RECLAIMING THE NATURAL RIVERS: THE ENDANGERED SPECIES ACT AS APPLIED TO ENDANGERED RIVER ECOSYSTEMS

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I. INTRODUCTION

The Columbia and Colorado Rivers are the lifeblood of their respective regions. Together they embrace the vast portion of the Western landscape, and their waters link the present West with a human geography dating back thousands of years.[1] But the rivers of today are not the rivers that flowed across the terrain just three human generations ago. The natural system that reigned for millennia before human intervention is under siege from federal water operations. The Colorado and Columbia River Basins are now among America's most environmentally degraded river ecosystems, and the native fish species in each basin are precariously close to extinction.[2] This Article compares implementation of the Endangered Species Act[3] ("ESA" or "Act") in the Colorado and Columbia River Basins in an effort to analyze the current and potential effects of the statute on such endangered river systems.

Like many rivers in the West, