMON LAW, *supra* note 1, at 112; *see also* U.S. Army Corps of Eng'rs, PCHB No. 20-043c, at 7 (2021) (describing the conditions Washington proposed for all eight dams as "largely identical"). For an example of the conditions Washington proposed *see* Dep't of Ecology, Clean Water Act Section 401 Final Certification EPA National Pollutant Discharge Elimination System Permit No. WA0026778, USACE – Bonneville Project (May 7, 2020).

126. *See* PACIFIC SALMON LAW, *supra* note 1, at 112.

127. *See U.S. Army Corps of Engineers v. Washington Department of Ecology* (Wash. Pol. Control Bd. June 8, 2020) (Notice of Appeal).

heard the challenge, rejected the Corps' claims and allowed state certification to proceed.[128]

The effort to impose limitations on states' authority ultimately fared no better. As it has done with many Trump-era environmental rollbacks, the Biden administration moved to reverse the effort to reduce states' authority to impose conditions on discharge permits under 401 of the CWA.[129] EPA also updated its TMDL for temperatures in the Columbia and lower Snake Rivers.[130] As of this writing, EPA has issued CWA discharge permits—which include the conditions imposed by the state—for four of the eight federal dams covered by the settlement agreement.[131]

E. The Federal Power Act

Often overlooked as an environmental statute, the Federal Power Act (FPA) has been in the forefront of the removal of federally licensed dams. The Act requires periodic federal relicensing of hydropower projects, which must include "fishways" that ensure upstream and downstream passage.[132] Approximately 2000 dams have been removed, more than two-thirds of which have been dismantled in the 21st century.[133] The results have included dramatic increases in fish populations.[134]

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128. PCHB, *supra* note 125, at 12.

129. *See* E.A. Crunden, *EPA Bolsters States' Control of Water, Infrastructure Permitting*, E&E NEWS (Sept. 14, 2023), https://www.eenews.net/articles/epa-bolsters-states-control-of-water-infrastructure-permitting/.

130. U.S. Env't Protection Agency, Region 10, *Total Maximum Daily Load for Temperature in the Columbia and Snake Rivers*, https://www.epa.gov/columbiariver/tmdl-temperature-columbia-and-lower-snake-rivers (last update January 27, 2023).

131. *See* State of Washington Department of Ecology, *Clean Water Act: Section 401 Water Quality Certifications*, STATE OF WASH., https://ecology.wa.gov/Regulations-Permits/Permits-certifications/401-Water-quality-certification (last visited July 15, 2023). The Biden administration is working to restore the scope 401 certification regulations that the Trump administration dismantled, enabling states to once again condition projects subject to 401 certification to reduce their overall environmental effects, not merely complying with state water quality standards. *See* Clean Water Act Section 401 Water Quality Certification Improvement Rule, 87 Fed. Reg. 35318 (proposed June 8, 2022) (to be codified at 40 C.F.R. pts. 121, 122 and 124).

132. Federal Power Act (FPA), § 18, 16. U.S.C. § 811; ADAM VANN, CONG. RSCH. SERV., IF11411, THE LEGAL FRAMEWORK OF THE FEDERAL POWER ACT (2020). *See* SACRIFICING THE SALMON, *supra* note 21, at 233–48 (explaining the Federal Power Act's fishery provisions and their effects).

133. *See* AMERICAN RIVERS, THE STATE OF DAM REMOVAL IN THE UNITED STATES 2-3 (Feb. 2022), https://www.americanrivers.org/wp-content/uploads/2023/02/DamList2021_Report_02172022_FINAL3.pdf (more than 1,956 dams have been removed in the U.S., and of those removals, 76% have occurred since July 1999).

134. *See* Christopher M. Tonra, et al., *The rapid return of marine-derived nutrients to a freshwater food web following dam removal*, 192 BIOLOGICAL CONSERVATION 130 (2015) (salmon rapidly returned to the post-dam Elwha River, with 85% of redds located upstream of the dam site one year after dam removal); JOSEPH ANDERSON, ELWHA RIVER WEIR PROJECT: 2013 OPERATIONS AND FINAL SUMMARY REPORT 22 (2015) https://wdfw.wa.gov/sites/default/files/publications/01706/wdfw01706.pdf (in the year following dam removal chinook return rates more than tripled in the Elwha); Sarah Trent, *When Dams Come Down, Fish Come Home*, HIGH COUNTRY NEWS (Nov. 8, 2022), https://www.hcn.org/articles/north-fish-when-dams-come-down-fish-come-home. ("Physical changes, caused by sediment redistribution and water movement, happen very quickly, stabilizing within years rather than decades.

Almost all the dam removals have occurred without congressional intervention; federally licensed dams under the FPA have been especially prominent.[135]

In the Pacific Northwest, dam removals have proceeded with some regularity, if not with alacrity.[136] Some, mostly small, old water supply dams have been removed under directives of state and local governments, but some larger hydroelectric dams have been removed due to the relicensing requirements of the FPA.[137] However, the even larger multi-purpose federal dams have no relicensing requirements; they require congressional approval for their removal.[138]

The biggest recent headlines concern removal of four large FPA-licensed dams on the Klamath River, scheduled for demolition in 2023 and 2024.[139] Dismantling these dams constitutes the largest dam removal in the world and promises considerable restoration of Klamath salmon habitat.[140] This FPA-induced removal should be contrasted with the apparently intractable situation on the lower Snake River, where four economically questionable and environmentally disastrous congressionally approved dams have thus far successfully resisted calls for their removal.[141]

III. RIVER BASIN RESTORATION

The federal law discussed above has materially affected salmon saving on the ground. This section looks at those effects in select river basins, from the Bristol Bay ecosystem in Alaska in the north to the Klamath Basin in Oregon and California in the south. Although Pacific salmon are in trouble throughout, the nature and causes of the threats varies considerably from river basin to river basin.

A. Bristol Bay

Southeast Alaska's Bristol Bay is an exceptionally unspoiled, well-preserved ecosystem with outstanding ecological resources. The watershed is home to the largest sockeye salmon fishery in the world, accounting for approximately 46

Ecological changes manifest at different time scales, but upstream fish migration is one of the first to occur, often within weeks or months.").

135. *See* ANNA E. NORMAND, DAM REMOVAL AND THE FEDERAL ROLE, CONGRESSIONAL RESEARCH SERVICE 4 (Oct. 27, 2021), https://sgp.fas.org/crs/misc/R46946.pdf (only 70 of the dams removed since 1912 were federally owned); *see also id.* at 9 (only dams with specific, congressionally authorized purposes require congressional authorization for removal; otherwise, federal agencies, managing federally owned dams, may exercise their discretion to remove those dams).

136. *See* Michael C. Blumm & Andrew A. Erickson, *Dam Removals in the Pacific Northwest: Lessons For the Nation*, 42 ENV'T L. 1043 (2012) [hereinafter *Dam Removals in the Pacific Northwest*]; and Michael C. Blumm, *Undamming the Pacific Northwest: An Update*, ENV'T L. ONLINE (2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3794819.

137. *See* WATERS AND WATER RIGHTS, at 40–52 (Amy K. Kelly, ed., 3rd ed. 2011).

138. *See* Normand, *supra* note 135, at 9.

139. *See generally* Blumm & Illowsky, *supra* note 33, at 35–45, 49–50.

140. *See id.* at 47–50.

141. For a discussion regarding the most recent proposals to remove the lower Snake dams, *see The Mistake on the Snake*, *supra* note 78, at 19–25, 33–35.

percent of the planet's wild sockeye salmon,[142] and also produces globally significant chinook runs.[143] This pristine resource supports entirely wild and self-sustaining salmon runs, some of the last on the Earth.[144] These runs sustain subsistence lifeways and one of the last salmon-based cultures in the world, including a two billion-dollar commercial fishing industry supplying 15,000 jobs.[145] Although Bristol Bay is a stronghold for wild salmon in Alaska, with salmon returning in increasingly larger numbers, other runs in the state are diminishing, likely due to climate change.[146]

The headwaters of the Nushagak and Kvichak, two rivers that produce approximately half of the Bristol Bay basin's sockeye, is also the site of the proposed Pebble mine, a low-grade copper and gold deposit that has engendered considerable controversy.[147] Mining companies first explored the Pebble deposit in the late 1980s.[148] Until 2005, under the state's Bristol Bay Area Plan,[149] Alaska managed

142. *See About Bristol Bay*, U.S. ENV'T PROTECTION AGENCY, https://www.epa.gov/bristolbay/about-bristol-bay (last visited Mar. 14, 2023).

143. EPA 404(c) Final Determination, *supra* note 13, at ES-1.

144. *Id.* at ES-1.

145. *Id.* at ES-3. The numbers in the text are from 2019, which was the bay's fourth largest sockeye run on record at the time. *See* Laine Welch, *Bristol Bay Sets Record Value for 2019 Salmon Harvest*, NAT'L FISHERMAN (Sept. 24, 2019), https://www.nationalfisherman.com/alaska/bristol-bay-sets-record-value-for-2019-salmon-harvest.

146. The 2022 season established the new record with nearly 80 million sockeye returning to Bristol Bay. ALASKA DEPT. OF FISH & GAME, 2022 BRISTOL BAY SEASON SUMMARY at 1 (2022) (recording 79 million sockeye). These results continue an 8-year streak of sockeye runs in Bristol Bay exceeding 50 million fish annually. *Id.*; ALASKA DEPT. OF FISH & GAME, 2015 BRISTOL BAY SEASON SUMMARY at 1 (2015) (recording 58 million sockeye); ALASKA DEPT. OF FISH & GAME, 2016 BRISTOL BAY SEASON SUMMARY at 1 (2016) (recording 51.4 million sockeye); ALASKA DEPT. OF FISH & GAME, 2017 BRISTOL BAY AREA ANNUAL MANAGEMENT REPORT at 1 (2017) (recording 57.6 million sockeye); ALASKA DEPT. OF FISH & GAME, 2018 BRISTOL BAY SEASON SUMMARY at 1 (2018) (recording 62.3 million sockeye); ALASKA DEPT. OF FISH & GAME, 2019 BRISTOL BAY SEASON SUMMARY at 1 (2019) (recording 56.5 million sockeye); ALASKA DEPT. OF FISH & GAME, 2020 BRISTOL BAY AREA ANNUAL MANAGEMENT REPORT at 1 (2020) (recording 58.3 million sockeye); ALASKA DEPT. OF FISH & GAME, 2021 BRISTOL BAY SEASON SUMMARY at 1 (2021) (recording 66.1 million sockeye). However, other parts of the state are seeing decreased salmon returns. For example, further south, the Gulf of Alaska is slightly warmer than Bristol Bay, and that small difference in water temperature may be negatively affecting salmon in that region. *See* Stephanie Maltarich, *Why is Bristol Bay's Sockeye Run Breaking Records While Other Areas Struggle?*, ALASKA PUB. MEDIA (Aug. 15, 2021), https://alaskapublic.org/2021/08/15/why-bristol-bays-sockeye-run-is-breaking-records-while-other-areas-struggle/.

147. *See About Bristol Bay*, *supra* note 142; and STUART LEVIT & DAVID CHAMBERS, COMPARISON OF THE PEBBLE MINE WITH OTHER ALASKA LARGE HARD ROCK MINES, CTR. FOR SCI. IN PUB. PARTICIPATION 1 (2012), https://ordspub.epa.gov/ords/eims/eimscomm.getfile?p_*download*_id=513582.

148. EPA 404(c) Final Determination, *supra* note 13, at 2–8. The grade of an ore refers to the concentration of mineable metals in that ore. A DICTIONARY OF GEOLOGY AND EARTH SCIENCES 225 (Michael Allaby ed., Oxford University Press 4th ed. 2013). Thus, a low-grade ore contains a lower quantity or purity of mineable minerals, requiring greater excavation and processing than a higher-grade ore.

149. Alaska law requires the Alaska Department of Natural Resources (DNR) Commissioner "adopt, maintain, and when appropriate, revise regional land use plans that provide for the management and use of state-owned land." ALASKA STAT. § 38.04.065 (2023). The Bristol Bay Area Plan implemented the statute by designating uses for all state lands within the Bristol Bay area and directing how the Alaska DNR must manage those lands. *See* Alaska Dep't of Nat. Res., Bristol Bay Area Plan for State Lands 1-5 (Sept. 2013) [hereinafter Bristol Bay Area Plan]. The plan gives designated primary uses priority over all

lands within this watershed primarily for fishing; that year, however, Governor Frank Murkowski (R-AK) modified the plan, establishing mining as the priority resource in the watershed.[150]

But actual mining required a federal permit under section 404 of the Clean Water Act because the project would involve filling numerous acres of wetlands.[151] In 2004, after nearly twenty years of exploration, North Star Dynasty—the company with state mining claims to the deposit[152]—sought a 404 permit from Army Corps to fill wetlands in connection with the proposed mine.[153] If built, the mine would be one of the world's largest.[154]

EPA determined that the proposed mine would cause direct irreparable harm to a pristine ecosystem;[155] moreover, accidents associated with mining operations could cause even wider catastrophic harm to the Bristol Bay watershed.[156]

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other uses. *Id.* at 2-2. Under the original 1984 plan, fish and wildlife habitat and harvest were the primary uses for all management units within the Bristol Bay area. *See* EPA 404(c) Final Determination, *supra* note 13, at 2-8. However, the current plan elevates mining as the primary use for state land containing the Pebble deposit. Bristol Bay Area Plan, *supra*, at 3-106.

150. *See* Brett Veerhusen, *How Alaska's Proposed Pebble Mine Conflict Could Shape Future Arctic Mineral Development*, THE ARCTIC INST. (Feb. 1, 2016), https://www.thearcticinstitute.org/how-alaskas-proposed-pebble-mine-conflict-could-shape-future-arctic-mineral-development/.

151. Section 404 of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the U.S. without a permit. 33 U.S.C. § 1344 (2023). Although the Army Corps issues 404 permits, *id.*, EPA regulations govern permit issuance (the so-called section 401(b)(1) guidelines), and section 404(c) authorizes EPA to veto Corps permits if proposed discharges would have an unacceptable effect to municipal water supplies, shellfish beds and fisheries, wildlife habitat, or recreation areas. *Id.* §§ 1344(b)(l) & (c). Given current mining technologies and the high density of water resources in the area, EPA anticipated that the Pebble project would include discharge of dredged or fill materials into waters of the U.S., requiring section 404 permit. *See* EPA 404(c) Final Determination, *supra* note 13, at ES-5. How the Supreme Court's substantial rollback in 404 jurisdiction worked by Sackett v. Env't Protection Agency, 598 U.S. 651 (2023), will affect EPA's 404(c) determination is unclear. Litigation is likely. Earthjustice estimates that nationally *the Sackett* decision will result in the deregulation of nearly 118 million acres of wetlands, an area larger than California. *See* Timothy Puko & Robert Barnes, *How Supreme Court's EPA Ruling Will Affect U.S. Wetlands, Clean Eater*, WASH. POST (May 25, 2023), https://www.washingtonpost.com/climate-environment/2023/05/25/supreme-court-epa-wetlands/#.

152. *See* AUSENCO ENGINEERING CANADA, PEBBLE PROJECT PRELIMINARY ECONOMIC ASSESSMENT NI 43-101TECHNICAL REPORT UPDATE 72 (Oct. 1, 2022), [hereinafter Pebble Project Preliminary Economic Assessment] (explaining that North Dynasty holds a 100% interest in the state mining claims of the Pebble deposit).

153. EPA 404(c) Final Determination, *supra* note 13, at 2–8. These meetings began in 2004. *Id.*

154. *The Pebble Proposal*, SAVE BRISTOL BAY, https://www.savebristolbay.org/pebbleproposal (last visited Mar. 28, 2023). North Star Dynasty estimates the proposed mine would produce 6.4 billion pounds of copper, 462,500 pounds of gold, 300 million pounds of molybdenum, and 2.3 million pounds of silver. Pebble Project Preliminary Economic Assessment, *supra* note 152, at 333.

155. EPA 404(c) Final Determination, *supra* note 13, at 3-1.

156. Depending on the size of the mine's footprint, it would destroy 1,300 to 5,350 acres of wetlands, ponds and lakes, and 24 to 94 miles of salmon-supporting streams. *Frequently Asked Questions About Bristol Bay Assessment*, U.S. ENV'T PROTECTION AGENCY, https://www.epa.gov/bristolbay/frequently-asked-questions-about-bristol-bay-assessment (Feb. 23, 2023). According to EPA, the mine would alter streamflows in 9 to 33 miles of salmon-supporting streams, likely affecting ecosystem structure and function. *Id.* Additionally, the mine's waste and wastewater management facility would create adverse direct and indirect effects to fish habitat in an estimated 13 to 51 stream miles. *Id.* Accidents and failures could occur within the mine's wastewater treatment plant, as well as along the transportation corridor, and

As the prospect of the mining project obtaining a permit became more of a reality, six federally recognized Bristol Bay Alaskan native tribal governments asked EPA to use its 404(c) authority and preemptively deny the permit.[157]

Section 404(c) gives EPA the discretion to veto a dredge or fill permit issued by the Corps if the discharge would likely result in an unacceptable effect to municipal water supplies, shellfish beds and fisheries, wildlife habitat, or recreation areas.[158] In January 2023, EPA rejected the Pebble permit after determining the adverse effects and losses to aquatic resources that support salmon in the Bristol Bay watershed were unacceptable.[159] This rarely used 404(c) veto prevented the Corps from issuing a permit.[160]

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even a partial accidental release of the mine's tailings in storage could catastrophically affect the fishery. *Id.*

157. *See* EPA 404(c) Final Determination, *supra* note 13, at 2–9.

158. 33 U.S.C. § 1344(c).

159. *See* EPA 404(c) Final Determination, *supra* note 13, at ES-22; Native American Indian Rights Fund, *Pebble Mine is Stopped*, 48 NATIVE AM. RIGHTS FUND LEGAL REV. L. 1 (2023). The 404(c) deliberations were procedurally complex. The final determination came nearly nine years after EPA issued its first proposed 404(c) determination in January 2014. *Bristol Bay 404(c) Timeline*, U.S. ENV'T PROTECTION AGENCY, https://www.epa.gov/bristolbay/bristol-bay-404c-timeline (Jan. 24, 2024). Pebble Limited Partnership (PLP), a subsidiary of Northern Dynasty Minerals Ltd., challenged this determination, and in 2017 EPA settled with PLP and withdrew its proposed 404(c) determination. EPA 404(c) Final Determination, *supra* note 13, at 2-14.

Following EPA's 2017 withdrawal of its 404(c) decision, the Army Corps reviewed Pebble's application and proceeded to deny the 404 permit in August 2020 because the project would likely result in significant environmental degradation, and the proposed mitigation was inadequate to offset those negative effects. U.S. Army Public Affairs, *Army finds Pebble Mine project cannot be permitted as proposed*, U.S. ARMY (Aug. 24, 2020) https://www.army.mil/article/238426/army_finds_pebble_mine_project_cannot_be_permitted_as_proposed. Twenty tribal, environmental, and conservation groups challenged EPA's withdrawal, alleging that the action was not supported by the record. Proposed Determination to Restrict the Use of an Area and Disposal Site; Pebble Deposit Area, 86 Fed. Reg. 66548–49 (Nov. 23, 2021). The federal District Court of Alaska dismissed the suit on grounds that the court lacked a meaningful legal standard to review EPA's withdrawal decision. Bristol Bay Econ. Dev. Corp. v. Hladick, 454 F.Supp.3d 892, 909-910 (D. Alaska 2020). In a 2-1 decision, the Ninth Circuit reversed the lower court's decision, concluding that the action was reviewable under 40 CFR § 231.5(a). Trout Unlimited et al. v. Pirzadeh et al., 1 F.4th 738, 744 (9th Cir. 2021). That regulation authorizes EPA to withdraw a proposed determination "*only* if the discharge of materials would be unlikely to have an unacceptable adverse effect." *Id.* at 757. The Ninth Circuit remanded the case to the district court to determine whether EPA had satisfied that regulatory burden. *Id.* at 760. Following that decision, EPA reinstated its 404(c) determination, and in October 2021, EPA asked the District Court to vacate its earlier withdrawal determination. U.S. ENV'T PROTECTION AGENCY, *supra*. The Alaska District Court granted EPA's motion without analysis. *Id.*

160. EPA used the 404(c) vetoes only 14 times in the first 50 years of the Clean Water Act. *See* Michael C. Blumm & Elisabeth Mering, *Vetoing Wetland Permits Under Section 404(c) of the Clean Water Act: A History of Inter-Federal Agency Controversy and Reform*, 33 UCLA J. ENV'T L. & POL'Y 215, 243-245 (2015) (reviewing the 404(c) vetoes). On July 26, 2023, Alaska filed a complaint seeking original jurisdiction before the U.S. Supreme Court. Press Release, Alaska Takes 404(c) Fight Directly to Supreme Court (July 26, 2023) (on file with the Alaska Department of Law). The state alleged that the U.S. breached a contract with Alaska, violated the Administrative Procedure Act (APA), depriving the state of property without just compensation. Complaint at 3, 36–38, Alaska v. U.S. et al., 144 S.Ct. 546 2024) (No. 22O157).

Under the 1958 Alaska Statehood Act, land grants to Alaska "shall include mineral deposits," and "[m]ineral deposits in such lands shall be subject to lease by the State as the State legislature may direct."

Advocates for protecting Bristol Bay have sought other forms of protection for the area. For example, Alaskans passed a ballot measure in 2014 that requires large mining projects within the Bristol Bay watershed to first obtain state legislative approval.[161] At the federal level, the United Tribes of Bristol Bay aim to bolster the 404(c) determination with congressional legislation establishing the bay as a national fisheries area, inspired by the Magnuson-Stevens Fishery Conservation and

Alaska Statehood Act, Pub. L. No. 85-508, § 6(a)–(b)(i), 72 Stat. 339, 33-34, 38 (1958). In 1976, the state, the U.S., and the Cook Inlet Alaska Native Corporation agreed to the largest land swap in U.S. history. Complaint, *supra*, at 1(unsure whether supra is proper for case filing). Alaska asserted that the lands transferred to Alaska during this swap were subject to the limitations imposed by the Statehood Act. *Id.* at 37. According to the state, the federal government breached an apparently implicit condition of the exchange agreement when EPA exercised the 404(c) veto blocking the Pebble Mine. *Id.* The state also alleged that EPA violated the APA by the Statehood Act. *Id.* at 38. Alaska also charged that the federal government engaged in an unconstitutional taking in denying the 404 permit. *Id.* at 39. The takings claim was the subject of a letter from Alaska's governor, Mike Dunleavy, to EPA Administrator Casey Sixkiller. onLetter from Governor of Alaska to Casey Sixkiller, Reg'l Adm'r, Env't Protection Agency- Region 10, May 26, 2022 Proposed Determination of EPA Region 10 Pursuant to Section 404(c) of the CWA Pebble Deposit Area, Southwest Alaska (87 FR 39091); Dkt. # EPA-R10-OW-2022-0418, (Sept. 6, 2022), https://s3.documentcloud.org/documents/23179462/goa-september-letters-11-13.pdf (in which Gov. Dunleavy claimed that the 404(c) determination was a regulatory taking "[for] which compensation, in the billions, is due").

As of this writing, Pebble Limited Partnership had yet to appeal EPA's decision, but its comments to EPA suggest some potential grounds for appeal. *See* Letter from Patricia Palacios & Cynthia L. Taub, Couns. to Pebble Ltd. P'ship to Michelle Pirzadeh, Acting Region 10 EPA Adm'r, (Mar. 28, 2022), https://www.epa.gov/system/files/documents/2022-03/bristol-bay-404-response-letter-plp-3-28-2022.pdf (claiming that (1) the project size is much smaller than the project size assumed by EPA; (2) EPA's authority under 404(c) is narrow and does not authorize watershed-based decisions; (3) the alleged adverse effects on fish are unsupported; and (4) the 404(c) permit denial violates the Alaska Native Claims Settlement Act (ANCSA) and the Alaska National Interest Land Claims Act (ANILCA)); *see also Frequently Asked Questions About Bristol Bay Assessment*, *supra* note 156 (in which EPA explained that the size scenarios for mining were based on industry standards for porphyry copper mining and the specific information provided by the project's proponents).

A legal challenge to EPA's 404(c) veto is likely to generate considerable opposition, as the mine is opposed by a two-to-one margin of Alaskans and by major environmental organizations). *Alaska Voters Strongly Oppose Pebble Mine and Would Support an EPA Veto*, DAVID BINDER RSCH. (2020), https://stoppebbleminenow.org/wp-content/uploads/2020/07/BBDF_PollingMemo.pdf; *See, e.g.*, *Sierra Club Welcomes EPA's Final Determination Protecting Bristol Bay from Pebble Mine*, SIERRA CLUB (Jan. 31, 2023), https://www.sierraclub.org/press-releases/2023/01/sierra-club-welcomes-epa-s-final-determination-protecting-bristol-bay-pebble; *Crushing Alaska's Pebble Mine*, NAT. RES. DEF. COUNCIL (Feb. 13, 2023), https://www.nrdc.org/stop-pebble-mine-save-bristol-bay; *A Huge Win for Alaska's Salmon: EPA Says No to Pebble Mine in Bristol Bay*, EARTHJUSTICE (Jan. 31, 2023), https://earthjustice.org/brief/2023/a-huge-win-for-alaskas-salmon-epa-says-no-to-pebble-mine-in-bristol-bay.

161. *See Ballot Measure 4*, STATE OF ALASKA DIV. OF ELECTIONS, https://www.elections.alaska.gov/petitions/07WTR3/07WTR3-Statement-in-Support.pdf (last visited Mar. 27, 2013); Michael Armstrong, *Alaskans Say 'Yes' at the Polls; All Three Ballot Measures Pass*, HOMER NEWS (Nov. 5, 2014), https://www.homernews.com/news/alaskans-say-yes-at-the-polls-all-three-ballot-measures-pass/.

Management Act.[162] Such a designation would extend protections similar to those of the 404(c) restriction to all nine major rivers within the bay's watershed.[163]

Conservation easements provide another route for protection. In December 2022, the Pedro Bay Corporation, an Alaskan Native corporation owning land in the region, sold 44,000 acres in watersheds on the northeast end of Lake Iliamna to the Conservation Fund, which placed the area in trust under a conservation easement.[164]

In recent years, sockeye returns in Bristol Bay have set state records. The 2022 run established a new record with nearly 70 million sockeye returning to the bay, surpassing the prior record established in 2021 by two million fish.[165] However, chinook runs have dwindled; in November 2022, the Alaska Department of Fish and Game designated one of the Bristol Bay chinook populations as a stock of concern.[166] Chum salmon have also been performing poorly, with escapement totals falling well below the lower limit for sustainable escapement.[167] Although pink salmon were abundant in Bristol Bay in 2022, recent harvests indicate that pink salmon may be in decline as well.[168] Coho salmon harvests vary annually; in 2022, harvests were below average.[169]

Elsewhere throughout the state, runs have been in decline. Over the past few years, chinook and chum runs on the Yukon River have collapsed, forcing U.S.

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162. *See* Ashley Braun, *Alaskans Pursue Permanent Protections for Bristol Bay*, HIGH COUNTRY NEWS (Feb. 16, 2021), https://www.hcn.org/articles/mining-alaskans-pursue-permanent-protections-for-bristol-bay.

163. *Id.* Although fuzzy on the details, Lisa Murkowski, Alaska's longest-serving senator, has endorsed permanent legislative protections for the region. Alex DeMarban, *Murkowski Denounces Pebble Mine at AFN and Says She Will Take Additional Steps to Protect Bristol Bay*, ANCHORAGE DAILY NEWS (Oct. 16, 2020), https://www.adn.com/business-economy/2020/10/15/murkowski-denounces-pebble-mine-at-afn-and-says-she-will-take-additional-steps-to-protect-bristol-bay/; *See also* Isabelle Ross, *On Dillingham Trip, Murkowski Pushes Permanent Protections for Bristol Bay*, ALASKA PUB. MEDIA (June 7, 2021), https://alaskapublic.org/2021/06/07/on-dillingham-trip-murkowski-pushes-permanent-protections-for-bristol-bay/.

164. *See Over 44,000 Acres of Critical Bristol Bay Habitat Permanently Protected*, THE CONSERVATION FUND (Dec. 22, 2022), https://www.conservationfund.org/impact/press-releases/2782-critical-bristol-bay-habitat-protected-in-alaska. Although the Pedro Bay Corporation retains ownership of those 44,000 acres, the conservation easements are held by the Bristol Bay Heritage Land Trust. *Id.* This sale includes land along the mine's proposed transportation route and protects the most productive and intact sockeye spawning and rearing habitats in the Lake Iliamna watershed, situated northwest of Bristol Bay and whose waters drain into the bay. *Id.*

165. Izzy Ross, *Bristol Bay's Sockeye Run of 69.7 Million Fish is the Biggest on Record*, KDLG 670AM (July 15, 2022), https://www.kdlg.org/fisheries/2022-07-15/bristol-bays-sockeye-run-of-69-7-million-fish-is-the-biggest-on-record.

166. Izzy Ross, *Nushagak King Salmon Are Now a Stock of Concern, Which Could Mean Big Changes for the Fishery*, KDLG 670AM (Nov. 22, 2022,), https://www.kdlg.org/fisheries/2022-11-22/nushagak-king-salmon-are-now-a-stock-of-concern-which-could-mean-big-changes-for-the-fishery.

167. ALASKA DEP'T OF FISH & GAME, 2022 BRISTOL BAY SALMON SEASON SUMMARY 2 (Sept. 2022).

168. *Id.*; ALASKA DEP'T OF FISH & GAME, 2020 BRISTOL BAY AREA ANNUAL MANAGEMENT REPORT 6 (June 2021) (the bay-wide pink salmon harvest was 72,000, seven times below the 20-year average of 510,000 fish); ALASKA DEP'T OF FISH & GAME, 2018 BRISTOL BAY SALMON SEASON SUMMARY 4 (Sept. 2018) (the harvest of pink salmon was 55% below the twenty-year average in 2018).

169. 2022 BRISTOL BAY SEASON SUMMARY, *supra* note 146, at 2 (2022) (in the Nushagak District, the bay's largest of coho salmon-producing district, 2022 harvests were approximately three times below average, with 1,789 fish harvested compared to a 20-year average of 5,138).

and Canadian managers to shut down those fisheries.[170] This crash, likely due to warming seas, has had a profound effect on Indigenous communities.[171] The situation is so dire that it has initiated a bi-national conversation to consider introducing hatchery production on the Yukon.[172]

B. Puget Sound

Puget Sound's unique geography makes it the second largest estuary in surface area in the U.S., but by far the largest in water volume.[173] This fjord-estuary encompasses an area of over 13,000 square miles, receiving an inflow of 41,000 cubic feet per second from rivers and streams.[174] Prior to white settlement, annual salmon run sizes in Puget Sound tributaries are estimated to have been between 13 and 27 million fish.[175]

Puget Sound salmon harvests were the subject of Judge George Boldt's historic 1974 treaty rights decision allocating half the salmon harvests to tribes who signed treaties in the 1850s promising them a "right of taking fish . . . in common with" the incoming white settlers.[176] The Supreme Court largely affirmed Judge Boldt five years later.[177] That decision, however, did not address the tribes' other claims: 1) that hatchery fish were not excluded from the 50/50 sharing, and 2) that the treaties aimed to ensure that there was suitable habitat to protect sustainable

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170. Nathaniel Herz, *Fish Hatcheries, Long Seen as a Last Resort, Get a New Look Amid Yukon River Salmon Crisis*, N. J. (Apr. 7, 2023), https://northernjournal.substack.com/p/fish-hatcheries-long-seen-as-a-last. In 2021, 154,000 summer chum were recorded in the Yukon River, drastically below their 1.6 million historical median. *Id.* The following year, summer chum in the Yukon increased to 464,000. *Id.* Yukon River chinook have been in decline for more than a decade; current run sizes are roughly 10% of what they were two decades ago. *Id.*

171. *See What's Behind Chinook and Chum Salmon Declines in Alaska?*, NAT'L OCEANIC & ATMOSPHERIC AGENCY FISHERIES (Aug. 23, 2022), https://www.fisheries.noaa.gov/feature-story/whats-behind-chinook-and-chum-salmon-declines-alaska (poor diet and changes in metabolism in young salmon, due to warming oceans, are the dominant culprits for chum and chinook declines, whereas bycatch contributes is a very minor factor). *See, e.g.*, Bathsheba Demuth & Olivia Ebertz, *Yukon Salmon Populations Are Falling. The Cultural Damage is Vast.*, WASH. POST (Sept. 15, 2022), https://www.washingtonpost.com/outlook/2022/09/15/alaska-salmon-climate-change-indigenous-communities/ (discussing the ramifications of salmon collapse for Indigenous communities along the Yukon River).

172. *See* Herz, *supra* note 170. Participants have approached these discussions cautiously, acknowledging the controversial nature of hatcheries. *Id.* The Dunleavy administration requested that Senator Lisa Murkowski (R-Alaska) secure federal funding for Yukon River hatcheries and hatchery-related research. *Id.* Currently, one small hatchery exists on the Yukon River in Whitehorse in Canada's Yukon Territory, mitigation for a hydroelectric project. *Id.*

173. *Coastal Habitats in Puget Sound*, USGS, https://www.usgs.gov/centers/pcmsc/science/coastal-habitats-puget-sound (last visited June 3, 2023); *Puget Sound's Physical Environment*, ENCYCLOPEDIA OF PUGET SOUND, https://www.eopugetsound.org/articles/puget-sounds-physical-environment (last visited June 3, 2023).

174. *Puget Sound's physical environment*, ENCYCLOPEDIA OF PUGET SOUND, https://www.eopugetsound.org/articles/puget-sounds-physical-environment (last visited June 3, 2023).

175. Ted Gresh et al., *An Estimation of Historic and Current Levels of Salmon Production in the Northeast Pacific Ecosystem: Evidence of a Nutrient Deficit in the Freshwater Systems of the Pacific Northwest*, 25 AM. FISHERIES SOC'Y 15, 18 tbl.5 (2000).

176. U.S. v. Wash., 384 F.Supp. 312 (W.D. 1974), *aff'd.* 443 U.S. 658 (1979).

177. Wash. V. Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979); *discussed in* PACIFIC SALMON LAW, *supra* note 1, at 45–47; SACRIFICING THE SALMON, *supra* note 21, at 82.

harvests to sustain tribal livelihoods.[178] The courts quickly upheld held the tribes on the hatchery issue,[179] but the habitat issue proved more problematic: the 1980 district court's decision's decision in favor of the tribes was vacated by an en banc Ninth Circuit in 1985 as imprudent absent a specific factual situation illustrating habitat degradation.[180] The upshot was more than two decades of delay.

While the habitat issue was in abeyance, salmon habitat was improved through the political process, when Congress—after over two decades of wrangling[181]—approved removal of two dams on the Elwha River, one of which was the only dam inundating national park lands in the country.[182] The dams were removed during 2012-14, and the results have been a substantial restoration of Elwha River salmon.[183] Elwha dam removal marked the beginning of a dam removal era in the Pacific Northwest.[184]

More habitat protection and restoration was promised in 2007, when over three decades after Judge Boldt's historical equal sharing decision, a successor, Judge Ricardo Martinez, finally ruled that the 19th century treaties did in fact include a promise of habitat protection from state road culverts which blocked fish passage.[185] After protracted negotiations over how to remedy the treaty violation failed, Judge Martinez issued a complex injunction requiring the state, among other things, to repair hundreds of barrier culverts by 2030.[186] The Ninth Circuit affirmed in 2017,[187] as did a divided Supreme Court that split 4-4 without issuing an

178. *See* Passenger Fishing Vessel Ass'n, 443 U.S. at 688 n.30.

179. U.S. v. Wash., 506 F.Supp. 187 (W.D. Wash. 1980), *aff'd in part, rev'd in part*, 694 F.2d 1374 (9th Cir. 1982), *on reh'g*, 759 F.2d 1353 (9th Cir. 1985*)* (en banc).

180. U.S. v. Wash., 759 F.2d 1353 (9th Cir. 1985*)* (en banc).

181. The details are explained in *Dam Removals in the Pacific Northwest*, *supra* note 136, at 1053–57.

182. *See id.*

183. *See* Elizabeth Castillo, *In Washington, Fish Populations Improve After Dam Removal*, (Aug. 5, 2022) (noting increasing stocks of both wild and hatchery fish, including 2,500 wild fish alone as of 2021), https://www.opb.org/article/2022/08/05/in-washington-fish-populations-improve-after-dam-removal-in-elwha-river/; Jeffrey J. Duda et al., *Reconnecting the Elwha River: Spatial Patterns of Fish Response to Dam Removal*, 9 FRONTIERS IN ECOLOGY & EVOLUTION, 1, 14 (2021) (spatial data confirms the success of chinook recolonization of the Elwha: adult chinook densities are higher in reaches that were previously inaccessible, than they were on any portion of the river prior to dam removal); Isabella Breda, *Tribe to Fish for Salmon on Elwha River a Decade After Dams Fell*, SEATTLE TIMES (Apr. 25, 2023) https://www.seattletimes.com/seattle-news/environment/tribe-to-fish-for-salmon-on-elwha-river-a-decade-after-dams-fell/ (five years post removal, chinook returns were estimated at 7,600, the highest return rate since the late 1980s; in 2021 only four-percent of returning cohos were tagged hatchery fish, down from ninety-percent in 2012 and 2013).

184. *See Undamming the Pacific Northwest: An Update*, *supra* note 136.

185. U.S. v. Wash. (Martinez Decision), No. CV 9213RSM, 2007 WL 2437166, at 8 (W.D. Wash.); *discussed in* Michael C. Blumm & Jane G. Steadman, *Indian Treaty Fishing Rights and Habitat Protection: The Martinez Decision Supplies a Resounding Judicial Reaffirmation*, 49 NAT. RES. J. 653 (2009).

186. U.S. v. Wash., No. CV 70-9213, 2013 WL 1334391 at 17, 25 (W.D. Wash. Mar. 29, 2013).

187. U.S. v. Wash., 864 F.3d 1017 (9th Cir. 2017), amending 827 F.3d 947 (9th Cir. 2016), *discussed in* Michael C. Blumm, *Indian Treaty Fishing Rights and the Environment: Affirming the Right to Habitat Protection and Restoration*, 92 WASH. L. REV. 1, 4 (2017) (citing to the unamended court decision; the amendments did not significantly change the original opinion).

opinion.[188] By June 2023, the state had repaired 114 barrier culverts, just 12 percent of the 989 identified culverts now subject to the 2030 injunction.[189]

Dam relicensing has helped to improve the prospects for salmon recovery in Puget Sound, largely due to pressure from salmon advocates. For example, the Sauk-Suiattle and Upper Skagit tribes fought for decades against three dams on the Skagit River owned by the City of Seattle that block salmon passage, seeking the dams' removal or reconfiguration before they were relicensed by FERC.[190] The tribes filed several lawsuits against the city, targeting the dams, including a "rights of nature" case in tribal court,[191] as well as state-court nuisance lawsuit charging that Seattle City Light engaged in greenwashing by portraying itself as the "Nation's Greenest Utility" despite the salmon habitat-destroying effects of its Skagit dams.[192] No doubt due at least in part to this pressure, Seattle City Light announced in 2023 that it incorporated into its final relicensing application a comprehensive fish passage program aimed at allowing salmon to bypass all three Skagit dams, as well as a long-term monitoring and an adaptive management strategy.[193]

Salmon hatcheries complicate salmon saving efforts, particularly in Puget Sound, the Columbia basin, and the Oregon coast. The undammed Bristol Bay basin has no hatcheries.[194] The region's commitment to hatchery production was a Faustian bargain struck when policymakers committed to "conserving" water behind dams for hydropower, irrigation, and navigation in pursuit of a myth that cheap electricity, farming, and shipping would not sacrifice the economically and culturally significant salmon runs.[195] That belief has proved to be unrealistic, although some still cling to it.[196] While hatcheries have helped maintain some harvests—and therefore are

188. An equally divided Court affirmed when Justice Kennedy, who had participated in treaty rights litigation as a Ninth Circuit judge, recused. Wash. v. U.S., 138 S.Ct. 1832 (2018) (mem.).

189. Washington State Department of Transportation, *WSDOT Fish Passage Performance Report* (June 2022), https://wsdot.wa.gov/sites/default/files/2022-07/Env-StrRest-FishPassageAnnualReport.pdf. Note that the list of injunction-applicable culverts has grown over the years as the state identifies new culverts subject to the court's injunction requirements.

190. *See* Rico Moore, *Washington Tribe Calls on Seattle City Light to Remove the Gorge Dam*, CROSSCUT (Aug. 4, 2021) https://crosscut.com/environment/2021/08/washington-tribe-calls-seattle-city-light-remove-gorge-dam.

191. *See supra* notes 29–32 and accompanying text.

192. In 2023, the Washington Court of Appeals allowed the Tribe's nuisance claim to go forward after an abortive foray into federal court, finding that the Tribe had stated a colorable claim of injury from the city's misrepresentations about the harm the dams caused salmon, and the resulting negative public perception of tribal fisheries management. Sauk-Suiattle Indian Tribe v. City of Seattle, 525 P.3d 238, 244 (Wash. App. 2023).

193. *See* Jenn Strang, *Energized Vision Set for Seattle City Light Hydroelectric Dam Operations*, SEATTLE CITY LIGHT (Apr. 28, 2023) https://powerlines.seattle.gov/2023/04/28/energized-environmental-vision-set-for-skagit-hydropower-project/ (Seattle City Light press release announcing new salmon mitigation strategy as part of the utility's final relicensing application to FERC).

194. *See About Bristol Bay*, *supra* note 141.

195. SACRIFICING THE SALMON, *supra* note 21, at 109–28.

196. *See, e.g.*, Cathy McMorris-Rodgers, *Come together to save Puget Sound and Snake River salmon*, SEATTLE TIMES (July 25, 2021), https://www.seattletimes.com/opinion/come-together-to-save-puget-sound-and-snake-river-salmon/ ("With little evidence to suggest removing these critical hydropower and navigation assets would restore salmon, it's time to take a look at the data and acknowledge salmon and dams – and do – coexist, as well as how we can continue to mitigate the impact dams have had on salmon with technology and fact-based solutions.").

supported by harvesters, including Indian tribes[197]—there is no evidence that traditional hatchery production can produce long-term salmon restoration.[198]

Hatchery fish damage wild fish by competing for food and habitat, threaten harmful genetic drift through interbreeding, mask declines in wild fish populations, and encourage fish harvest regulators to sanction overharvests of wild salmon in "mixed-stock fisheries."[199] For over a century, national, regional, and state policymakers pursued the false hope of salmon hatcheries.[200]

The tide seemed to turn somewhat by the turn-of the 21st century, however, as evidenced by Congress' creation of the Hatchery Reform Project for Puget Sound in 2000.[201] The project's independent scientific review panel established several principles for reforming hatchery practices, including setting clear, quantifiable goals for conservation and harvest; operating hatcheries in a scientifically defensible matter; and monitoring, evaluating, and adaptively managing hatchery production.[202] But in 2020, over the objections of over 70 wildlife groups, the Washington Department of Fish and Wildlife abandoned efforts to manage hatcheries consistent

197. For example, the tribal plan for the salmon restoration in the Columbia basin maintained that hatchery propagation was appropriate as a means of supporting harvests. *See Tribal Hatchery Management (Institutional Recommendation 7)*, COLUMBIA RIVER INTER-TRIBAL FISH COMM'N. (1995, updated 2014), https://plan.critfc.org/vol1/tribal-restoration-plan/recommendations/institutional-changes/tribal-hatchery-management/. Other scientific reports opposed hatchery production as a means to support harvests and declared that hatcheries should be limited genetic conservation. *See., Looking for Common Ground: Comparison of Recent Reports Pertaining to Salmon Recovery in the Columbia River Basin*, INDEPENDENT SCIENTIFIC ADVISORY BD (1999) (referencing the Independent Scientific Group's *Return to the River* (1995, 2000) and the National Resource Council's *Upstream: Salmon and Society in the Pacific Northwest* (1996)).

198. *See, e.g.*, Lars Mobrand, et al., *Hatchery Reform: Principles and Recommendations of the Hatchery Scientific Review Group*, HATCHERY SCIENTIFIC REVIEW GROUP 5 (2004), https://www.noaa.gov/sites/default/files/legacy/document/2020/Oct/07354626228.pdf (hatchery programs are one of the contributors to the overall decline of naturally-spawning stocks).

199. Kerry A. Naish, et al., *Evaluation of the Effect of Hatcheries on Wild Salmon*, 53 ADVANCES IN MARINE BIOLOGY 61, 77, 102, 106, 136 (2008), https://psf.ca/wp-content/uploads/2021/10/Download-PDF148-1.pdf.

200. *See, e.g.*, *Hatcheries*, Nw., POWER AND CONSERVATION COUNCIL, https://www.nwcouncil.org/reports/columbia-river-history/hatcheries/ (last visited July 15, 2023) (surveying the history of hatcheries in the Pacific Northwest, and noting that cannery operators built the first hatchery in the late 19th century).

201. *See* Pub. L. No. 106-113 (appropriations bill providing funding for the Hatchery Reform Project); *see also Department of the Interior and Related Agencies Appropriations for 2000, Part 5: Hearing Before the Subcomm. on the Interior, the Environment, and Related Agencies of the H. Comm. on Appropriations*, 106th Cong. 407, 467-468 (1999) (U.S. Fish and Wildlife Service budget request concerning the national hatchery system); *Hatchery Reform Principles and Recommendations of the Hatchery Scientific Review Group, Hatchery Scientific Review Group*, PUGET SOUND AND COASTAL WASHINGTON HATCHERY REFORM PROJECT 3 (2004), https://www.noaa.gov/sites/default/files/legacy/document/2020/Oct/07354626228.pdf (explaining that Congress adopted and funded recommendations provided by a group of leading scientists regarding hatchery reforms); *and* Letter from Peter K. Bergman, Gorton Science Advisory Team, to Senator Slade Gorton, U.S. Senator, Wash. (Dec. 22, 1925), https://www.streamnet.org/app/hsrg/docs/Gorton-Report1999[1].pdf (providing recommendations for reforming hatcheries in Puget Sound and Coastal Washington).

202. *See, About Hatchery Reform*, STREAMNET, https://www.streamnet.org/home/data-maps/hatchery-reform/about-hsrg/#:~:text=The%20U.S.%20Congress%20established%20the,hatchery%20system%20needs%20comprehensive%20reform (last visited July 22, 2023).

with meeting wild fish conservation goals.[203] The following year, the department announced a policy of having tribal co-management of salmon fisheries,[204] although in 2023 the tribes objected to a new draft policy on conservation as being too vague and omitting any mention of tribal co-management.[205]

Concerns over the viability of southern resident killer whale populations have sparked several lawsuits involving chinook salmon. The first involved a challenge in state court to Washington's 2021 hatchery plan, which aimed to increase hatchery production in an effort to bolster prey for the endangered orcas.[206] Conservation organizations focused on protecting wild salmon objected to the plan, alleging that Washington had violated the state's Environmental Policy Act (SEPA) and requested the Washington Department of Fish and Wildlife conduct a state EIS evaluating the hatchery plan.[207] The conservationists sought to invalidate the increase in chinook salmon hatchery production, which aimed to increase production by 50 million fish beyond 2018 levels.[208]

A second case involving orcas and chinook extended beyond Puget Sound into Southeast Alaska's commercial chinook troll fishery. In May 2023, a Washington district court rejected the incidental take statement (ITS) from a 2019 NMFS BiOp for the take of listed chinook salmon during the commercial harvest, finding likely harm to orcas.[209] Were it not for a Ninth Circuit stay of this decision, the district court's rejection would have shut down the Southeast Alaska chinook

203. *See*, *Defending Science-Based Hatchery Reform Policy,* WILD FISH CONSERVANCY (Aug. 29, 2020), https://wildfishconservancy.org/defending-science-based-hatchery-reform-policy/ (charging that the state commission changed policy without a full public review, ignored the best available science and the views of independent scientists).

204. *Co-manager hatchery policy development,* WASH. DEPT. OF FISH & WILDLIFE, (Apr. 9, 2021), https://wdfw.wa.gov/about/commission/comanager-hatchery-policy.

205. *See* Andy Walgamott, *NWIFC Chair Weighs In On WA FWC's Draft Conservation Policy*, NW. SPORTSMAN MAG. (June 12, 2023), https://nwsportsmanmag.com/nwifc-chair-weighs-in-on-wa-fwcs-draft-conservation-policy/.

206. Kimberly Cauvel, *Lawsuit Claims Hatcheries Harm Wild Fish, Orcas*, THE CHRONICLE (Oct. 17, 2021), https://chronline.com/stories/lawsuit-claims-hatcheries-harm-wild-fish-orcas,275401.

207. Complaint at 41, Wild Fish Conservancy v. Wash. Dep't of Fish & Wildlife, No. 21-2-13546-0 SEA, (Wash. 2021).

208. *Id.* at 3, 43.

209. Wild Fish Conservancy v. Rumsey, No. 20-cv-417-RAJ, 2023 WL 3204697, at *1 (W.D. Wash. May 2, 2023).

troll fishery during summer and winter 2023.[210] The Ninth Circuit's stay of the district court's order allowed the fishery to open as scheduled on July 1.[211]

Another allocation case recently decided by the Ninth Circuit challenged both harvest rates and hatchery practices. In that case, Fish Northwest, a group of recreational fishers, challenged a NMFS BiOp authorizing a 2021-2022 tribal harvest plan for Puget Sound.[212] Fish Northwest contended that the BiOp failed to ensure no jeopardy by 1) authorizing unsustainable harvest rates, 2) failing to coordinate harvest with hatchery genetic management, and 3) failing to account for the increased risk of single-year fisheries authorizations."[213] The Ninth Circuit affirmed the lower court's ruling, rejecting Fish Northwest's arguments.[214]

Listed Puget Sound chinook and steelhead populations continue to fare poorly; chinook have been experiencing a persistent decline, while steelhead

210. *Federal Judge's Rejection of NOAA BiOp May Shut Down SE Alaska Commercial Troll Fishery for Chinook Salmon; Alaska Seeks Stay, Appeal*, COLUMBIA BASIN BULL. (May 5, 2023), https://cbbulletin.com/federal-judge-rejection-of-noaa-biop-may-shut-down-se-alaska-commercial-troll-fishery-for-chinook-salmon-alaska-seeks-stay-appeal/. The Wild Fish Conservancy originally filed the lawsuit in 2020, alleging that the BiOp's incidental take statement for the chinook troll fishery violated both NEPA and the ESA. Wild Fish Conservancy v. Rumsey, No. C20-417-RAJ-MLP, 2022 WL 18877886 at *6 (W.D. Wash. Dec. 13, 2022). The NEPA claim challenged agency's decision to issue an EA instead of an EIS. *Id.* at *1. The plaintiffs also asserted that NMFS violated the ESA by relying on uncertain and undeveloped mitigations measures, including increased hatchery production in Puget Sound, and by failing to determine whether those mitigation measures would jeopardize chinook. Complaint at 2-3, 27-28, Wild Fish Conservancy v. Rumsey, No. 20-cv-417-RAJ, 2023 WL 3204697 (W.D. Wash. May 2, 2023). According to the conservancy, only 3% of the chinook harvested by the trollers originated in Alaskan rivers. Of the remining 97% of fish, nearly half are native to the Columbia River. COLUMBIA BASIN BULL., *supra*. Although chinook would have benefited from this suit, the plaintiffs were primarily focused on stabilizing the declining population of southern Resident Killer Whales in the Puget Sound by increasing availability of the orca's salmon prey. *Id.*

The lawsuit generated controversy in the conservation community. Tim Bristol, Executive Director of Alaskan conservation organization, SalmonState, characterized the action as, "an abuse of the Endangered Species Act by out-of-touch, ideological, serial litigants." Max Graham & Nathanial Herz, *To Protect Orcas, Federal Judge Orders Closure of Iconic Southeast Alaska Troll Fishery*, ALASKA BEACON (May 3, 2023), https://alaskabeacon.com/2023/05/03/to-protect-orcas-federal-judge-orders-closure-of-iconic-southeast-alaska-troll-fishery/.

The Wild Fish Conservancy also notified the State of Alaska in May 2023 that it intends to file a petition to list chinook in Southeast and Southwest Alaska, and Cook Inlet. Nathaniel Herz, *A Conservation Group's Lawsuit Already Closed an Iconic Alaska Fishery. Now it's Pushing for Endangered Species Act Protections for King Salmon*, NORTHERN JOURNAL (June 7, 2023), https://northernjournal.substack.com/p/a-conservation-groups-lawsuit-already. The organization has yet to file the petition.

211. *Ninth Circuit Rules for NOAA, Southeast Alaska Trollers Over Incidental Take; Fishing for Chinook Salmon can Begin July 1*, COLUMBIA BASIN BULL. (June 29, 2023), https://cbbulletin.com/ninth-circuit-rules-for-noaa-southeast-alaska-trollers-over-incidental-take-fishing-for-chinook-salmon-can-begin-july-1/.

212. Fish Nw. v. Rumsey, No. 22-35641, 2023 WL 4071941, at *3 (9th Cir. June 20, 2023).

213. *Id.* at *9.

214. *Id.* at *8–11 (dismissing Fish Northwest's ESA § 7(a)(2) claim for a lack of requisite notice and its APA claim for lack of record support).

populations have not improved since their 2007 listing.[215] Puget Sound coho are also in decline, while chum, pink, and sockeye populations are relatively stable.[216]

C. Columbia Basin

The Columbia River has been fished for at least 9,000 years.[217] Extensive trade routes, which connected the Columbia River to areas far afield throughout North America, demonstrate that the basin's profound importance was not confined to Indigenous people of the Pacific Northwest.[218] Discharging an average of nearly 275,000 cubic feet per second at its mouth, the Columbia is the largest North American river flowing into the Pacific Ocean.[219] The drainage basin covers an area roughly the size of France, including portions of seven states and British Columbia.[220] Significant tributaries to the Columbia include the Snake, Kootenai, and Willamette rivers.

Snowpack serves as the source of much of the Columbia's water, which historically led to high volumes of discharge during the spring and early summer, creating prime conditions for anadromous fish.[221] Estimates suggest that up to 10-16 million salmon and steelhead returned to the basin prior to white settlement in the Northwest.[222] So-called "June hogs"—chinook from the upper portion of the basin measuring three-to-four feet in length and weighing 60 pounds or more—were once common in the river but vanished after construction of Grand Coulee Dam blocked upriver runs.[223] Dams now block over 40 percent of habitat once accessible to salmon

215. NAT'L MARINE FISHERIES SERV. W. COAST REGION, 2016 5-YEAR REVIEW: SUMMARY & EVALUATION OF PUGET SOUND CHINOOK SALMON, HOOD CANAL SUMMER-RUN CHUM SALMON, AND PUGET SOUND STEELHEAD 19–20 (2016), https://www.fisheries.noaa.gov/resource/document/2016-5-year-review-summary-evaluation-puget-sound-chinook-salmon-hood-canal.

216. *See* Kathryn L. Sobocinski et al., *Using a Qualitative Model to Explore the Impacts of Ecosystem and Anthropogenic Drivers Upon Declining Marine Survival in Pacific Salmon*, 45 ENV'T CONSERVATION 278, 287 (2018).

217. Virginia Butler & Jim E. O'Connor, *9000 Years of Salmon Fishing on the Columbia River, North America*, 62 QUATERNARY RSCH., no. 1, 2004, at 1.

218. *Columbia River/Plateau Region*, SMITHSONIAN, https://americanindian.si.edu/nk360/pnw-history-culture-regions/columbia-river (last visited June 3, 2023).

219. *See Columbia River: Description, Creation, and Discovery*, NW. POWER AND CONSERVATION COUNCIL https://www.nwcouncil.org/reports/columbia-river-history/columbiariver/ (last visited June 3, 2023); *see also* U.S. GEOLOGICAL SURVEY, RIVER BASINS OF THE UNITED STATES: THE COLUMBIA (Comm. Print 1981) https://pubs.usgs.gov/gip/70039373/report.pdf (last visited March 8, 2024).

220. *Columbia River: Description, Creation, and Discovery*, NW. POWER AND CONSERVATION COUNCIL https://www.nwcouncil.org/reports/columbia-river-history/columbiariver/ (last visited June 3, 2023). The drainage basin covers approximately 259,000 square miles. *Id.* The Columbia is also the fourth largest river in North America by volume. *See id.*

221. *Id.*

222. *Columbia Basin Salmonids*, COLUMBIA INTER-TRIBAL FISH COMM'N, https://critfc.org/fish-and-watersheds/columbia-river-fish-species/columbia-river-salmon/ (last visited June 3, 2023).

223. *See June Hogs*, NW. POWER & CONSERVATION COUNCIL, https://www.nwcouncil.org/reports/columbia-river-history/junehogs/ (last visited June 3, 2023).

and steelhead, including blockage or inundation of 87 percent of the mainstem spawning habitat historically used by fall chinook, a Tribal mainstay.[224]

Of the river basins explored in this paper, the Columbia Basin is the most clearly affected by the federal laws discussed in section II. As discussed above, federal dam building beginning in the 1930s New Deal era began the transformation of the basin into what would eventually become the largest interconnected hydroelectric system in the world.[225] After completion of the Columbia River Treaty projects in the 1970s, the mature hydroelectric system soon caused dramatic salmon declines, leading Congress to call for a Columbia Basin Fish and Wildlife Program aimed at restoring the basin's salmon runs.[226] That program, authorized by the 1980 Northwest Power Act, now in its seventh edition, has spent a total of more than $20 billion ratepayer and taxpayer dollars, mostly on habitat restoration and hatchery management.[227] However, the interstate council formulating the program made only a halting effort to change the operation of the federal dams, which proved insufficient to ward off ESA listings.[228]

Despite increasing numbers of Columbia Basin salmon and steelhead being listed under the ESA, conservation efforts adopted by federal agencies have continued to focus primarily on habitat and hatcheries—with only minor changes to dam operations and configuration. Biological opinions by NMFS—required by the ESA's section 7(a)(2) consultation requirements—largely rubber-stamped status quo hydrosystem operations to the increasing frustration of a series of federal judges.[229] In the long-running case brought by fish advocates and joined by the state of Oregon and a changing roster of Indian tribes, judges over the next two decades threw out a series of NMFS BiOps examining the effects of Columbia Basin hydroelectric operations.[230] Judge Michael Simon of the federal district of Oregon aptly summed up the shortcomings of federal agencies' efforts to protect the listed runs:

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224. *See Dam: Impacts on Salmon and Steelhead*, NW. POWER & CONSERVATION COUNCIL, https://www.nwcouncil.org/reports/columbia-river-history/damsimpacts/ (last visited March 8, 2024) (discussing dams' effects on Columbia Basin salmon); D.D. Dauble, et al., *Impacts of the Columbia River Hydroelectric System on Main-Stem Habitats of Fall Chinook Salmon*, N. AM. J. OF FISHERIES MGMT. 641, 651 (2011).

225. *See supra* notes 40–42 and accompanying text; *Hydropower vs. Salmon*, *supra* note 40, at 223–43 (discussing the evolution of dam-building in the basin). There was some water project development in the 19th century, as the first locks were constructed near the present location of the Bonneville Dam in 1876, and several hydroelectric "dynamos" (generators) were installed beginning in the 1880s. *See* Michael C. Blumm, *Col-rb Columbia River Basin*, *in* 4 WATERS AND WATER RIGHTS I § XI.A, at n.4 (3rd ed. Amy K. Kelley & Jesse J. Richardson, Jr. eds. 2020); *see also id*. at 17–45 (a treatise chapter containing a detailed discussion of dam-building in the Columbia Basin).

226. *See Hydropower vs. Salmon*, *supra* note 40, at 216; *Beyond Parity*, *supra* note 68, at 36.

227. *See* Tony Schick, *How a Federal Agency is Contributing to Salmon's Decline in the Northwest*, OR. PUB. BROAD. (August 4, 2022), https://www.opb.org/article/2022/08/04/bonneville-power-administration-columbia-river-dams-salmon-recovery-spending-tribes/. For a discussion of the program, *see* PACIFIC SALMON LAW, *supra* note 1, at 85-93; SACRIFICING THE SALMON, *supra* note 21, at 129–60.

228. *See supra* notes 67–69, 79, 81–84 and accompanying text.

229. *See infra* notes 230–34 and accompanying text (discussing the frustrations of Judges James Redden and Michael Simon).

230. The Northwest Council has a fairly thorough overview of the Columbia Basin salmon litigation over the past three decades. *See Endangered Species Act, Columbia River Salmon and Steelhead, and the*

> For more than 20 years, NOAA Fisheries, the Corps, and BOR (the Bureau of Reclamation) have ignored the admonishments of Judge Marsh and Judge Redden to consider more aggressive changes to the FCRPS (the Federal Columbia River Power System) to save the imperiled listed species. The agencies instead continued to focus on essentially the same approach to saving the listed species—minimizing hydro mitigation efforts and maximizing habitat restoration. Despite billions of dollars spent on these efforts, the listed species continue to be in a perilous state. . . . The FCRPS remains a system that 'cries out' for a new approach. . . . [Yet] the 2014 BiOp continues down the same well-worn and legally insufficient path taken during the last 20 years. It impermissibly relies on supposedly precise, numerical survival improvement assumptions from habitat mitigation efforts that, in fact, have uncertain benefits and are not reasonably certain to occur. It also fails to adequately consider the effects of climate change and relies on a recovery standard that ignores the dangerously low abundance levels of many of the populations of the listed species.[231]

Building on a similar injunction imposed a decade earlier, in 2017 Judge Simon ordered the Corps to spill additional water through the dams' spillways to allow more juvenile salmon migrating downstream to avoid passing through the dams' turbines, thus improving their survival.[232] Simon also ordered preparation of yet another new BiOp, as well as an environmental impact statement (EIS) by federal dam operating agencies to update a previous NEPA analysis of FCRPS operations.[233] Significantly, pointed dicta in the court's 2016 opinion noted that an EIS would likely not satisfy federal agencies NEPA duties unless the document considered as an operations alternative breaching the four lower Snake River dams.[234]

In the ensuing Trump Administration, however, the agencies' 2020 EIS rejected the dam breaching alternative in favor merely continuing the court-ordered increased spills at the dams (which the operating agencies earlier opposed). Even though the EIS recognized that breaching would provide the most benefit to the listed

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Biological Opinion, NW. POWER & CONSERVATION COUNCIL, https://www.nwcouncil.org/reports/columbia-river-history/endangeredspeciesact (last visited Mar. 26, 2023) [hereinafter *NW Council History*] (providing a history of the litigation over the 2000 BiOp, 2014 BiOp, and now the 2020 BiOp). The five opinions granting injunctive relief were: Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 2004 WL 1698050, at *6 (D. Or. 2004) (Redden, J.); Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 2005 WL 1398223, at *5 (D. Or. 2005) (Redden, J.); Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 2005 WL 3576843, at *9 (D. Or. 2005) (Redden, J.); Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv. ("NMFS IV"), 839 F.Supp.2d 1117, 1121 (D. Or. 2011) (Redden, J.); and Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., No. 2:01-cv-0640-SI, 2017 WL 1829588, at *16 (D. Or. 2017) (Simon, J.).

231. Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 184 F.Supp.3d 861, 876 (D. Or. 2016).

232. *See supra* notes 96–97 and accompanying text (discussing Judge Simon's spill decision); *Fighting Over Spills supra* note 78, at 6–9. Judge Simon ordered an increase in spills at Columbia Basin federal dams to the maximum levels permitted under state law. *Id.* at 9 (finding that NMFS violated the ESA and the Administrative Procedure Act (APA), and that the federal agencies operating the dams violated NEPA by failing to discuss the effect of those dam operations in an EIS).

233. Nat'l Wildlife Fed'n, 184 F.Supp.3d at 950.

234. *Id.*

species, the federal operating agencies rejected this course of action because removing the Snake dams would allegedly produce unacceptable effects on other authorized purposes of the dams including navigation, hydropower, irrigation, and recreation.[235] This assertion again prompted the plaintiffs' coalition to challenge the EIS and the 2020 BiOp.[236] Although Judge Simon approved a stay in the case to allow negotiations between the plaintiffs and Biden administration officials on a deal to protect the fish, but a recent settlement provides little interim relief for the listed salmon.[237]

Looking toward a future in which the effects of climate change on salmon survival rivals the effects of dams, a coalition of 57 Northwest Tribes, including the Columbia River Inter-Tribal Fish Commission (CRITFC), released energy recommendations for the Columbia Basin in 2022.[238] This "Energy Vision" is replete with recommendations for ensuring that the transition to renewables supports restoration of salmon populations, mostly focused on operational changes at the dams.[239]

For example, the coalition recommended allowing so-called "zero flow" operations in the lower Snake River only when biological criteria indicate that withholding flows will pose little risk to salmon migrants.[240] It also recommended managing flows to mimic natural hydrograph patterns and processes by increasing

235. Columbia River System Operations Environmental Impact Statement & Record of Decision, 85 Fed. Reg. 63834, 63838–40 (September 28, 2020) (explaining that Alternative 3, the breaching alternative, would yield the highest return rate of salmon). But the agencies claimed that alternative would not maintain the authorized operating purposes for navigation, hydropower, envisioned recreation, and irrigation. *Id.* at 63,855. However, the only express statutorily authorized purposes of the dams were to improve navigation and provide irrigation. *See Hydropower vs. Salmon*, *supra* note 41, at 233 (discussing the purposes of the dams). NMFS rejected increased spills in its 2014-18 BiOp, mostly on fish passage efficacy grounds. *See NW Council History*, *supra* note 230.

236. Am. Rivers v. Nat'l Marine Fisheries Serv., 2021 WL 3575104, at *2 (D. Or. 2021).

237. *See infra* notes 416–22 and accompanying text; Nicholas K. Geranios, *Federal Judge Orders Stay in Case Seeking to Remove Snake River Dams*, OPB (Oct. 26, 2021), https://www.opb.org/article/2021/10/26/judge-orders-stay-in-case-seeking-to-remove-snake-river-dams/.

238. Founded in 1977 by the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe, CRITFC seeks to "ensur[e] a unified voice in the overall management of fishery resources" in the Columbia River Basin. Ed Sheets & Margie Schaff, COLUMBIA RIVER INTER-TRIBAL COMM'N, ENERGY VISION FOR THE COLUMBIA BASIN 119 (2022), https://critfc.org/wp-content/uploads/2022/09/CRITFC-Energy-Vision-Full-Report.pdf [hereinafter ENERGY VISION]. In 2021, the coalition of 57 Pacific Northwest tribes adopted a resolution soliciting Congress and the President to "Invest in Salmon and River Restoration in the Pacific Northwest: Charting a Stronger, Better Future for the Northwest, and Bringing Long-Ignored Tribal Justice to Tribal Peoples and Homelands." *Id.* at 6.

239. Also related to salmon are recommendations concerning amendments to the Columbia River Treaty, increasing electricity storage, maximizing energy efficiency, strategically siting renewable resources, and minimizing transmission and distribution systems. *See id.* at 10–13.

240. *Id.* at 53. During zero flow periods, which managers typically order at night when demand for electric power is at its lowest, dam operators use dams to withhold water behind dams that would otherwise flow downstream in order to save water for generating power later when it is more economically valuable. Fish advocates have generally sought to limit such operations because they produce temporary lake-like river conditions that confuse migrating salmon. *See, e.g.*, K.C. Mehaffey, *Corps to Expand Zero-Flow Operations on Lower Snake, Pending Review*, NEWSDATA (Oct. 2, 2020), https://www.newsdata.com/clearing_up/environment/corps-to-expand-zero-flow-operations-on-lower-snake-pending-review/article_aa9c87b0-04ee-11eb-89f1-f3d8f15e5af0.html.

mainstem flows and maintaining minimum pool heights upstream from dams during salmon migration periods.[241] Beyond hydropower operations, Energy Vision suggested modifying flood control reservoir operations to allow managers to release more water during the spring and summer during low snowpack years.[242] And in anticipation of the flood control provisions of the Columbia River Treaty expiring in 2024—which would likely require U.S. reservoirs to shoulder additional flood control burdens—the coalition called on the Corps to assess of the costs and benefits of flood control measures compared to allowing increased flood risk.[243]

Events in 2022 produced both a potential breakthrough for salmon-saving efforts as well as a conundrum. Seemingly reversing course from only two years before, NMFS released a report concluding that only far-reaching changes—notably including breaching the lower Snake dams—could bring about comprehensive salmon recovery in the Columbia Basin.[244] At the same time, however, federal dam operators showed no sign of moving to reconsider their 2020 EIS and record of decision that rejected major dam modifications, and NMFS gave no indication that it would withdraw its 2020 BiOp finding that status quo configuration and operations of the dams complies with the ESA. Meanwhile, salmon returns continued to be alarming: in 2020, 1.35 million salmon and steelhead returned to the Columbia, just a fraction of the estimated returns of 16 million that the basin supported prior to 1850.[245]

The fate of the four federal dams on the lower Snake River continues to be a primary flashpoint of controversy. Government agencies, regional politicians, tribes, and salmon advocates have all devoted substantial attention to proposals to remove the dams which produce marginal economic benefits and impose catastrophic salmon costs.[246] Although there have been numerous studies showing

241. ENERGY VISION, *supra* note 238, at 51.

242. *Id.* at 54.

243. *Id.* at 62–64 (noting that increased stagnancy in the lower reaches of the Columbia would likely have detrimental effects on migrating salmon).

244. *See* NAT'L OCEANOGRAPHIC AND ATMOSPHERIC ADMIN. NAT'L MARINE FISHERIES SERV., REBUILDING INTERIOR COLUMBIA BASIN SALMON AND STEELHEAD 16 (2022), https://media.fisheries.noaa.gov/2022-09/rebuilding-interior-columbia-basin-salmon-steelhead.pdf.

245. *See With Few Exceptions, Columbia River Salmon and Steelhead Returns Continue Downward Trend*, NW. POWER & CONSERVATION COUNCIL (Mar. 12, 2021), https://www.nwcouncil.org/news/2021/03/12/few-exceptions-columbia-river-salmon-and-steelhead-returns-continue-downward-trend/. Prior to 1850, returns of salmon and steelhead were estimated at 16 million. *See Columbia River Basin Salmon and Steelhead: Federal Agencies' Recovery Responsibilities, Expenditures And Actions*, U.S. GEN. ACCT. OFF., (2002), https://www.gao.gov/assets/gao-02-612.pdf.

246. Once all the Snake River dams became fully operational in the 1970s, "smolt to adult return" (SAR) rates—a critical indicator of the well-being of a salmon run—experienced a sharp decline. From 1964-69, SAR rates for wild Snake River spring chinook averaged 4.38%, dropping to 1.2% from 1976-83, a decrease of over 350%. *See* Howard L. Raymond, *Effects of Hydroelectric Development and Fisheries Enhancement on Spring and Summer Chinook Salmon and Steelhead in the Columbia River Basin*, 8 N. AM. J. FISHERIES MGMT. 1, 8–9 (1988). Similarly, wild Snake River summer chinook SAR rates declined from an average of 4.2% for the period 1964–69 to less than 1.1% during 1976–83. *Id.* For a discussion of studies on the economic feasibility of removing the lower Snake dams *see Fighting Over Spills*, *supra* note 78, at 20–24.

the economic feasibility of removing the dams,[247] dam removal will not take place absent express authorizations and funding from Congress, which does not appear likely to consider such legislation seriously any time soon.[248]

247. *See* Susan Whately & Rocky Barker, *Breaching: A Natural River Saves Fish and Money*, IDAHO STATESMAN (July 20, 1997), https://www.idahostatesman.com/opinion/editorials/article162699983.html, at 12A (explaining that breaching the lower Snake dams would yield a net benefit of $183 million); *Saving Salmon and Water Simultaneously*, *supra* note 78, at 1029 (explaining that so long as restored salmon runs were included in the calculus, the value of removing dams on the Lower Snake would "clearly overwhelm a hundred million dollars or so of foregone electricity") (quoting EBAN GOODSTEIN, DAM ECONOMICS: OVERVIEW AND APPLICATION TO THE LOWER SNAKE RIVER C-18 (1998)); *The Lower Snake river Dams Power Replacement Study: Fact Sheet*, NW. ENERGY COALITION (Apr. 4, 2018), https://nwenergy.org/wp-content/uploads/2018/04/LSRD-Study-Fact-Sheet.pdf, replacing power generated by the lower Snake river dams with entirely clean energy sources would cost about a dollar per month for most residential customers); Anthony Jones & Linwood Laughy, *Bonneville Power Administration and the Lower Snake River Dams: The Folly of Conventional Wisdom*, ROCKY MOUNTAIN ECONOMETRICS 6 (2018), http://www.rmecon.com/examples/BPA%20&%20LSRDs%206-5-18.pdf (claiming that the Bonneville Power Administration (BPA) removed lower Snake River dams in 2008, BPA could have saved its customers upwards of $100 million annually, while still meeting customer power demand); *See also Saving Salmon and Water Simultaneously*, *supra* note 78, at 1024–31 (cataloging numerous studies in the 1990s demonstrating the feasibility of removing the Lower Snake River dams).

248. In February 2021, Congressman Mike Simpson (R-Id.) proposed a $33.5 billion plan to breach the LSR dams. *See The Mistake on the Snake*, *supra* note 78, at 19–28. The plan's price-tag included funding for breaching the dam and river improvements, replacing the electric power generated by the dam, and compensation and development for communities along the Lower Snake River. *See Fighting Over Spills*, *supra* note 78, at 20–23. Most controversial were the plan's provisions for a 35-year moratorium on CWA, ESA, and NEPA lawsuits concerning salmon in the Columbia Basin and a concomitant 35-year extension on all current FERC licenses producing greater than five megawatts. *Id.* at 23–24; *The Mistake on the Snake*, *supra* note 78, at 23–25. Extensions of these FERC licenses would presumably relieve dam operators of fish passage standards under the Federal Power Act and water quality requirements under the Clean Water Act. *Id.* at 24.

After Simpson's proposal, Governor Jay Inslee (D-Wash.) and U.S. Senator Patty Murray (D-Wash.) released their Lower Snake River Benefit Replacement Report which investigated ways to replace the clean energy, navigation, irrigation, recreation, and other economic benefits provided by the lower Snake dams. *See The Mistake on the Snake*, *supra* note 78, at 33; *See also* LOWER SNAKE RIVER DAMS: BENEFIT REPLACEMENT REPORT (Aug. 2022), https://governor.wa.gov/sites/default/files/2022-11/LSRD%20Benefit%20Replacement%20Final%20Report_August%202022.pdf (concluding that the dams' benefits could be replaced, although some industries and localities would experience profound socio-economics changes). After the 2022 federal elections, Congress became less friendly to considerations of dam removal. With leadership in the U.S. House of Representatives in Republican hands, the House Natural Resources Committee in 2023 opened an investigation into what it called NMFS' "sudden policy reversal" of its previous position (under the Trump Administration) that removal of the four lower Snake dams is not necessary to recover listed fish in that basin. *See* Press Release, House Committee on Natural Resources, *Members Investigate NOAA's Sudden Policy Reversal Impacting Lower Snake River Dams* (May 1, 2023), https://naturalresources.house.gov/news/documentsingle.aspx?DocumentID=413174.

Environmental groups continue to pressure removal of the Lower Snake River Dams. In July 2023, an environmental coalition notified the U.S. Army Corps of Engineers of their intent to sue agency to compel the Corps to remove the dams. Courtney Flatt, *Groups plan to sue to remove Snake River dams over hot water troubles for salmon*, OR. PUB. BROAD. (July 25, 2023), https://www.opb.org/article/2023/07/25/snake-river-pacific-northwest-oregon-columbia-salmon-conservation-idaho/. The coalition alleges that the Corps is violating the ESA by causing hot water conditions through their operation of the Lower Snake River Dams. Letter from Miles Johnson, Legal Dir. Columbia Riverkeeper, to Lt. Gen. Scott Spellmon, Commanding Gen. & Chief of Eng'rs U.S. Army Corps of Eng'rs Headquarters, and Lt. Co. ShaiLin KingSlack, Dist. Commander & Eng'r Walla Walla District (July 21, 2023), https://www.columbiariver

Endangered species listings have also been slow to produce meaningful dam reforms in the Willamette Basin. In 2020, federal district court judge Marco Hernández ruled in favor of several environmental organizations, finding that the Corps of Engineers had failed to reinitiate ESA consultation with NMFS after the Corps failed to fully implement reasonable and prudent measures called for by a biological opinion issued over a decade earlier.[249] In that BiOp, NMFS determined that the Corps' operation of thirteen federal dams in the Willamette Basin was jeopardizing the continued existence of upper Willamette chinook and steelhead.[250] In 2021, Judge Marco Hernández set a deadline for the Corps to complete reinitiating ESA consultation and issued an injunction requiring the Corps conduct a deep drawdown of Cougar Reservoir on the McKenzie River and spill operations at several dams on the Middle Fork of the Willamette.[251] In 2022, the Corps issued a draft EA outlining a preferred alternative that combines modified dam operations, structural changes, and other measures to balance water management and meet recovery obligations under the ESA.[252]

Salmon hatcheries are plentiful in the Columbia Basin, no surprise given its status as the most dammed river basin in the country, if not the world.[253] Hatcheries were introduced in the 19th century and came to dominate the basin in the 20th century as the dam-building era proceeded.[254] By the 1990s, several scientific reviews questioned the basin's heavy reliance on hatcheries to mitigate dams' adverse effects, especially on wild-spawning salmon.[255]

In 1997, the NW Council commissioned a review of hatcheries in the Columbia Basin by its independent scientists.[256] The ensuing report, like other scientific reviews, found that hatchery operations were based on false assumptions

keeper.org/sites/default/files/2023-07/ESA%20Notice%20Letter%20for%20Snake%20River%20Dams.pdf.

249. Nw. Env't Def. Ctr. v. U.S. Army Corps of Eng'rs, 479 F.Supp.3d 1003, 1027 (D. Or. 2020).

250. *Id.* at 1009.

251. Nw. Env't Def. Ctr. v. U.S. Army Corps of Eng'rs, 558 F.Supp.3d 1056, 1076–79 (D. Or. 2021). The Corps reinitiated consultation with NMFS shortly after the plaintiffs filed their original suit in 2018. *Id.* at 1061. Judge Hernández's order required this consultation be completed by December 31, 2024. *Id.* at 1076.

252. *See* U.S. ARMY CORPS OF ENG'RS PORTLAND DIST., WILLAMETTE VALLEY SYSTEM OPERATIONS AND MAINTENANCE: DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (2022), https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/22208; *See also Comments on Corps' Draft EIS for 13 Willamette Valley Dams Question Whether Plan Avoids Jeopardy for ESA-Listed Salmonids*, COLUMBIA BASIN BULL. (Mar. 23, 2023), https://cbbulletin.com/comments-on-corps-draft-eis-for-13-willamette-valley-dams-question-whether-plan-avoids-jeopardy-for-esa-listed-salmonids/ (explaining that comments on the draft EIS were split between concerns over the effectiveness of the Corps' proposed plans and increased electricity rates).

253. Richard Kyle Paisley, *A River Runs Through Us*, CAN.'S HISTORY (May 24, 2014), https://www.canadashistory.ca/explore/politics-law/a-river-runs-through-us (the Columbia is the most dammed river in North America).

254. *See* SACRIFICING THE SALMON, *supra* note 21, at 109–15.

255. *See id.* at 119–28. The Tribal assessment downplayed adverse genetic effects and advocated "supplementation," an approach to restoration that fused natural and hatchery fish as a single gene pool and attempted to create natural conditions to reestablish naturally spawning fish runs. *See id.* at 124.

256. Ernie Brannon, et al, *Independent Scientific Advisory Board*, Review of Salmonid Artificial Production in The Columbia River Basin 1 (1998), https://www.nwcouncil.org/media/filer_public/74/90/74907ca4-1845-4116-aab3-466aa7090779/98-33.pdf.

and had failed to reduce their adverse effects on naturally spawning fish.[257] The report recommended that all supplementation programs aimed at producing spawning fish must be linked to habitat improvements, and suggested close monitoring of the genetic effects of hatcheries and their relationship to functioning ecosystems.[258] Nevertheless, reliance on hatcheries to maintain salmon harvests has continued, often with alarming results. According to one recent study, the recent return rates of hatchery fish are some of the worst on record: of eight populations assessed, none met the four percent survival threshold necessary for recovery.[259] One upshot is tribes located in the upper basin do not have sufficient egg-bearing female salmon of hatchery origin, prompting some hatchery managers to capture wild fish for hatchery propagation.[260] Shortages are expected to become commonplace as the effects of climate change intensify, warming both ocean and inland waters.[261]

Approximately one-third of Columbia Basin hatcheries are funded by the Mitchell Act of 1938.[262] Congress passed the Act to mitigate the decline of salmonid populations in the Columbia due to dams and water diversions within the basin.[263] Over the years, Mitchell Act funds have gone overwhelming to hatcheries; none to changed hydroelectric operations.[264] Disbursement of these funds constitutes a major federal action, triggering NEPA review, and that process has led to some hatchery reforms in the basin.[265] For example, a 2017 BiOp on Mitchell Act hatchery funding conditioned approval of continued funding on a suite of hatchery reforms, including developing broodstocks more compatible with local natural populations, implementing methods to reduce hatchery straying, and increased monitoring efforts.[266]

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257. *Id.* at 31.

258. *Id.* at 59.

259. *See* Tony Schick & Irena Hwang, *The US has spent more than $2B on a plan to save salmon. The fish are vanishing anyway*, OR. PUB. BROAD. (May 24, 2022), https://www.opb.org/article/2022/05/24/pacific-northwest-federal-salmon-hatcheries-declining-returns/ (citing data from 2014 to 2018, although noting that 17 scientists, in a 2015 report to Congress, claimed that the 4% goal established by the NW Council's independent scientists was inadequate "to effectively contribute to harvest and/or conservation").

260. *Id.* (noting shortages at hatcheries at the Klickitat. Cle Elum, Leavenworth, and Nez Perce hatcheries).

261. *Id.* (citing Lisa Crosier, *Warming Ocean Will Challenge Snake River Salmon Survival in Coming Decades, New Research Shows*, NOAA FISHERIES (Feb. 18, 2021), https://www.fisheries.noaa.gov/feature-story/warming-ocean-will-challenge-snake-river-salmon-survival-coming-decades-new-research.).

262. *How the Mitchell Act Supports Fisheries*, NOAA FISHERIES, https://media.fisheries.noaa.gov/2022-03/mitchell-act-fact-sheet.pdf (last visited July 8, 2023).

263. *Mitchell Act*, NW. POWER & CONSERVATION COUNCIL, https://www.nwcouncil.org/reports/columbia-river-history/mitchellact/ (last visited July 8, 2023); *see* PACIFIC SALMON LAW, *supra* note 1, at 66–67.

264. On Mitchell Act funding, *see* SACRIFICING THE SALMON, *supra* note 21, at 10–12, 94–95, 113–14, 123.

265. *Mitchell Act Questions and Answers*, NOAA FISHERIES, https://www.fisheries.noaa.gov/west-coast/endangered-species-conservation/mitchell-act-questions-and-answers (last visited July 8, 2023).

266. NOAA FISHERIES, MITCHELL ACT BIOLOGICAL OPINION EXECUTIVE SUMMARY 2 (2017), https://media.fisheries.noaa.gov/dam-migration/mitchell-act_opinion_exec-summ.pdf. The BiOp was a

The upper Columbia Basin once produced one to three million returning salmon as well as lamprey, sturgeon, and other fish.[267] These returns were central to the culture and subsistence of Indigenous people in both Canada and the U.S. But the majority of these salmon were lost with the construction of Grand Coulee dam in 1941, with the remaining remnant diminished further by construction of the impassable Chief Joseph dam.[268] The 1964 Columbia River Treaty fostered more dam construction in Canada with no concern over potential future fish passage.[269] Decisions to block fish passage were made over objections of Indigenous tribes and without consultation.[270]

In recent years, upper Columbia Basin Tribes have pushed for reintroduction of salmon above Grand Coulee dam. A coalition of tribes from the upper basin has undertaken scientific and economic studies and concluded that a phased reintroduction would be feasible through the use of floating surface collectors for downstream migrating juvenile salmon and trap and haul for adult salmon.[271] The Tribes determined that there are hundreds of miles of quality habitat in the blocked area.[272] Studies are underway to refine fish passage options, identify suitable donor stocks, evaluate flow management alternatives, develop local rearing facilities, and assess the effects of climate change in conjunction with the Northwest Council's independent scientists.[273] Experimental reintroduction occurred in 2021, and the

response to the decision in Native Fish Soc'y v. Nat'l Marine Fisheries Serv., 992 F.Supp.2d 1095 (D. Or. 2014), in which the court required preparation of a BiOp, perhaps signaling increased level of judicial scrutiny for hatcheries by rejecting a hatchery genetic management plan (HGMP) that supplied an exemption for takes of listed salmon on the Sandy River in Oregon otherwise impermissible under the ESA. The court also criticized NMFS for failing to prepare an EIS on the federal funding. After determining that there was no evidence suggesting that hatcheries can restore wild salmon runs, the court faulted for NFMS for concluding that hatchery operations produced "no significant environmental effect" (a NEPA trigger for an EIS) and "no jeopardy" to listed salmon (an ESA trigger for a biological opinion). The court was especially critical of NMFS' assumption that the HGMP would reduce straying, as inconsistent with best available science. Reducing stay rates was, the court ruled, essential to recovery Sandy River salmon, which in turn was a prerequisite to delisting salmon in the Lower Columbia region.

267. *See Restore Fish Passage*, COLUMBIA RIVER INTER-TRIBAL FISH COMM'N, https://critfc.org/tribal-treaty-fishing-rights/policy-support/columbia-river-treaty/restore-fish-passage/ (last visited Nov. 9, 2023).

268. *See* UPPER COLUMBIA UNITED TRIBES, FISH PASSAGE AND REINTRODUCTION PHASE 1 REPORT: INVESTIGATIONS UPSREAM OF CHIEF JOSEPH AND GRAND COULEE DAMS 1 (2019), https://ucut.org/wp-content/uploads/2019/05/Fish-Passage-and-Reintroduction-Phase-1-Report.pdf [hereinafter *PHASE 1 REPORT*]; *Blocked Area Mitigation: Above Chief Joseph and Grand Coulee Dams*, NW. POWER & CONSERVATION COUNCIL, https://www.nwcouncil.org/blocked-area-mitigation-uppercolumbia/ (last visited Nov. 9, 2023) (explaining that Grand Coulee and Chief Joseph dams were built without fish passage); *Grand Coulee Dam: Impacts on Fish*, NW. POWER & CONSERVATION COUNCIL, https://www.nwcouncil.org/reports/columbia-river-history/grandcouleeimpactsonfish/ (last visited Nov. 9, 2023).

269. *See Columbia River Treaty*, COLUMBIA RIVER INTER-TRIBAL FISH COMM'N, https://critfc.org/tribal-treaty-fishing-rights/policy-support/columbia-river-treaty/ (last visited Nov. 9, 2023).

270. *See* COLUMBIA RIVER INTER-TRIBAL FISH COMM'N, *supra* note 267.

271. *See generally PHASE 1 REPORT*, *supra* note 268 (discussing floating surface collection).

272. *See Frequently Asked Questions – Salmon Reintroduction Upstream of Chief Joseph and Grand Coulee Dams*, UPPER COLUMBIA UNITED TRIBES, https://ucut.org/culture/frequently-asked-questions-salmon-reintroduction-upstream-of-chief-joseph-and-grand-coulee-dams/ (last visited March 18, 2024).

273. *See generally Phase 1 Report*, *supra* note 268. The tribes identified summer chinook salmon as a prime donor stock, since summer chinook are not ESA-listed; donor fish have to be hatchery-origin, since there are not sufficient numbers of wild fish.

Colville Tribe counted some 70 salmon redds (nests) that winter in the Sanpoil River.[274] Despite these promising results, the studies necessary to proceed with large-scale reintroduction are largely unfunded, and some critics blame BPA's cost-cutting for salmon research.[275]

Other conservation efforts in the Columbia basin have focused on protecting existing salmon by eliminating predators rather than increasing production. Beginning in 2008, NMFS issued take permits to Oregon, Washington, and Idaho to allow killing California sea lions at Bonneville Dam.[276] After a decade of the initial program, Congress expanded it, amending the Marine Mammal Protection Act to 1) allow both hazing and the lethal take of stellar sea lions; 2) expand the program to larger stretches of the lower Columbia and Willamette Rivers; and 3) include Tribes as co-managers authorized to lethally remove marine mammal predators.[277] Although killing sea lions continues to draw the ire of marine mammal advocates,[278] biologists involved with the efforts claim that the program has saved approximately 65,000 adult salmon since 2008.[279]

Federal agencies have also determined cormorants (seabirds) are threats to juvenile salmon, and in 2015 the Corps and U.S. Fish and Wildlife Service authorized culling and harassment methods to decrease the population of these avian predators.[280] The agencies targeted a huge cormorant colony at East Sand Island, near the mouth of the Columbia River.[281] After a federal court rejected a challenge to this decision, based in part on a FWS study indicating that this program would not

274. *See* Michelle Campobasso, *Salmon Redds Show Promise in the Upper Columbia River*, TRIBAL TRIB. (Jan. 10, 2022), http://www.tribaltribune.com/news/article_1a07460a-726a-11ec-8805-9f9dcd5c93d6.html.

275. Tony Schick, *How a Federal Agency is Contributing to Salmon's Decline in the Northwest*, OR. PUB. BROAD. (Aug. 4, 2022), https://www.opb.org/article/2022/08/04/bonneville-power-administration-columbia-river-dams-salmon-recovery-spending-tribes/.

276. *See* PACIFIC SALMON LAW, *supra* note 1, at 155–56; Humane Soc'y of U.S. v. Locke, 626 F.3d 1040, 1044 (9th Cir. 2010) (explaining that NFMS authorized Oregon, Washington, and Idaho to kill California sea lions at Bonneville Dam). Although the Ninth Circuit upheld the district court's summary judgment in favor of NMFS, the court required a better explanation as to why California sea lions were having such a significant negative effect on salmonid recovery and how the prescribed reduction in sea lions would produce appropriate results for salmon recovery. *Id.* at 1048.

277. *See Pinniped Removal at Willamette Falls Drops Extinction Risk of Wild Winter Steelhead; 376 Sea Lions Euthanized on Columbia, Willamette Since 2008*, COLUMBIA BASIN BULL. (Dec. 16, 2022), https://cbbulletin.com/pinniped-removal-at-willamette-falls-drops-extinction-risk-for-wild-winter-steelhead-376-sea-lions-euthanized-on-columbia-willamette-since-2008/ [hereinafter *Pinniped Removal*].

278. For example, *see* Press Release, *A Statement in Response to Columbia River Basin Sea Lion Cull*, THE MARINE MAMMAL CTR. (Aug. 17, 2020), https://www.marinemammalcenter.org/news/response-to-columbia-river-basin-sea-lion-cull (arguing that killing sea lions will not result in salmon recovery).

279. *See Pinniped Removal*, *supra* note 277 (the lead marine mammal biologist at the Washington Department of Fish & Wildlife believes the estimate in the text to be conservative).

280. *See Third Year of Shooting Salmon-Eating Cormorants, Oiling Nests: Goal is to Kill 2,409 Birds*, COLUMBIA BASIN BULL. (APR. 28, 2017), https://cbbulletin.com/third-year-of-shooting-salmon-eating-cormorants-oiling-nests-goal-is-to-kill-2409-birds/.

281. *See id.*; *see also* PACIFIC SALMON LAW, *supra* note 1, at 157–58.

increase returns of listed salmon runs, shooting birds and oiling their nests began.[282] To escape these actions, the colony moved upstream.[283] Because fewer marine fish that serve as cormorant prey are present upstream, the federal efforts likely inadvertently resulted in greater cormorant predation of salmonid smolts.[284] It also caused damage of $1 million per year due to birds nesting on the Astoria-Megler Bridge near the mouth of the Columbia River.[285]

As policy debates and litigation have continued, the thirteen ESA-listed salmon species in the Columbia Basin show few signs of recovery some three decades after the initial ESA listings.[286] The most recent population studies underline the precarious condition of Columbia Basin salmon. Of the Columbia Basin salmon species, naturally produced Snake River sockeye are likely at the highest risk of extinction,[287] although Snake River chinook and steelhead and Upper Columbia steelhead and spring-run chinook are all experiencing consistent, sharp declines.[288] Middle Columbia River steelhead are at a moderate risk of extinction, while Upper Willamette chinook are currently at a high risk of extinction, with five of seven demographically independent populations at very high of extinction.[289] Willamette winter steelhead are faring better than their chinook cousins, with a low to moderate

282. *See* Audubon Soc'y of Portland v. U.S. Army Corps of Eng'rs, No. 3:15-cv-665-SI, 2016 WL 4577009, at *16 (D. Or. Aug. 31, 2016) (leaving the cormorant culling plan in place because the plan provides benefits to listed salmonids, whereas cormorants are not a listed species).

283. *See Council Reaches Out to State Agencies to Discuss 'Alarming Conclusions' of Study Detailing Impacts to Salmon from Cormorants on Astoria Bridge*, COLUMBIA BASIN BULL. (Jan. 26, 2023), https://cbbulletin.com/council-reaches-out-to-state-agencies-to-discuss-alarming-conclusions-of-study-detailing-impacts-to-salmon-from-cormorants-on-astoria-bridge/; Memorandum from Mark Fritsch to Council Members (Nov. 8, 2022), https://www.nwcouncil.org/fs/18099/2022_11_f2.pdf.

284. *See Columbia Basin Bull.*, *supra* note 283.

285. *See id.*

286. *See NW Council History*, *supra* note 230.

287. NAT'L MARINE FISHERIES SERV. W. COAST REGION, 2022 5-YEAR REVIEW: SUMMARY & EVALUATION OF SNAKE RIVER SOCKEYE SALMON 25 (2022), https://repository.library.noaa.gov/view/noaa/45366 (concluding that naturally produced Snake River sockeye are at extremely high risk of extinction).

288. NAT'L MARINE FISHERIES SERV. W. COAST REGION, 2022 5-YEAR REVIEW: SUMMARY & EVALUATION OF SNAKE RIVER SPRING/SUMMER CHINOOK SALMON 16 (2022), https://repository.library.noaa.gov/view/noaa/45367 (observing that Snake River chinook populations are experiencing consistent, sharp declines); NAT'L MARINE FISHERIES SERV. W. COAST REGION, 2022 5-YEAR REVIEW: SUMMARY & EVALUATION OF SNAKE RIVER BASIN STEELHEAD 18 (2022), https://repository.library.noaa.gov/view/noaa/45368 [hereinafter SNAKE RIVER BASIN STEELHEAD] (]determining that Snake River steelhead have been experiencing sharp declines in population, including a 50% decrease in population in five years); NAT'L MARINE FISHERIES SERV. W. COAST REGION, 2022 5-YEAR REVIEW: SUMMARY & EVALUATION OF UPPER COLUMBIA RIVER SPRING-RUN CHINOOK SALMON AND UPPER COLUMBIA RIVER STEELHEAD 19–20 (2022), https://repository.library.noaa.gov/view/noaa/45369 (concluding that Upper Columbia River spring-run chinook are at a high risk of extinction, with a decline of 48% in five years, and all four populations of Upper Columbia River steelhead also experienced sharp declines). An existential threat to all upper Columbia salmon is the invasion of Northern pike, voracious predators, first introduced to the Columbia Basin by Montanans as recreational fish. *See* PACIFIC SALMON LAW, *supra* note 1, at 158–60.

289. SNAKE RIVER BASIN STEELHEAD, *supra* note 288, at 16 (finding that Middle Columbia River steelhead face a moderate threat of extinction); OREGON DEP'T OF FISH & WILDLIFE AND NAT'L MARINE FISHERIES SERV. NW. REGION, UPPER WILLAMETTE RIVER CONSERVATION AND RECOVERY PLAN FOR CHINOOK SALMON AND STEELHEAD 4-3 (2011), https://repository.library.noaa.gov/view/noaa/15981.

risk of extinction.[290] Population health for Lower Columbia salmonids populations is highly varied, with some populations at or near extinction while others are rebounding, largely due to removal of smaller dams on tributary habitat.[291] The 2023 pre-season forecast for summer steelhead passing Bonneville Dam was projected to be the lowest on record.[292] No listed ESUs in the Columbia Basin are making significant progress toward recovery.

D. Oregon Coast

The many rivers and streams of coastal Oregon once held an estimated 300,000 to 600,000 chinook and anywhere from one to two million coho.[293] By the 1990s, chinook runs had declined by thirty to fifty percent, and coho runs had fallen even more precipitously to less than five percent of their historic numbers.[294] Multiple factors led to these collapses: high commercial harvest rates, hatchery overproduction, widespread habitat degradation, and poor ocean conditions.[295] Coho spend a significant part of their lives in freshwater river systems, which make them especially vulnerable to habitat and water quality degradation.[296] In 1993, Pacific Rivers Council and twenty-two other organizations petitioned NMFS to add all West Coast coho species to the endangered species list.[297] NMFS responded in 1995 with

290. OR. DEP'T OF FISH & WILDLIFE AND NAT'L MARINE FISHERIES SERV. NW. REGION, *supra* note 289, at 4. We had to use decade-old figures because the most recent evaluations sidestep current salmon status.

291. NAT'L MARINE FISHERIES SERV. W. COAST REGION, 2022 5-YEAR REVIEW: SUMMARY & EVALUATION OF LOWER COLUMBIA RIVER CHINOOK SALMON, COLUMBIA RIVER CHUM SALMON, LOWER COLUMBIA RIVER COHO SALMON, LOWER COLUMBIA RIVER STEELHEAD, 32–33 (2022), https://repository.library.noaa.gov/view/noaa/48670 (noting that lower Columbia River coho and steelhead populations are at moderate risk of extinction); *Id.* at 30–31 (finding that with the exception of three demographically independent populations (DIPs) which have improved in abundance since 2014, abundances for Columbia River chum salmon were assumed to be at or near zero); *Id.* at 29–30 (Lower Columbia River chinook have experienced population increases in about 50% of fall-run populations and 75% of the spring-run populations. In particular, Sandy River spring-run chinook have nearly doubled in five years, due largely to the removal of two dams on that river).

292. *See* The Conservation Angler, *2023 Columbia River Preseason Summer Steelhead Forecast: Projected Returns Just 36% of an already-low 10-year Current Average* (June/July newsletter).

293. NATIVE FISH SOC'Y CTR. FOR BIOLOGICAL DIVERSITY UMPQUA WATERSHED, PETITION TO LIST THE OREGON COAST, SOUTHERN OREGON AND NORTHERN CALIFORNIA COASTAL ESUS OF CHINOOK SALMON (*ONCORHYNCHUS TSHAWYTSCHA*) UNDER THE ENDANGERED SPECIES ACT, at 25 (Aug. 4, 2022), https://media.fisheries.noaa.gov/2022-08/2022%20Chinook%20Petition%20080422_508-compliant.pdf. [hereinafter Petition to List Chinook]; Endangered and Threatened Species; Proposed Threatened Status for Three Contiguous ESUs of Coho Salmon Ranging from Oregon Through Central California, 60 Fed. Reg. 38011 at 38021 (1995) (codified in part at 50 C.F.R. pt. 227) [hereinafter Proposed Threatened Status].

294. *See* Petition to List Chinook, *supra* note 293, at 25.

295. *Id.*

296. *See* JAY NICHOLAS, STATE OF OR., OREGON COASTAL SALMON RESTORATION INITIATIVE: THE OREGON PLAN 7 (1997) [hereinafter OREGON COASTAL SALMON RESTORATION INITIATIVE]; *see also* Charles Huntington et al., *A Survey of Healthy Native Stocks of Anadromous Salmonids in the Pacific Northwest and California*, FISHERIES March 1996, at 6, 10.

297. Endangered and Threatened Species; Threatened Status for Southern Oregon/Northern California Coast Evolutionarily Significant Unit (ESU) of Coho Salmon, 62 Fed. Reg. 24588 at 24589 (1997) [hereinafter Threatened Status for Oregon coho].

a proposed listing, identifying six evolutionary significant units (ESUs)[298] ranging from coastal British Columbia to central California, including two Oregon coho species: the Oregon Coast ESU ("OC" coho) and the Southern Oregon/ Northern California ESU ("SONC" coho).[299]

Within two months of NMFS's proposal, however, in an effort to avoid an ESA listing, Oregon Governor Kitzhaber announced that the state would begin its own conservation program.[300] Launching the Oregon Coastal Salmon Restoration Initiative ("OCSRI"), the state convened agency working groups and stakeholder meetings, culminating in a 1997 conservation proposal.[301] In order to avoid the listing, the state aimed to restore coastal coho to "productive and sustainable levels," emphasizing that it would rely on "existing laws and environmental protections."[302] The OCSRI envisioned a four-part, mostly voluntary program, in which the state would coordinate agency efforts, promote community-led actions, conduct monitoring, and take "appropriate corrective measures" through education and selective enforcement of existing laws.[303] Oregon negotiated a memorandum of understanding (MOU) with NMFS, promising to implement conservation measures through the OCSRI, and NMFS agreed to support its efforts to avoid a listing.[304]

As a result, in 1997, NMFS made the unprecedented decision to reverse its proposed listing on the grounds that Oregon Coast coho would no longer need ESA protection due to the state's promised OCSRI program and the MOU.[305] Conservation groups immediately challenged the agency's decision in federal district court, arguing that NMFS's denial on the basis of the state's voluntary, prospective, and unenforceable conservation program violated the federal agency's statutory duty to protect biologically threatened species under the ESA.[306]

In 1998, U.S. Magistrate Judge Janice Stewart agreed with the conservationists that NMFS's decision to deny listing coho was arbitrary and capricious.[307] Stewart ruled that the agency had applied an "incongruous" legal standard by basing its reversal decision on prospective, voluntary actions that only

298. The ESA defines "species" as any "distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." 16 U.S.C. §1532(16). Since 1991, NMFS has defined endangered salmon species by ESU. For distinct salmon populations to qualify as an ESU they must be 1) "reproductively isolated from other conspecific population units," and 2) "represent an important component in the evolutionary legacy of the biological species." Policy on Applying the Definition of Species Under the Endangered Species Act to Pacific Salmon, 56 Fed. Reg. 58612 at 58618 (1991).

299. Proposed Threatened Status, *supra* note 293, at 38011.

300. *See* Christine Golightly, *The Oregon Coastal Salmon Restoration Initiative: A Flawed Attempt to Avoid ESA Listing*, 7 N.Y.U. ENV'T L. J. 398, 406 (1999).

301. *Id.*

302. *Id.*

303. *See* OREGON COASTAL SALMON RESTORATION INITIATIVE, *supra* note 296, at 3.

304. *See* Golightly, *supra* note 300, at 399. The OCSRI was thus an archetypical example of agency capture, although the fact that the state agency captured the federal agency was a bit unusual. On agency capture and how to avoid it, *see* PREVENTING REGULATORY CAPTURE: SPECIAL INTEREST INFLUENCE AND HOW TO LIMIT IT (Daniel Carpenter & David A. Moss eds. 2014); *see also Protecting the Public Interest: Understand the Threat of Agency Capture, Before the Subcomm. on Admin. Oversight and the Courts, Comm. On the Judiciary*, 111th Cong., 2d Session (2010).

305. *See* Threatened Status for Oregon coho, *supra* note 297, at 24607.

306. *See* Or. Nat. Res. Council v. Daley, 6 F.Supp. 2d 1139, 1150 (D. Or. 1998).

307. *Id*. at 1152.

might protect the fish from reaching endangered status.[308] She held the ESA does not allow agencies to rely on either prospective or unenforceable actions as reasons to deny a listing.[309] The court concluded: "[t]he wait-and-see stance of the NMFS has no support in the ESA or case law. Instead of placing the risk on the future and voluntary conservation measures proposed by the OCSRI, the NMFS unlawfully placed the risk of failure squarely on the species."[310] Consequently, NMFS returned to the drawing board, and in 1998 listed as Oregon Coast coho as a threatened species.[311]

In the years since listing, federal recovery efforts for coastal coho have focused on habitat restoration.[312] In its 1998 listing decision, NMFS ascertained that intensive habitat degradation, water diversions, overharvests, and hatchery propagation had contributed to the species' abrupt decline.[313] In a 2016 recovery plan, the agency identified three primary factors limiting recovery: 1) lack of habitat complexity, 2) degraded water quality, and 3) blocked or impaired fish passage.[314] But through ensuing local collaboration, more than 200 habitat restoration projects have improved coho rearing success by reconnecting tidal estuaries, removing

308. *Id.* ("It is incongruous for the NMFS to defer listing a species as "threatened" because the agency is hoping for a significant alteration in the conditions or practices presently threatening the long-term viability of the species, which in turn might prevent the species from actually reaching the "endangered" level. The whole purpose of listing species as "threatened" or "endangered" is not simply to memorialize species that are on the path to extinction, but also to compel those changes needed to save these species from extinction.")

309. *Id.* at 1155.

310. *Id.* at 1160–61.

311. Another 10 years of back-and-forth litigation would pass, however, before coastal coho received stable ESA protection. In 2001, a group of private property advocates challenged the listing. Alsea Valley Alliance v. Evans, 161 F.Supp.2d 1154, 1162 (D. Or. 2001). In *Alsea Valley Alliance*, federal district judge Michael Hogan decided that the coastal coho listing was arbitrary and capricious because NMFS had failed to consider hatchery fish in its listing determination. NMFS' policy had been to include hatchery populations in ESU findings, but then to only consider wild populations for listing. Rather than appeal, NMFS changed its policy and eliminated the distinction between hatchery and wild fish in listings. Policy on the Consideration of Hatchery–Origin Fish, 70 Fed. Reg. 37, 204 (June 28, 2005) (to be codified at 50 C.F.R. pts. 223–24). The agency proceeded to conduct a new study and proposed relisting coho. In the interim, however, Oregon conducted its own viability study of coastal coho, and NMFS relied on these more hopeful findings to again withdraw the relisting. Trout Unlimited challenged the withdrawal, and in 2007 Judge Stewart determined that NMFS had improperly based its decision on the state's reliability assessment instead of the best available science. That court ordered a new determination. Trout Unlimited v. Lohn, 645 F.Supp.2d 929, at 942–62 (D. Or. 2007). In 2008, NMFS issued a final rule listing Oregon Coast coho as a threatened species. Final Threatened Listing Determination, Final Protective Regulations, and Final Designation of Critical Habitat for the Oregon Coast Evolutionarily Significant Unit of Coho Salmon, 73 Fed. Reg. 7815 (Feb. 11, 2008) (to be codified at 50 C.F.R. pts. 223, 226).

312. *ESA Listing*, COAST COHO P'SHIP, https://coastcoho.org/why-esa-listed (last visited Apr. 7, 2023).

313. NAT'L MARINE FISHERIES SERV., FINAL ESA RECOVERY PLAN FOR OREGON COAST COHO SALMON (ONCORHYNCHUS KISUTCH) S-5 (2016).

314. *Id* at S-5–6. NMFS also listed uncertainty regarding the adequacy of voluntary programs as a factor limiting coho recovery. *Id.*

stream blockages, restoring complexity in coastal rivers, and reintroducing beaver to watersheds.[315]

The restoration efforts on the Siuslaw River are an example of joint federal-state-tribal efforts. Since 1997, the Siuslaw Watershed Council has been working with the federal government, the state of Oregon, and other local groups to restore salmon in the Siuslaw River.[316] This watershed-based approach has included restoring meander geometry, stream complexity, and wetland connectivity.[317]

Reforms of timber harvesting have also resulted in some salmon habitat protections. For example, the Northwest Forest Plan (NFP) designated for protection over nine million acres of high quality water resources and salmon habitat.[318] The NFP's aquatic conservation strategy (ACS) aims to restore and preserve the health of aquatic ecosystems within the plan area, regardless of whether those areas are under protection from logging, by continuously monitoring watershed conditions and protecting riparian areas from the effects of management activities.[319] The strategy contains four components: riparian reserves, key watersheds, watershed analysis, and watershed restoration.[320] The focus is multi-scale, involving regional, river basin,

315. *See Endangered Species Act Reviews for Some Northwest Salmon and Steelhead Show Promise for Recovery*, NAT'L MARINE FISHERIES SERV. (Oct. 21, 2022), https://www.fisheries.noaa.gov/feature-story/endangered-species-act-reviews-some-northwest-salmon-and-steelhead-show-promise.

316. *About the Council*, SIUSLAW WATERSHED COUNCIL, https://www.siuslaw.org/the-story-of-the-siuslaw/about-the-council/ (last visited June 3, 2023).

317. For examples of past Watershed Council projects, *see Restoration Activities*, SIUSLAW WATERSHED COUNCIL, https://www.siuslaw.org/restoration-activities-2/ (last visited June 3, 2023). In 2022, the council received more than $400,000 from the Oregon Watershed Enhancement Board to continue adding large woody debris to tributaries of the Siuslaw in order to increase stream complexity and encourage formation of deeper pools, gravel beds, and secondary channels beneficial to salmon and steelhead. *See* Adam Duvernay, *Siuslaw Coho Salmon Spawning Gets Assist from Grant-Funded Improvements to Watershed Streams*, EUGENE REG.-GUARD (May 13, 2022), https://www.registerguard.com/story/news/2022/05/13/grant-funds-helicopter-transport-of-trees-to-improve-siuslaw-watershed-coho-salmon-habitat/65355178007/.

318. U.S. DEP'T OF AGRIC., STANDARDS AND GUIDELINES FOR MGMT. OF HABITAT FOR LATE-SUCCESSIONAL AND OLD-GROWTH FOREST RELATED SPECIES WITHIN THE RANGE OF THE N. SPOTTED OWL A-5 (1991).

319. *See* U.S. DEPT. OF AGRIC., FINAL SUPPLEMENTAL ENV'T IMPACT STATEMENT ON MGMT. OF HABITAT FOR LATE-SUCCESSIONAL AND OLD-GROWTH FOREST RELATED SPECIES WITHIN THE RANGE OF THE N. SPOTTED OWL app. B6 at B-82–83 (1994) [hereinafter ACS Planning Document] (describing in full the AC's objectives).

320. U.S. DEP'T OF AGRIC., REC. OF DECISION FOR AMENDMENTS TO FOREST SEV. AND BUREAU OF LAND MGMT. PLAN. DOCUMENTS WITHIN THE RANGE OF THE N. SPOTTED OWL 9 (1994) [hereinafter NFP Record of Decision]; *see also* ACS Planning Document, *supra* note 319, at B-82 ("The Assessment Team believed that any species-specific strategy aimed at defining explicit standards for habitat elements would be insufficient for protecting even the targeted species. To succeed, any aquatic conservation strategy must strive to maintain and restore ecosystem health at watershed and landscape scales"). The ACS protects against the adverse effects of management activities within "riparian reserves" by establishing buffer zones around water features. Buffer width and management requirements are a function of a waterbody's characteristics, which include fish-bearing streams; permanently flowing non-fish-bearing streams; lakes and natural ponds; constructed ponds, reservoirs, or wetlands greater than one acre; seasonally flowing or intermittent streams; and wetlands less than one acre, unstable areas, and potentially unstable areas. NFP Record of Decision at 9. Agencies are required to adhere to requirements within these reserves for activities within these areas, including "timber management, road construction and

watershed, and individual sites.[321] Forest Service monitoring of the ACS implementation determined that "aquatic and riparian ecosystems in the [NFP] area are improving as expected, albeit slowly."[322]

Along the Oregon coast, where nonfederal timber is plentiful, recent efforts to amend Oregon's logging practices have helped address other major limiting factors to coho recovery. Most prominently, in 2020 conservation organizations and private timber owners reached a historic agreement to amend the Oregon Forest Practices Act ("OFPA") and improve logging practices across the state.[323] That process, known as the Private Forest Accord, culminated in three bills amending the OFPA and creating incentives for landowner compliance with improved stream buffers, erosion control, and other species and habitat protections on private timber land.[324] The result enabled the timber industry, in a media campaign, to celebrate its commitment to what is called "Oregon Forests Today and Forever."[325]

Another significant development was the 2023 settling of a suit by environmentalists against the Oregon Department of Forestry (ODF) over the agency's permitting of widespread roadbuilding and clearcut logging practices on the steep slopes of the Clatsop and Tillamook state forests.[326] Logging steep slopes produces sediment in coastal streams, especially damaging to coho which spend up

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maintenance, grazing, recreation, minerals management, fire/fuels management, research, and restoration activities." *Id.* "Key watersheds" provide refuge for at-risk aquatic species, including anadromous salmonids. *Id.* at 10.

The ACS classifies these watersheds as Tier 1, Tier 2, or non-key. Tier 1 watersheds are managed for at-risk anadromous salmonids, bull trout, and resident fish. *Id*. The remaining two categories are not managed specifically for fish: Tier 2 watersheds are maintained for high water quality and non-key watersheds comprise all other watersheds. *Id*.; *see also* Michael C. Blumm, *The Amphibious Salmon: The Evolution of Ecosystem Management in the Columbia River Basin*, 24 ECOLOGY L.Q. 653, 670 (1997) (describing the ACS provisions). "Watershed analysis" undergirds the strategy, establishing baseline conditions of physical and biological processes within watershed ecosystems which informs watershed restoration proposals, refine riparian boundaries, and development of monitoring programs. *Id*. (characterizing watershed analysis as the "linchpin" in the NFP). Additionally, NEPA analyses often use data gathered by the watershed analysis. *Id*. The long-term "watershed restoration" program seeks to restore degraded watershed habitat. NFP Record of Decision, *supra*, at 10.

321. Michael C. Blumm, Susan Jane Brown & Chelsea Stewart-Fusek, *The World's Largest Ecosystem Management Plan: The Northwest Forest Plan After a Quarter-Century*, 52 ENV'T L. 1, 28 (2022).

322. U.S. DEP'T OF AGRIC., SYNTHESIS OF SCI. TO INFORM LAND MGMT. WITHIN THE NW. FOREST PLAN AREA 93 (2018).

323. *See* OR. DEP'T OF FORESTRY, PRIVATE FOREST ACCORD REPORT 2022 1, 4 (2008), https://www.oregon.gov/odf/aboutodf/documents/2022-odf-private-forest-accord-report.pdf.

324. *See* S.B. 1501, 81st Leg. Assemb., Reg. Sess. (Or. 2022); S.B. 1502, 81st Leg. Assemb., Reg. Sess. (Or. 2022); H.B. 4055, 81st Leg. Assemb., Reg. Sess. (Or. 2022). These bills added more than 100 changes to the OFPA.

325. *See Sponsors*, OR. FORESTS TODAY AND FOREVER, https://web.archive.org/web/20231021130501/http://foreststodayandforever.org/about/sponsors/ (last visited Aug. 10, 2023) (listing sponsors, largely from the timber industry).

326. *See* April Ehrlich, *Oregon Settles Lawsuit Over Salmon Protections Near Logging Sites*, OR. PUB. BROAD. (March 6, 2023), https://www.opb.org/article/2023/03/26/oregon-settles-lawsuit-over-salmon-protections-near-logging-sites/ (Previous attempts by the agency to require similar protections were successfully opposed by timber advocates).

to half of their lives in freshwater.[327] The environmentalists claimed that the regulations caused illegal "takes" of listed species without permits, a violation of section 9 of the ESA.[328] The settlement agreement endorsed the terms of a draft habitat conservation plan (HCP) published by ODF in 2022 to comply with ESA requirements for the incidental takes of numerous endangered species as a result of state logging practices; once finalized, the HCP will apply to all Oregon state forestland.[329] In the settlement, ODF committed to extend stream buffers from 25 to 120 feet and impose new buffer requirements for non-fish bearing streams and unstable uplands, which had lacked any harvest protection.[330] ODF also promised to inventory its vast road network, identify roads that contribute sediment or block fish passage, and estimate the cost of repair.[331]

In another settlement agreement, conservation groups, timber industry representatives, Oregon State University, and the state of Oregon agreed to designate the Elliott State Forest as a state research forest.[332] The state had moved to sell the entire state forest to the timber industry after lawsuits aimed at protecting marbled murrelets halted planned timber harvests.[333] The resulting public furor prompted efforts to transfer ownership of the forest from the state school fund to an entity that

327. *See* Cassandra Profita, *Lawsuit Aims to Protect Salmon from Logging on Oregon State Forests*, OR. PUB. BROAD. (June 13, 2018, 5:15 PM), https://www.opb.org/news/article/coho-salmon-logging-oregon-forests-lawsuit/ (discussing *Center for Biological Diversity v. Daugherty* (filed June 13, 2018)).

328. *Id.*

329. Western Oregon State Forests Habitat Conservation Plan, 87 Fed. Reg. 24191 (Apr. 22, 2022). *See* WESTERN OREGON STATE FORESTS HABITAT CONSERVATION PLAN: PUBLIC DRAFT, OR. DEP'T OF FORESTRY (2002) https://media.fisheries.noaa.gov/2022-03/wosf-hcp-feb-2022.pdf. After facing considerable opposition from private landowners concerning a bill that would have established mandatory buffer zones, the Washington Legislature considered a bill that would establish a voluntary, regionally focused riparian grant program. *See* Todd Myers, *HB 1720: Legislation is a Positive Step to Help Salmon by Collaboratively Reducing Stream Temperature*, WASH. POL'Y CTR. (Feb. 2, 2023), https://www.washingtonpolicy.org/publications/detail/hb-1720-legislation-is-a-positive-step-to-help-salmon-by-collaboratively-reducing-stream-temperature. Under the program, grant funding would be awarded throughout the state for stream restoration to benefit salmon habitat. H.B. 1720, 68th Leg., Reg. Sess. (Wash. 2023). So far, this bill has only been introduced into the Washington State House. H.B. 1838, 67th Leg., Reg. Sess. (Wash. 2022). The California Code established four classes of waterbodies, setting corresponding buffers depending on slope. CAL. NAT. RES. CODE §§ 916.5, 936.4, 956.4 (WEST 2023). For example, a class I waterbody bordering a slope of 30–50 percent (approximately 15–25 degrees) requires a stream buffer of 100 feet. *Id*.

330. *Id.; See Settlement Agreement*, BIOLOGICAL DIVERSITY (2023), https://www.biologicaldiversity.org/species/fish/coho_salmon/pdfs/Coho-Settlement-Agreement-2023-03-23.pdf; and April Erlich, *Oregon Settles Lawsuit Over Salmon Protections Near Logging Sites*, OR. PUB. BROAD. (Mar. 23, 2023, 7:00 AM), https://www.opb.org/article/2023/03/26/oregon-settles-lawsuit-over-salmon-protections-near-logging-sites/.

331. *Settlement Agreement*, *supra* note 330.

332. David Steves & Cassandra Profita, *Oregon's Elliott research forest will be North America's largest*, OR. PUB. BROAD. (Dec. 14, 2022, 10:37 AM), https://www.opb.org/article/2022/12/14/oregons-new-elliott-research-forest-declared-north-americas-largest/.

333. Anna V. Smith, *Oregon may sell a state forest that's no longer profitable*, HIGH COUNTRY NEWS (Mar. 23, 2017), https://www.hcn.org/articles/oregon-looks-to-sell-a-state-forest-thats-no-longer-profitable.

could implement more conservation-focused management.[334] This new research designation sets aside 80,000 acres of habitat.[335] Although some of the land may be logged in the future to collect research data, 34,000 acres will be permanently set aside, constituting the largest stretch of protected forest in the coast range.[336] Designating the Elliott as a research forest decoupled the forest from the obligation to raise funds for public schools, creating an unprecedented new management paradigm for Oregon state forest land.[337]

In recent years, the Oregon Fish and Wildlife Commission has adopted new regulations limiting hatchery production to emphasize conservation of wild listed coho through a network of "wild fish emphasis areas."[338] These wild fish management areas now extend along the entire coast—from the mouth of the Columbia River to California's Smith River—creating new monitoring requirements and harvest guidelines, while sharply limiting hatchery production to prioritize wild

334. *See* Zach Urness, *Elliott State Forest sale closes amid controversy*, STATESMAN J. (June 12, 2014, 9:00 PM), https://www.statesmanjournal.com/story/news/2014/06/13/elliott-state-forest-sale-closes-amid-controversy/10408225/ (describing the sale as "a flashpoint in the lingering dispute between environmentalists and timber companies"); Steves & Profita, *supra* note 332.

335. Steves & Profita, *supra* note 332.

336. *Id.*

337. *Id.* The Oregon Common School Fund provides funding for schools from timber sales, though reliance on this source of revenue has decreased in recent years. State income and local property taxes now serve as the primary funding source for state schools, due in part to maintenance costs exceeding revenue generation on these state lands, as was the case with the Elliott. *Id.* In November 2023, Oregon State University pulled out of the agreement in which it would manage the research forest, citing disagreements with local tribes, which thought the agreement lacked sufficient tribal participation and reflected commitment to Indigenous practices and knowledge. *See* April Erlich & Monica Samayoa, *Oregon State walks away from Elliott Forest plan, but backers say forest in good hands*, OR. PUB. BROAD. (Nov. 16, 2023, 7:00 AM), https://www.opb.org/article/2023/11/16/elliott-state-research-forest-limbo-osu-steps-back/. The University also took issue with the agreement's set harvest levels, which the University explained undermined the overall goals of a research forest. *See* Letter from Jayathi Y. Murthy, President, Or. State Univ., to Or. State Land Bd. (Nov. 13, 2023), https://mycof.forestry.oregonstate.edu/sites/default/files/President%20Murthy%20Letter%20to%20State%20Land%20Board%2011-13-2023.pdf.

338. *Commission Adopts Rogue South Coast Plan that Emphasizes Wild Fish, Continues to Allow Wild Steelhead Retention*, OR. DEP'T OF FISH AND WILDLIFE (Dec. 17, 2021), https://www.dfw.state.or.us/news/2021/12_Dec/121721.asp. These stream buffers limit and prohibit activities within these riparian conservation areas (RCAs), maximizing the amount of large woody debris that would naturally accumulate in the streams, thereby reducing sedimentation and stream temperature. The RCAs encompass approximately 35,000 acres of the total area covered by the HCP. WESTERN OREGON STATE FORESTS HABITAT CONSERVATION PLAN: PUBLIC DRAFT, *supra* note 329, ES-8. In addition to leaving timber along riparian corridors, the plan sets forth a mechanism to fund additional conservation efforts such as placements of woody debris into steams, side-channel projects, and fish passage improvements. *Id.* at ES-11. Although the fund is generated through a nominal tax on timber harvests, the fund accrues an average of one million dollars per year. *Id.*

fish.[339] In 2022, NMFS estimated that wild coho now make up 99 percent of the spawning fish in coastal populations.[340]

National legislation has been important in protecting Oregon coast salmon streams. In 2016, Congress imposed a twenty-year moratorium on mineral extraction in Southwestern Oregon in response to foreign mining interests initiating exploration in the region.[341] Recently, Representative Val Hoyle (D-Or.) introduced the Southwest Oregon Watershed and Salmon Protection Act in Congress, which would make the temporary ban on mineral development permanent.[342]

Although Oregon Coast coho have shown signs of resilience and recovery, coastal spring-run chinook and California chinook have struggled in recent years. In August 2022, environmentalists petitioned NMFS to list Oregon Coast and Southern Oregon/Northern California chinook ESUs as threatened or endangered because of their dwindling populations, which have declined because of drought.[343] In early 2023, NMFS responded by beginning to review for a potential listing.[344]

In April 2023, NMFS accepted the Pacific Fisheries Management Council's recommendation to close the entire 2023 coastal commercial salmon fishing season along all of California, to protect depleted California chinook populations.[345] Earlier

339. *See Oregon Commission Expands South Coast Wild Fish Protections*, WILD SALMON CENTER (Jan. 25, 2022), https://wildsalmoncenter.org/2022/01/25/oregon-commission-expands-south-coast-wild-fish-protections/.

340. Kim Kratz, *Opinion: Oregon Coast Salmon Recovery is Within Our Reach*, THE OREGONIAN (Dec. 14, 2022, 6:31 AM), https://www.oregonlive.com/opinion/2022/12/opinion-oregon-coast-salmon-recovery-is-within-our-reach.html (discussing a NMFS 5-year review in which the agency concluded that most Oregon coho runs are now on a sustainable path and no long are at risk of extension, although about 20% need improvement).

341. Sam Davidson, *Wild Steelheaders United and Trout Unlimited Applaud Introduction of Southwest Oregon Watershed and Salmon Protection Act*, TROUT UNLIMITED (July 27, 2023), https://www.tu.org/press-releases/wild-steelheaders-united-and-trout-unlimited-applaud-introduction-of-southwest-oregon-watershed-and-salmon-protection-act/.

342. Press Release, Rep. Hoyle Introduces Bill to Protect Southwestern Oregon Rivers from Mining Pollution (July 27, 2023), https://hoyle.house.gov/media/press-releases/rep-hoyle-introduces-bill-protect-southwestern-oregon-rivers-mining-pollution.

343. *See* Petition to List Chinook, *supra* note 293, at 10–11 (arguing both the Oregon Coast and the Southern Oregon/Northern California and populations face "existential threats" and should be protected "to preserve this critical life history diversity." Spring chinook populations which arrive are genetically unique from fall run chinook, which make up the bulk of the population. Spring chinook evolved to occupy a unique niche in the run, entering the river system earlier and spending more time there over the summer months); *See also* Roman Battaglia, *Oregon Coast's Chinook salmon among populations under review for endangered-species listing*, OR. PUB. BROAD. (Jan. 13, 2023, 6:00 AM), https://www.opb.org/article/2023/01/13/oregon-coast-chinook-salmon-endangered-species-review/; Julie Watson & Lisa Baumann, *U.S. panel closes Chinook salmon ocean fishing for much of West Coast*, JEFFERSON PUB. RADIO (Apr. 7, 2023, 3:03 PM), https://www.ijpr.org/environment-energy-and-transportation/2023-04-07/us-panel-closes-chinook-salmon-ocean-fishing-for-much-of-west-coast (explaining that drought conditions have contributed to the rapid decline in chinook populations in recent years).

344. 90-Day Finding on a Petition to List Oregon Coast and Southern Oregon and Northern California Coastal Chinook Salmon as Threatened or Endangered Under the Endangered Species Act, 88 Fed. Reg. 1548 (proposed Jan. 11, 2023) (to be codified at 50 C.F.R. pt. 223–24).

345. *Pacific Fishery Management Council Adopts 2023 West Coast Ocean Salmon Seasons*, PACIFIC FISHERIES MGMT. COUNCIL, (Apr. 6, 2023), https://www.pcouncil.org/documents/2023/04/pacific-fishery-management-council-adopts-2023-west-coast-ocean-salmon-seasons.pdf/.

in the year, NMFS closed the scheduled chinook fishery until May.[346] The closures were a response to forecasts predicting record-low California chinook returns, following years of drought, heat waves, and water-stressed rivers.[347]

Tribal co-management has increased throughout the country,[348] and especially along the Oregon Coast. Recently, the Coquille Tribe entered into a co-management agreement with the Oregon Department of Fish and Game (ODFW),[349] in the most extensive agreement that ODFW has approved: the area under co-management encompasses five counties in southwestern Oregon.[350] In collaboration with ODFW, the Tribe will set harvest level standards for tribal members, with the Tribe controlling the harvest method.[351] The regulations, which must comply with state and federal harvest closures,[352] govern all fish and wildlife managed by ODFW and set limits based on the best available science of estimated run sizes, escapement goals, Tribal needs, and conservation necessity.[353] The plan regulates only subsistence and ceremonial harvests, although it may be amended to regulate

346. *See id.*

347. *See* Catrin Einhorn, *California Salmon Stocks Are Crashing. A Fishing Ban Looks Certain.*, N.Y. TIMES (Apr. 3, 2023), https://www.nytimes.com/2023/04/03/climate/salmon-fishery-closed-california.html.

348. Tribal co-management is a priority of the Biden administration. *See* Press Release, U.S. Dept of the Interior, Interior Issues Guidance to Strengthen Tribal Co-Stewardship of Public Lands and Waters (Sept. 13, 2022), https://www.doi.gov/pressreleases/interior-department-issues-guidance-strengthen-tribal-co-stewardship-public-lands-and. *See also* Michael C. Blumm & Lizzy Pennock, *Tribal Consultation: Toward Meaningful Collaboration with the Federal Government*, 33 COLO. ENV'T L. J. 1 (2022); Kevin Washburn, *Facilitating Tribal Co-Management of Federal Public Lands*, 2022 Wis. L. Rev. 263.

349. Chris Aadland, *Oregon tribe, state leaders enter historic agreement*, INDIAN COUNTRY TODAY (JUNE 23, 2022) https://ictnews.org/news/oregon-tribe-state-leaders-enter-historic-agreement (last visited June 3, 2023). Plummeting returns of fall chinook in the Coquille River encouraged the Tribe to push for this agreement. *See* Letter from Brenda Meade, Chairman, Coquille Indian Tribe, to Senator Michael Denbrow and Representative Knanh Pham, Co-Chairs, Joint Subcommittee on Natural Resources, Oregon State Legislature (Mar. 21, 2023), https://olis.oregonlegislature.gov/liz/2023R1/Downloads/PublicTestimonyDocument/79158. The Tribe elected to pool resources and work with the state to restore salmon runs. *Id.* The Tribe's legal counsel, John Ogan, has described the agreement as one of the best functioning models of co-management. Telephone Interview with John Ogan, Legal Counsel, Coquille Indian Tribe (July 25, 2023) [hereinafter Ogan interview].

350. Ogan interview, *supra* note 349.

351. Memorandum of Agreement to Define Exercise of Hunting, Fishing, Trapping, and Gathering by the Coquille Indian Tribe and its Members and for Cooperative Management of Natural Resources Between The Coquille Indian Tribe and The State of Oregon, through the Department of Fish & Wildlife 4–5 (June 17, 2022), https://www.dfw.state.or.us/agency/commission/minutes/22/06_June/C/Exhibit%20C_%20Attachment%203_%20Amended%20Memorandum%20of%20Agreement_Coquille%20Indian%20Tribe_6-17-22%20.pdf [hereinafter Coquille Memorandum of Agreement].

352. *Id.* at 10.

353. *Id.* at 5.

commercial harvests as well.[354] Signed for a five-year term, both parties intend the agreement to be perpetual.[355] However, in the event of a disagreement, either party

354. The agreement defines "subsistence harvest" as being consistent with Tribal cultural practices for acquiring traditional foods and other resources for personal, familial, or community sharing. Agenda Item Summary: Coquille Agreement, 2 (June 17, 2022), https://www.dfw.state.or.us/agency/commission/minutes/22/06_June/C/Exhibit%20C_Attachment%201_Agenda%20Item%20Summary_Coquille%20Agreement.pdf. The agreement defines "ceremonial harvest" as harvest for community-wide events that acknowledge and perpetuate religious, cultural, and other traditions. *Id.* Ceremonial harvests may occur throughout the year. *Id.*

355. Coquille Memorandum of Agreement, *supra* note 351, at 14. In the event of a disagreement, either party may unilaterally terminate the agreement if after good faith and diligent efforts the parties are unable to resolve the dispute. *Id.* The Coos, Lower Umpqua and Siuslaw, and Cow Creek tribes initially withheld support because the agreement overlapped the ancestral territories of those tribes. These tribes eventually agreed after the Coquille and ODFW added language guaranteeing that the agreement would not diminish the rights or privileges of other tribes. Aadland, *supra* note 349. Additionally, if another area tribe develops a similar co-management agreement, the Coquille will meet annually with that tribe to discuss issues of mutual concern. Coquille Memorandum of Agreement, *supra* note 351, at 7.

Shortly after the Coquille signed its co-management agreement, the Cow Creek Band of Umpqua Tribe of Indians entered into a co-management agreement with essentially identical terms as that of the Coquille's. *See generally* Memorandum of Agreement to Define Exercise of Hunting, Fishing, Trapping and Gathering by the Cow Creek Band of Umpqua Tribe of Indians and its Members and for Cooperative Management of Natural Resources Between the Cow Creek Band of Umpqua Tribe of Indians and the State of Oregon, through the Department of Fish & Wildlife (Feb. 8, 2023), https://dfw.state.or.us/tribal_relations/Cow_Creek/CCBUTI-ODFW_MOA_final_signed_Feb_2023.pdf.

In June 2023, both the Confederated Tribes of Siletz Tribe and Confederated Tribes of the Coos, Lower Umpqua, and Siuslaw Indians signed co-management agreements with the state, similar to those signed by the Coquille and Cow Creek. Karina Brown & Nika Bartoo-Smith, *2 More Tribes Make Historic Co-management Agreements with Oregon*, OR. PUB. BROAD. (June 20, 2023), https://www.opb.org/article/2023/06/20/oregon-department-fish-wildlife-tribes-agreement. The original signing for the Siletz Tribe had been set for a December 2022 meeting, the same meeting in which the Cow Creek Band of Umpqua Tribe of Indians signed their agreement with ODFW. Oregon Fish & Wildlife Comm'n Min., 5 (Dec. 16, 2022), https://www.dfw.state.or.us/agency/commission/minutes/22/12_Dec/December_16_2022_Minutes_final.pdf. However, alleged opposition from the Confederated Tribes of Grand Ronde prompted ODFW to remove the Siletz proposal from the commission agenda at the last minute. *See* Letter from Kathryn Bringham, Chair, Board of Trustees for the Confederated Tribes of the Umatilla Indian Reservation, to Curtis E. Melcher, Dir. of Oregon Dep't of Fish and Wildlife (May 22, 2023), https://www.dfw.state.or.us/agency/commission/minutes/23/08_Aug/Exhibit%20C/Exhibit%20C_Supplemental%20Public%20Correspondence%20Received%20as%20of%207-25-23.pdf. The Siletz's agreement incorporated the restrictive 1980 agreement that the tribe was coerced into with the state as a condition for regaining federal recognition in the 1980s. Memorandum of Agreement with the Confederated Tribes of Siletz Indians, 16 (July 7, 2023), https://records.sos.state.or.us/ORSOSWebDrawer/Recordhtml/9597498.

As a condition for regaining federal recognition in the 1980s, the Siletz Tribe was coerced into signing an agreement with the state of Oregon in which the Tribe ceded its authority to manage fish and wildlife resources on and off-reservation. *See* Agreement Among the State of Oregon, the United States of America and the Confederated Tribes of Siletz Indians of Oregon to Permanently Define Tribal Hunting, Fishing, Trapping, and Gathering Rights of the Siletz Tribe and its Members, 3 (May 2, 1980), https://assets.website-files.com/5ecc17729deedd4c8b908b49/648fd434f75399278b9bd711_Siletz%20Consent%20Decree.pdf. While the Siletz Tribe's co-management agreement incorporates the 1980 agreement, *see* Memorandum of Agreement with the Confederated Tribes of Siletz Indians, 14 (Dec. 12, 2022), https://www.dfw.state.or.us/agency/commission/minutes/22/12_Dec/EX%20C%20-%20SILETZ%20TRIBE%20-%20PDF%20FILES%20FOR%20WEB/Exhibit%20C_Addendum%201_Siletz_Memorandum%20of%20Agreement%20with%20ODFW__12.12.22.pdf, Congress may soon restore the

may unilaterally terminate the agreement if, after good faith and diligent efforts, the parties are unable to resolve the dispute.[356]

E. Klamath Basin

The Klamath Basin, extending over 12,000 square miles, was once home to the third largest salmon runs on the Pacific coast.[357] However, decades of dam building and irrigation diversions have taken a severe toll, slashing run sizes and producing ESA listings.[358] The listed species are of cultural and economic significance to Indian tribes both in the arid upper basin and the lower basin, which

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Tribe's ability to manage natural resources. Twice during 2022, the Senate Committee on Indian Affairs met to discuss a bill introduced by Oregon Senator Jeff Merkley (D) to restore the power of the Siletz Tribe to regulate hunting and fishing on their tribal lands. A Bill to Amend the Siletz Reservation Act to Address the Hunting, Fishing, Trapping, and Animal Gathering Rights of the Confederated Tribe of Siletz Indians, and for Other Purposes, S. 3123, 117th Cong. (2021).

Like the Siletz, the Confederated Tribes of Grand Ronde ceded their hunting, fishing and trapping rights as a condition of restoration in 1983. *See* Brown & Bartoo-Smith, *supra*. In April 2023, Oregon Representative Andrea Salinas (D-Or.) and Senator Jeff Merkley (D-Or.) introduced bills into the U.S. House and Senate to restore the Grand Ronde Tribe's hunting, fishing, trapping, and gathering rights. A Bill to Amend the Grand Ronde Reservation Act to Address the Hunting, Fishing, Trapping, and Animal Gathering Rights of the Confederated Tribes of the Grand Ronde Community, and for Other Purposes, H.R. 2850, 118th Cong. (2023); Grand Ronde Reservation Act, S. 1287, 118th Cong. (2023).

Concerned with the geographic scope of the Confederated Tribes of Grand Ronde's co-management agreement, which included Willamette Falls, the usual and accustomed treaty fishing grounds of other Oregon tribes, as well as prior controversial dealings with the Grand Ronde, the Confederated Tribes of Warm Springs, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes and Bands of the Yakama Nation opposed the agreement. *See* Letter from Kathryn Bringham, Chair, Board of Trustees, to Curtis E. Melcher, Dir. of Oregon Dep't of Fish and Wildlife (May 22, 2023); *See* Letter from Johnathan W. Smith, Sr. Chairmen for Confederated Tribes of the Warm Springs Reservation of Oregon, to Curtis E. Melcher, Dir. of Oregon Dep't of Fish and Wildlife (June 5, 2023); *See* Letter from Gerald Lewis, Chairman, Yakama Tribal Council, to Ms. Mary Wahl, Chair of The Oregon Fish and Wildlife Comm'n (June 14, 2023). The Oregon Fish & Wildlife Commission held a meeting in August 2023 to consider the Grand Ronde proposal. *See generally* Oregon Dep't of Fish and Wildlife, *Oregon Fish & Wildlife Comm'n Meeting August 4, 2023*, YOUTUBE (Aug. 4, 2023), https://www.youtube.com/watch?v=2MXjmEfbUkc. After hearing considerable opposition to the agreement during public testimony by the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe, the Commission postponed signing the co-management agreement. *Id*.

356. Coquille Memorandum of Agreement, *supra* note 351, at 7.

357. *Restoring the Klamath River Basin: The Largest Dam Removal Project in the World*, NOAA FISHERIES: DIVE IN WITH NOAA FISHERIES (Aug. 4, 2023), https://www.fisheries.noaa.gov/podcast/restoring-klamath-river-basin-largest-dam-removal-projectworld#:~:text=The%20Klamath%20was%20once%20the,in%20salmon%20and%20steelhead%20abundance.

358. In 1988, the Fish & Wildlife Service (USFWS) listed the shortnose sucker and the Lost River sucker in Klamath Lake as endangered, due to water quality problems, changed streamflows, and fish passage barriers. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Shortnose Sucker and Lost River Sucker, 53 Fed. Reg. 27130 (July 18, 1988) (codified at 50 CFR pt. 17). In 1997, the NMFS listed Southern Oregon/Northern California coastal coho as threatened, because of dams and irrigation withdrawals, including unscreened diversions. Endangered and Threatened Species; Threatened Status for Southern Oregon/Northern California of Coho Salmon, 62 Fed. Reg. 24588 (May 6, 1997) (codified as 50 CFR pt. 227).

has more rainfall.[359] The listings led to biological opinions in 2001 calling for cutbacks of federal irrigation deliveries to preserve the listed freshwater fish species in Upper Klamath Lake in a drought.[360]

When the federal Bureau of Reclamation proceeded with the irrigation cutbacks, a firestorm of opposition from the irrigation community erupted.[361] That opposition convinced the incoming Bush administration to largely end the water use cutbacks, which sent both water quantity and quality plummeting and produced disastrous consequences in 2002—a massive fish kill in which over 34,000 salmon perished.[362] Despite this mortality, for years irrigators unsuccessfully pursued litigation claiming that the federal cutbacks were an unconstitutional taking of their property right in water entitling them to government compensation.[363] In 2019, nearly two decades after the fish kill, the Federal Circuit affirmed a lower court decision concluding that there was no taking because the tribes, which supported the cutbacks, possessed the senior water rights in the basin.[364]

The water and fishing rights of the Klamath tribes were judicially recognized long ago in 1983, when the Ninth Circuit affirmed a lower court decision that upheld the Klamath tribes rights some thirty years after the Congress misguidedly terminated their reservation.[365] The court ruled that the tribes' water rights survived that termination and had a "time immemorial" priority date for

359. The tribes in the upper basin are a confederation of Klamath, Modoc, and Yahooskin tribes in the vicinity of Upper Klamath Lake. The tribes in the lower basin are the Yurok, Hoopa Valley, and Karuk tribes. A thorough overview of the Klamath and its conflicts is HOLLY D. DOREMUS & A. DAN TARLOCK, WATER WAR IN THE KLAMATH BASIN: MACHO LAW COMBAT BIOLOGY, AND DIRTY POLITICS (2008).

360. *See* WILLIAM S. BRAUNWORTH, JR. ET AL., WATER ALLOCATION IN THE KLAMATH RECLAMATION PROJECT, 2001: AN ASSESSMENT OF NATURAL RESOURCE, ECONOMIC, SOCIAL, AND INSTITUTIONAL ISSUES WITH A FOCUS ON THE UPPER KLAMATH BASIN 103 (2002). NMFS's 2001 BiOp established minimum flows at Iron Gate Dam to benefit coho salmon, reducing the amount of water available to irrigators. *Id.* at 17. Meanwhile, out of concern for the short-nosed sucker, the USFWS's 2001 BiOp raised the minimum level in the Upper Klamath Lake by one foot, reserving water for conservation needs in the upper Klamath Basin. *Id.* at 16. On the same day that NMFS issued its BiOp, the federal Bureau of Reclamation's Klamath office informed water users that irrigation would be reduced during the 2001 irrigation season due to an ongoing severe drought *Id.* at 40–41.

361. The details are supplied in Blumm & Illowsky, *supra* note 33, at 23–24. (noting that the cutbacks would affect some 200,000 irrigated acres in the basin, instigating threats to federal officials by irrigators who promised to open irrigation headgates by force).

362. *See id.* at 24–27 (explaining a controversial review by the National Research Council that questioned the underlying science of the BiOps calling for fish flows, which itself was criticized as contrary to field experience, ignoring effects on chinook salmon and contributing to anti-federal government attitudes by promoting so-called "combat biology").

363. *See* Jeremy P. Jacobs, *Court tosses farmers' takings claim in Klamath battle*, E&E NEWS (Nov. 14, 2019, 1:25 PM), https://www.eenews.net/articles/court-tosses-farmers-takings-claim-in-klamath-battle/.

364. Baley v. U.S., 942 F.3d 1312, 1341 (Fed. Cir. 2019), *aff'g*, 134 Fed. Cl. 619, 641 (2017).

365. U.S. v. Adair, 723 F.2d 1394, 1411 (9th Cir. 1983). In the Klamath Termination Act, Pub. L. No. 587-732, 68 Stat. 718 (1954), Congress terminated the tribes' federal recognition, disestablished the Klamath Reservation, ceased providing welfare services, and authorized the sale of tribal timber. *See* Blumm & Illowsky, *supra* note 33, at 9. The tribes regained federal recognition in 1986 but not their reservation land, which is now largely part of the Fremont-Winema National Forest. *See id.*

hunting and fishing.[366] It was therefore no surprise that these rights trumped the irrigators' 20th century irrigation rights.[367]

The most prominent recent development in the Klamath Basin has been the successful campaign to remove four dams that were up for Federal Power Act (FPA) relicensing.[368] FPA licenses are renewed only if they meet public interest requirements under current environmental conditions, not conditions that existed at the time of licensing.[369] Relicensing is subject to the conditioning authority of federal land managers and fishery agencies under the FPA and state water quality agencies under the Clean Water Act.[370] The prescribed conditions for the relicensing of PacfiCorp's four Klamath hydroelectric projects, including new fish passage facilities, made the projects uneconomical for the utility, which agreed to remove the dams after protracted negotiations with tribes, the states, and the public.[371] Eventually, the Federal Energy Regulatory Commission approved the deal in 2022.[372] Removal of one of the dams took place in 2023, and the other three removed

366. *Adair*, 723 F.2d at 1412. Unlike the tribal off-reservation fishing rights of the tribes with so-called Stevens treaty rights in Puget Sound and the Columbia Basin, the Klamath tribes' rights do not extend beyond the former reservation's boundaries. *See* Blumm & Illowsky, *supra* note 33, at 37 (tribes' 1864 treaty recognized their exclusive right of taking fish in the streams and lakes within the former reservation).

367. The irrigators' priority date was not earlier than 1905. *See* Blumm & Illowsky, *supra* note 33, at 32.

368. The basin was also affected by President Obama's 2017 expansion of the Cascade-Siskiyou National Monument by 48,000 acres, which included Jenny Creek, a potential habitat for threatened coho salmon. *See* Boundary Enlargement of the Cascade-Siskiyou National Monument, 82 Fed. Reg. 6145 (Jan. 12, 2017). Although the monument contains only potential habitat for salmon, its expansion preserves the ecological connectivity and integrity of an exceptionally biodiverse area. *Id.* The expansion was challenged by the timber industry for allegedly being in excess of the president's authority under the Antiquities Act, but in 2023 the Ninth Circuit reversed a lower court decision and upheld the expansion. Murphy Company v. Biden, 65 F.4th 1122, 1138 (9th Cir. 2023). Another timber industry challenge to the expansion failed in the D.C. Circuit, in Am. Forest Res. Council v. Hammond, 77 F.4th 787 (D.C. Cir. 2023) (rejecting the timber industry's argument that the Oregon and California Lands Act of 1937, 43 U.S.C. §§ 4301-34, exempted the lands from the Antiquities Act of 1906, 54 U.S.C. §§ 320301-320303).

369. 16 U.S.C. § 808(a)(1) (explaining that the Commission is authorized to issue a new license when a license expires); *Id.* § 808(a)(2) (when selecting new license proposals, the Commissioner determines and issues the final proposal which "is best adapted to serves the public interest").

370. The mandatory conditioning provisions in the FPA are sections 4(e) (federal land management conditions) and 18 (federal fishery agency conditions), 16 U.S.C. §§ 797(c), 811. The Clean Water Act conditioning authority is in section 401(d), 33 U.S.C. § 1341(d), an authority which the Supreme Court has ruled extends to the whole of an activity, not just the discharge itself. PUD No. 1 of Jefferson Cnty. v. Wash. Dept. of Ecology, 511 U.S. 700, 712 (1994).

371. The protracted negotiations included two 2010 settlement agreements: the Klamath Basin Restoration Agreement, which would have revised water flows in the basin but was never funded by Congress, and the Klamath Hydroelectric Settlement Agreement, which eventually help lead to the dam removals. *See* Blumm & Illowsky, *supra* note 33, at 36–43 (discussing the two 2010 agreements and a 2020 memorandum of agreement among the states, the tribes the utility, and a newly formed corporation to manage the dam removals, which led FERC in 2022 to approve the license surrender to the states and the new corporation as co-licensees).

372. *Id.* at 49–50.

in 2024.[373] The river's salmon, whose 2023 fall chinook run was forecasted by the California Department of Fish and Game as the second lowest on record, will be the principal beneficiaries.[374]

IV. THE LESSONS

Since saving salmon touches on almost every aspect of the Northwest's culture and economy, it is hardly a surprise that fish conservation efforts have been complex and variegated, and their results decidedly mixed. Here we suggest some lessons from decades of efforts to conserve the region's iconic fish runs and draw some conclusions about what these lessons mean for the goal of saving these regional icons.

The first lesson is that unanimity and discord about salmon saving go hand in hand. People across political and cultural spectrums, as well as governments, tribes, industries, and advocacy groups, all recognize the importance of salmon to the Northwest and its inhabitants and cultures. In one way or another, all espouse a desire to restore the region's anadromous fish. At the same time, few agree on what exactly this means—let alone how to bring about this recovery. Squabbles begin almost immediately over the very nature of the fish themselves; should recovery efforts focus mainly or exclusively on wild fish, or can hatcheries continue to play an important role in producing salmon and steelhead, especially for harvest purposes? Beyond this fundamental issue, little agreement exists on the ultimate goal of efforts to save salmon. Should the region merely aim at merely ensuring that runs are not at risk of extinction, enabling their removal from the lists of threatened and endangered species while still allowing status quo exploitation of resources important to fish for economic activities such as hydropower production, agriculture, forestry, and urban development? Or should society be willing to modify these economic uses and aim at restoring runs to levels that will once again enable salmon to be keystone species in Northwest ecosystems, as well as supply harvest levels that will vindicate the Tribes' treaty rights and support rural fishing economies?

Even assuming the region's disparate interests can reach consensus on an overall goal, substantial disagreement exists over what specific measures will lead to success—and what those measures are likely to cost. Opponents of necessary changes to benefit salmon, such as removing federal dams on the lower Snake River, also point to scientific and economic uncertainties to slow divergence from the status

373. *See* Juliet Grable, *With one down, Klamath dam removal proceeds on schedule*, OR. PUB. BROAD. (July 18, 2023, 7:00 AM), https://www.opb.org/article/2023/07/16/klamath-dam-removal-copco-2/. *See also* Brian Graber, *Five Key Lessons as World's Biggest Dam Removal Project Will Soon Begin on the Klamath* River, AM. RIVERS (Nov. 17, 2022), https://www.americanrivers.org/2022/11/five-key-lessons-as-worlds-biggest-dam-removal-project-will-soon-begin-on-the-klamath-river/ (suggesting that the Klamath removals illustrate the sound economics of dam removal and recommending that Congress and FERC should make dam removals easier in the future to foster tribal sovereignty and food security). KLAMATH RIVER RENEWAL CORPORATION, https://klamathrenewal.org/.

374. *Fishery Scientists Announce Poor 2023 Outlook for California's Ocean Salmon Stocks*, CALIFORNIA DEP'T OF FISH & GAME (Mar. 1, 2023), https://wildlife.ca.gov/News/Archive/fishery-scientists-announce-poor-2023-outlook-for-californias-ocean-salmon-stocks#gsc.tab=0. Salmon may also benefit from the Yurok Tribe's 2019 declaration of personhood status from the Klamath River. That status will enable the river to have its rights, whatever they may be, in Yurok Tribal Court. *See* Blumm & Illowsky, *supra* note 33, at 48–49. On treaty rights, *see supra* notes 16–28 and accompanying text.

quo. Mountains of studies have stretched for decades, and used vast resources, but have brought little agreement on fundamental questions.[375] Politicians' insistence on fully compensating all parties whose interests may be affected by fish conservation measures has erected a high bar for moving forward. Universal agreement on the basic idea of saving salmon quickly fragments into discord when the task turns to efforts to identify specific remedial measures.

The second lesson is that government entities in particular have been willing to spend vast amounts of money to try to save salmon—at least to fund certain types of conservation actions. In the Columbia basin alone, the Northwest Council's program has authorized nearly $2 billion for habitat restoration measures and well over $900 million for hatcheries over 22 years.[376] States and tribes have also spent

375. *See, e.g., Saving Salmon and Water Simultaneously*, *supra* note 78, at 1024–31 and accompanying text (examining studies in the 1990s showing the feasibility of lower Snake River dam breaching).

376. We calculated these numbers by adding total habitat, production, and harvest augmentation expenditures from fiscal year 2000 to fiscal year 2022 (excel spreadsheet with data on file with authors). Production and harvest augmentation expenditures were then added together for an estimate of total hatchery expenses; this estimate is quite conservative because it does not account for research, monitoring, and evaluation costs associated with hatcheries. While not all of these expenses were captured by hatchery projects, a significant portion were. For example, during the 2009 fiscal year, research, monitoring, and expenses accounted for more than one-third of artificial production expenditures (reporting that of the $48.9 million artificial expenditures, $17.3 million was spent on research, monitoring, and evaluation; for comparison, total research, monitoring, and evaluation expenses for the Fish and Wildlife Program that year amounted to $70.3 million). Unfortunately, few of the annual reports identified research, monitoring, and evaluation expenses spent on hatchery projects; thus, the estimate of total expenditures on hatcheries is significantly underestimated. For the raw data, *see Second Annual Report to the Northwest Governors on Expenditures of the Bonneville Power Administration*, NW. POWER AND CONSERVATION COUNCIL 10 (2002), https://nwcouncil.org/media/filer_public/f3/ee/f3eea3c5-d701-45e4-b82c-d170fe1529fe/2002-13.pdf (fiscal year 2000 numbers); *Third Annual Report to the Northwest Governors on Expenditures of the Bonneville Power Administration*, NW. POWER AND CONSERVATION COUNCIL 11 (2004), https://www.nwcouncil.org/sites/default/files/report.pdf (fiscal year 2002 numbers); *Fourth Annual Report to the Northwest Governors on Expenditures of the Bonneville Power Administration*, NW. POWER AND CONSERVATION COUNCIL 5 (2005), https://www.nwcouncil.org/media/filer_public/65/a4/65a409fc-4be1-4225-a334-1b3cbda857ce/2005_9.pdf (fiscal year 2003); *Fifth Annual Report to the Northwest Governors on Expenditures of the Bonneville Power Administration*, NW. POWER AND CONSERVATION COUNCIL 24 table 4 (2006), https://www.nwcouncil.org/media/filer_public/58/a1/58a1d3d7-0820-4a71-861d-b4aef3331b88/2006_11.pdf (fiscal years 2004 and 2005); *Ninth Annual Report to the Northwest Governors on Expenditures of the Bonneville Power Administration*, NW. POWER AND CONSERVATION COUNCIL 25 table 3 (2010), https://nwcouncil.org/media/filer_public/9c/a9/9ca9491e-5583-4a59-98df-de5be6d27d2b/2010-06.pdf (fiscal years 2006-2009); *2014 Columbia River Basin Fish and Wildlife Program Costs Report*, NW. POWER AND CONSERVATION COUNCIL 33 table 3B (2015), https://www.nwcouncil.org/sites/default/files/2015-06.pdf (fiscal years 2010-2014); *2015 Columbia River Basin Fish and Wildlife Program Costs Report*, NW. POWER AND CONSERVATION COUNCIL 16 fig. 6A (2016), https://www.nwcouncil.org/sites/default/files/2016-4.pdf (fiscal year 2015); *2016 Columbia River Basin Fish and Wildlife Program Costs Report*, NW. POWER AND CONSERVATION COUNCIL 13 fig. 6A (2017), https://www.nwcouncil.org/sites/default/files/2017-2.pdf (fiscal year 2016); *2017 Columbia River Basin Fish and Wildlife Program Costs Report*, NW. POWER AND CONSERVATION COUNCIL 14 fig. 6A (2018), https://www.nwcouncil.org/sites/default/files/2018-4.pdf (fiscal year 2017); *2018 Columbia River Basin Fish and Wildlife Program Costs Report*, NW. POWER AND CONSERVATION COUNCIL 14 fig. 6A (2019), https://www.nwcouncil.org/sites/default/files/2019-5_0.pdf (fiscal year 2018); *2019 Columbia River Basin Fish and Wildlife Program Costs Report*, NW. POWER AND CONSERVATION COUNCIL 15 fig. 6A (2020), https://

huge sums on such measures. Private-public partnerships have also formed to carry out expensive big-ticket restoration, most prominently removal of dams on the Klamath River.[377] But like most aspects of saving salmon, there is widespread disagreement about the cost of measures to benefit fish. For example, the price tag for measures to benefit Columbia Basin salmon often is reported as many billions of dollars.[378] However, these figures typically include "foregone revenue" from projected hydropower sales: the money that might have been generated from sale of the electric power because dam managers were forced to take actions to benefit salmon such as allowing water (and juvenile fish) to pass through dam spillways rather than hydroelectric turbines.[379] To fish advocates, such accounting of costs is disingenuous because it implies that dam managers essentially have carte blanche to use the river as they see fit for producing power and revenue. Only under this view can managing a river to flow like a river can be seen as a cost "charged" to salmon. There is in fact no national commitment to prefer hydropower operations that keep salmon on the ESA list.

In contrast to most government agencies and Tribes, some powerful economic interests in the Northwest see many measures aimed at saving salmon as too expensive.[380] Economics can be a significant hurdle to restoring fish runs. Perhaps most prominently, despite growing consensus that recovering Snake River salmon requires breaching the lower Snake dams, progress toward doing so has largely been stymied by the steadfast opposition of those worried about the economic

www.nwcouncil.org/sites/default/files/2020-2.pdf (fiscal year 2019); *2020 Columbia River Basin Fish and Wildlife Program Costs Report*, NW. POWER AND CONSERVATION COUNCIL 15 fig. 6A (2021), https://www.nwcouncil.org/media/filer_public/0f/e5/0fe568ae-005d-4a91-af2b-5091c88f1dc0/2021_05_10costs.pdf (fiscal year 2020); *2021 Columbia River Basin Fish and Wildlife Program Costs Report*, NW. POWER AND CONSERVATION COUNCIL 15 fig. 6A (2022), https://www.nwcouncil.org/media/filer_public/56/ba/56babcce-8c1a-4543-b2f9-40c5bb812e8e/2022-1.pdf (fiscal year 2021); 2023-3_FYANNUAL REPORT, NW. POWER AND CONSERVATION COUNCIL, Figure 6A (2023), https://www.nwcouncil.org/f/18354/2023-3_FY22AnnualReport.xlsx. All of these values are compiled within an excel spreadsheet on file with the authors.

377. *See supra* notes 368–74 and accompanying text.

378. *See, e.g.*, NORTHWEST POWER AND CONSERVATION COUNCIL, 2018 COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM COSTS REPORT 22 (2018), https://www.nwcouncil.org/sites/default/files/2019-5_0.pdf (showing total costs since 1981 totaling $16.8 billion).

379. *Id.* (showing cumulative foregone revenues since 1981 totaling $3.4 billion).

380. *See, e.g.*, Hayley Austin and Anna V. Smith, *Can dam removal save the Snake River?*, HIGH COUNTRY NEWS (Jan. 1,2023) https://www.hcn.org/issues/55.1/indigenous-affairs-dams-can-dam-removal-save-the-snake-river#:~:text=Removing%20the%20dams%20could%20cost,adaptation%20and%20broader%20habitat%20restoration (describing the potential consequences that removal of the lower Snake River dams would have on farming); *The Lower Snake River Dams*, NW. RIVER PARTNERS, https://nwriverpartners.org/wp-content/uploads/2022/06/2022_NorthestRiverPartners_LSRDFactSheet_FINAL.pdf (last visited July 13, 2023) (listing the potential costs of dam removal on the lower Snake and declaring that "[s]everal models and studies demonstrate that there may be little to no real-world benefit to the destruction of these dams"); Catie Clark, *What wild Snake River salmon will cost*, IDAHO BUSINESS REVIEW (July 8, 2022), https://idahobusinessreview.com/2022/07/08/what-wild-snake-river-salmon-will-cost/ (opining that the costs of salmon recovery on the Snake River outweigh the benefits); Loraine Clarno and Erica Wirtala, *Sustainable Growth Requires Reliable Hydropower*, FLATHEAD BEACON (May 19, 2022), https://flatheadbeacon.com/2022/05/19/sustainable-growth-requires-reliable-hydropower/.

effects of dam removal on regional power rates, transportation infrastructure, and agriculture.[381]

A third lesson is that to be effective, salmon advocates must be dexterous in using the array of laws sketched above, as appropriate legal protections often vary depending on the watershed. Moreover, law has proved to be only episodically successful over the past half-century at restoring salmon and their habitat.

Notable success stories include provisions of the Federal Power and Clean Water Acts that have prompted a number of dam owners to agree to modify or even remove their dams in order to facilitate salmon passage.[382] These consequential legal requirements illustrate the value of licensing dams for limited terms, as opposed to the unlimited existence Congress has granted to federal dams. The ongoing removal of PacifiCorp's four Klamath dams serves as the marquee success story, although governments had to step in with public guarantees to enable the rem funding to shoulder much of the cost of the project.[383] Increasingly robust salmon runs in the Elwha River,[384] the promise of passage improvements in the Skagit River,[385] as well as revitalized runs in streams where smaller private dams have been removed,[386] underline the power of the Federal Power and Clean Water Acts to protect and restore fish passage in the region's rivers and streams, and thus serve as vehicles for salmon restoration in select river basins.

The Tribes' success—after decades of legal efforts—in using their treaty rights to force remediation of habitat damage linked to salmon decline resulted in an order for a billion dollar-plus culvert removal and rehabilitation program. Treaty fishing rights holds promise for similar future applications of this elsewhere.[387]

Laws not directly focused on salmon have also had positive effects. For example, in the Bristol Bay basin salmon protection involved denying a federal permit for the proposed Pebble mine section 404(c) of the Clean Water Act, although the viability of that protection may be under question now that the Supreme Court has rolled back the scope of that statute's jurisdiction.[388] The Clean Water Act also

381. *See, e.g.*, Hal Bernton, *Dam politics: why public power utilities are pouring cash into the campaign to support Lower Snake River dams*, SEATTLE TIMES (June 26, 2022, 6:00 AM), https://www.seattletimes.com/seattle-news/environment/public-power-utilities-pour-cash-into-campaign-to-boost-support-for-lower-snake-river-dams/.

382. *See supra* notes 132–41, 368–74 (Federal Power Act), 108–32, 159–61 (Clean Water Act) and accompanying text. Additionally, concerns about water temperature prompted the Corps to modify the adult fishway at Lower Granite Dam in an effort to improve water quality conditions that in the summer can become harmful or even lethal for migrating salmon. *See Lower Granite Fish Ladder Temperature Improvement*, U.S. ARMY CORPS OF ENGINEERS (last visited July 13, 2023), https://www.nww.usace.army.mil/Missions/Fish-Programs/Lower-Granite-Fish-Ladder-Temperature-Improvement/. However, temperature problems at the Corps' four dams on the lower Snake River persist. A coalition of salmon conservation advocates publishes an online newsletter during the summer – the Hot Water Report – dedicated to reporting on temperature problems in the Snake system. *See, e.g*, HOT WATER REPORT 2023 – JULY 6, ISSUE 1, SAVE OUR WILD SALMON https://www.wildsalmon.org/news-and-media/sos-blog/hwr-2023-issue-1.html (last visited July 13, 2023).

383. *See supra* note 371 and accompanying text.

384. *See supra* note 183 and accompanying text.

385. *See supra* note 193 and accompanying text.

386. *See supra* notes 133–34 and accompanying text.

387. *See supra* notes 22–27, 184–88 and accompanying text.

388. *See supra* notes 28, 151 and accompanying text.

may hold promise to solve temperature problems in the Columbia River. But success in actually reducing sometimes lethal summertime temperatures in the mainstem Columbia and Snake Rivers will depend on whether the Corps, Oregon, and Washington can agree on an operational program to meet EPA's TMDL and the states' water quality standards.[389] The combination of Clean Water Act and treaty fishing rights has proved surprisingly effective in preventing the siting of fossil fuel export terminals throughout the region.[390]

On the other hand, the salmon-damaging status quo has proven remarkably resilient despite laws designed specifically to restore fish runs. Although the Northwest Power Act's requirement that BPA fund the Northwest Council's Fish and Wildlife Program has been a prominent source of funds in the Columbia Basin for measures often focused on habitat restoration and research,[391] the law's mandate that dam managers give salmon "equitable treatment" with hydropower has yet to have a significant effect on hydroelectric-dominated dam operations.[392] Aside from hard-fought orders to increase spill, [393] the ESA and NEPA have been unable to work substantial changes in those operations or to the configuration of the dams themselves.

A fourth lesson is that actually making progress on fish restoration, such as operational changes to dams or implementation of water quality standards, usually requires court oversight.[394] Litigation and public participation have played an important role in salmon saving efforts, from the interpretation of Indian treaties, to harvest and hatchery reforms, to overturning ESA biological opinions that rubber-stamped a status quo harmful to salmon. ESA petitions from Tribes and salmon advocates led to the first salmon listings in the Northwest, and citizen participation in processes, ranging from NEPA analyses to "listening sessions" about the future of Snake River dams have created pressure on agencies that manage salmon, dams, and habitat.[395]

Examples of court decisions helping to save the region's fish runs include the Klamath Tribes securing judicial recognition of the seniority of their water rights, which will protect non-salmonid species in Klamath Lake, though many unresolved issues remain regarding the effects of irrigation diversions in the basin.[396] Litigation thwarted efforts to avoid an ESA listing for coastal coho, and the resulting ESA measures have led to a wide variety of watershed-based restoration efforts.[397] A

389. *See supra* notes 114–31 and accompanying text.

390. *See generally* Blumm & Litwak, *supra* note 36 (discussing the Tesoro Savage Petroleum Terminal, Millennium Coal Terminal, Coyote Island Coal Terminal, Gateway Pacific Coal Terminal, and Union Pacific Second Mainline Railroad Track).

391. Section 4(h)(10)(A) of the Northwest Power Act, 16 U.S.C. § 839b(h)(10)(A) (requiring BPA to act "consistent with" the NW Council's program); *see supra* note 227 and accompanying text.

392. *Id.* § 4(h)(11).

393. *See supra* notes 231–34 and accompanying text.

394. *See supra* notes 96–97 (discussing Judge Simon's spill decision), 116–18 (explaining the "constructive submission" TMDL decision of the 9th Circuit) and accompanying text.

395. *See supra* notes 83, 247 and accompanying text; *see also*, *Salmon Wars*, OR. PUB. BROAD. (Mar. 24, 2024), (discussing one Native family's struggles over the years of salmon decline, including losing their home, their main food source, and their ancestral fishing grounds).

396. *See supra* note 370.

397. *See supra* notes 305–11 and accompanying text.

lawsuit prompted changes to improve stream protection under Oregon's Forest Practices Act,[398] and litigation over protections for northern spotted owls led to adoption of the federal Northwest Forest Plan—the largest ecosystem management program in the world—and also been a major source of salmon protection on federal lands in the region.[399] Finally, and perhaps most prominently, no fewer than three federal judges over more than three decades have made overseeing—and sometimes pushing—efforts to restore salmon in the Columbia Basin a key part of their judicial legacies.[400]

A fifth lesson is that Tribes will play an increasingly prominent role in saving salmon. Along with the federal and state governments, they are one of three sovereigns managing habitat, hatcheries, and harvest, as well as carrying out affirmative—and sometimes controversial—actions such as predator control.[401] Tribes have significant resources at their disposal, including in the Columbia Basin federal funds that some have criticized as dampening some tribes' zeal for advocating reforms in dam operations.[402] But Tribes have also been frequent litigants in efforts to push their fellow sovereigns to take actions promoting salmon recovery

398. *See supra* notes 326–31 and accompanying text.

399. *See supra* notes 318–22 and accompanying text.

400. Three judges in the Portland chambers of the federal District of Oregon have handled most federal salmon cases, including the long-running *NWF v. NMFS* litigation over impacts on salmon from operations of the federal hydropower dams. They include Judge Malcolm Marsh, who wrote the still-cited 1994 opinion noting that the federal hydropower system "literally cries out for a major overhaul." *Idaho Dep't of Fish & Game v. Nat'l Marine Fisheries Serv.*, 850 F. Supp. 886, 900 (D. Or. 1994). Judge Redden presided over the NWF v. NMFS litigation for many years, and issued the first injunction requiring dam managers to provide additional spill to enhance survival of juvenile migrants. Upon his retirement from the bench in 2011, the *Oregonian* newspaper dubbed him "Judge of the river." *See Judge of the River*, THE OREGONIAN (Dec. 5, 2011, 9:38 PM), https://www.oregonlive.com/opinion/2011/12/judge_of_the_river.html. *See also* Michael Blumm & Aurora Paulson, *The Role of the Judge in Endangered Species Act Implementation: District Judge James Redden and the Columbia Basin Salmon Saga*, 32 STAN. ENV'T L. REV. 87 (2013). Judge Michael Simon assumed leadership of that case and other salmon-related cases when Judge Redden retired, and is now widely respected for his knowledge of the Columbia Basin hydroelectric system and salmon biology, issued a sweeping indictment of federal dam management in his 2016 opinion, *supra* text accompanying note 232, which became the basis for another injunction requiring additional spill to improve fish survival. *See supra* notes 90–97 and accompanying text.

401. *See supra* notes 276–85 and accompanying text.

402. In 2008, four Columbia Basin Tribes signed the Columbia Basin Fish Accords with the Bureau of Reclamation, Corps of Engineers, and Bonneville Power Administration. The deal provided $900 million over a decade to the tribes for spending on mainly salmon habitat restoration; in exchange, the Tribes switched sides in the *NWF v. NMFS* litigation to support the federal defendants' view on proper hydropower operations. *See Columbia Basin Fish Accords*, COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION, https://critfc.org/fish-and-watersheds/fish-and-habitat-restoration/columbia-basin-fish-accords/ (last visited July 12, 2023). This agreement was extended and expanded in 2018. *See Partners United for Salmon, Steelhead and Lamprey Extend Columbia Basin Fish Accords*, FED. CAUCUS, https://www.salmonrecovery.gov/Partners/FishAccords.aspx (last visited July 12, 2021). This funding has been criticized as coming with strings that prevent Tribes from taking measure to restore salmon that may conflict with BPA's interest in maximizing its hydropower revenue. *See, e.g.*, Tony Schick, *OPB and ProPublica: How the BPA is Contributing to Salmon's Decline in the Northwest*, SAVE OUR WILD SALMON (Aug. 4, 2022), https://www.wildsalmon.org/news-and-media/news/opb-and-propublica-how-the-bpa-is-contributing-to-salmon-s-decline-in-the-northwest-tanya-riordan-i-ll-send-sos-statement-to-sr-reporters-and-the-inlander-when-it-is-ready-tanya.html (describing accord funding that prevented the Colville Tribe from using the money to reintroduce salmon above barrier dams).

and, as noted above, the habitat protections required by the Tribes' treaty fishing rights hold promise for salmon-saving elsewhere.[403]

A growing number of co-management agreements, such as those with tribes along the Oregon coast, may help usher in a new era of salmon habitat protection.[404] Tribal co-management arrangements offer promise for salmon habitat restoration in select watersheds.[405] And in an era when decision-makers are belatedly and deservedly placing more emphasis on justice for communities that have suffered discrimination and dispossession of land and resources,[406] the Tribes have growing political clout to advocate for actions important to save an important component of tribal food, culture, and religion.[407]

The final—and in the end perhaps most far-reaching—lesson is that the ultimate decisions that could play determinative roles in whether Northwest salmon will be saved will likely come from beyond the Northwest. Federal politics has always played an important background role in management decisions crucial for fish, such as exerting influence over the actions of federal agencies tasked with constructing, managing, and regulating dams, hatcheries, harvest, and habitat. Recent years have underlined the fact that important decisions such as the fate of the four lower Snake dams rest not with agencies, Tribes, or judges, but ultimately with the political branches of government: members of Congress and the occupant of the White House.[408]

Climate change may prove to be the ultimate challenge as to whether it is possible to save Northwest salmon. Increasing temperatures in both the atmosphere and ocean affect water availability and flows crucial to salmon spawning and rearing, as well as nutrients and prey in the ocean where salmon and steelhead spend the majority of their life cycles. Rising water temperatures in rivers and streams can be harmful, even lethal, for salmon, and increasing storms and flooding can scour away important habitat. Political battles over national climate policies in Washington D.C. are thus in part debates about the future of salmon in the Pacific Northwest.[409]

CONCLUSION

Dr. Robert Lackey, a long-time professor at Oregon State University, has claimed that the public and decision-makers alike lack the will to bear the economic

403. *See supra* notes 26–28, 190–93 and accompanying text.

404. *See supra* notes 348–56 and accompanying text.

405. *Id.*

406. *See, e.g.*, Blumm & Litwak, *supra* note 36, at 2–4.

407. *See, e.g.*, Biden Administration Comanagement Initiatives, *supra* note 70; *infra* note 417.

408. *See supra* note 247 and accompanying text.

409. *See* Lisa G. Crozier et al., *Climate Change Threatens Chinook Salmon Throughout Their Life Cycle*, COMMUNICATIONS BIOLOGY 1, 5–6 (2021) https://www.nature.com/articles/s42003-021-01734-w (under various warming scenarios chinook populations are at a high risk of extinction; given the strong synchrony across salmon populations, similar effects likely extend to other salmon species); *see also* PACIFIC SALMON, *supra* note 1, at 179–207, reprinted at 52 E.L.R. 10980–94 (2022) (examining the effects of climate change on salmon, the legal responses to those effects, and the future of wild salmon in a climate-changed world).

and political costs of implementing measures necessary to save salmon.[410] Although a long-term verdict on the accuracy of this assertion is not at hand, our study suggests that law is capable of producing some therapeutic, if not consistent, results. At least sometimes societal costs do not outweigh the felt necessity to restore the iconic wild salmon runs that virtually define the boundaries of the Pacific Northwest.

The case studies offered in this paper illustrate a variety of approaches to salmon saving based on the context: the current nature of the watershed. In Bristol Bay, a largely unspoiled watershed, protection of the existing environment is paramount, an outcome successful so far through the Clean Water Act—the jurisdiction of which is now quite a bit less than it was.[411] In Puget Sound, treaty fishing rights have required implementation of a large-scale road culvert reconstruction program which will provide for the restoration of considerable river miles of accessible salmon habitat.[412] In the Columbia basin, the massive dam building of the 20th century has led to ESA listings, large expenditures on habitat restoration and hatchery production, the innovation of so-called "conservation hatcheries" to restore spawning runs, and modest operational changes like increased spills at dams to foster fish passage.[413] Along the Oregon coast, a seemingly successful transition from hatcheries to naturally-spawning fish has taken place, spurred by ESA listings.[414] And the Klamath River salmon runs are soon to benefit from a free-flowing river for the first time in a century due to the relicensing and fishway provisions of the Federal Power Act.[415]

The past half-century of efforts to save salmon has left a legacy of both agreement and discord surrounding the Northwest's efforts to restore its iconic anadromous fish. Nearly all people and institutions in the region agree on the need for solutions to reverse salmon declines. But while there has been some progress toward this goal, enormous tumult over the elements and implementation of necessary remedial measures remains. The next fifty years will demand a larger consensus to move forward with significant changes to both human infrastructure and even human society to save wild salmon for future generations. Consensus has been infrequent in salmon country, however, and the policy challenges ahead in a climate-changed world are considerable.

An optimistic view would have salmon saving emerge as a focal point of national climate adaptation policy—confronting increasing temperatures, flooding and drought, and wildfires—with sustainable policies that support and expand upon ongoing river basin and species restoration efforts. A pessimistic view would see looming salmon extinctions as unavoidable, given political polarization as well as the economic and social costs of restoration. Avoiding the prospect of the latter will require unusual bipartisan cooperation, combined with significant international,

410. Robert T. Lackey, *Saving Wild Salmon: A 165 Year Policy Conundrum*, OR. ST. UNIV. (Oct. 3-4, 2013), https://forestpolicypub.com/wp-content/uploads/2014/01/165-Year-Salmon-Policy-Conundrum-R-T-Lackey.pdf.

411. *See supra* § III(A).

412. *See supra* notes 185–89 and accompanying text.

413. *See supra* § III(C).

414. *See supra* notes 338–40 and accompanying text.

415. *See supra* notes 368–74 and accompanying text.

national, regional, and river basin coordination. Most, and, most of all, salmon saving will require uncommon wisdom in the years ahead.

Postscript

While this article was in press, governmental entities, Tribes, and fish advocates finalized an agreement that could mark an important milestone in efforts to save salmon in the Columbia River Basin.[416] The coalition that mounted the decades-long lawsuit against management of federal hydropower dams, along with federal defendants, asked the federal district court judge overseeing the case to stay litigation for five years—and potentially an additional five years—on the basis of a far-reaching deal that may provide a pathway to eventually breaching the four federal dams on the lower portion of the Snake River.[417]

In a Memorandum of Understanding filed with the district court in late 2023, federal agencies agreed to manage federal hydropower dams according to specified operational parameters for a period of ten years.[418] The federal government also pledged to spend at least $300 million over a ten-year period to bolster state and tribal fish and habitat restoration efforts, support a Tribal energy program aimed at developing clean energy generation to replace the output of the four federal hydropower dams on the Snake River that tribes and conservation interests have long targeted for removal, and support studies of how to replace the transportation, irrigation, and recreation services of the Snake dams.[419]

The agreement made no federal commitments regarding a decision to actually breach the dams, however. Nevertheless, hydropower proponents and other resource user groups complained that they were left out of discussions that led to the agreement and asked the district court not to stay proceedings in the case.[420] Judge Simon turned away their objections and approved the deal on February 8, 2024.[421] The upshot could be substantial pause in the long-running ESA litigation over the adverse effects of the operation of the Columbia Basin's dams on the basin's iconic

416. *See supra* note 237 and accompanying text.

417. *See* Press Release, Biden-Harris Administration Announces Ten-Year Partnership with Tribes & States to Restore Wild Salmon, Expand Clean Energy Production, Increase Resilience, and Provide Energy Stability in the Columbia River Basin (Dec. 14, 2023), https://www.whitehouse.gov/ceq/news-updates/2023/12/14/biden-harris-administration-announces-ten-year-partnership-with-tribes-states-to-restore-wild-salmon-expand-clean-energy-production-increase-resilience-and-provide-energy-stability-in-the-col/.

418. *See Appendix B, U.S. Government Commitments in Support of the "Columbia Basin Restoration Initiative" and in Partnership with the Six Sovereigns*, https://earthjustice.org/wp-content/uploads/2023/12/snake-river-litigation-usg-commitments.pdf.

419. *See Fact Sheet: Biden-Harris Administration Announces Ten-Year Partnership with Tribes & States to Restore Wild Salmon, Expand Clean Energy Production, Increase Resilience, and Provide Energy Stability in the Columbia River Basin*, (Dec. 14, 2023) https://www.whitehouse.gov/briefing-room/statements-releases/2023/12/14/fact-sheet-biden-harris-administration-announces-10-year-partnership-with-tribes-and-states-to-restore-wild-salmon-expand-clean-energy-production-increase-resilience-and-provide-energy-stability-i/.

420. *See* Jennifer Yachnin, *Judge Halts Lawsuit on Pacific Northwest Dams for Five Years*, GREENWIRE (Feb. 9, 2024, 1:41 PM), https://subscriber.politicopro.com/article/eenews/2024/02/09/judge-halts-lawsuit-on-pacific-northwest-dams-for-5-years-00140694.

421. *Id.*

salmon populations.[422] Whether the agreement begins the long-promised restoration of the salmon is far less certain.

422. Funding called for in the settlement is of course subject to a congressional willingness to fund the program and a future administration to implement it.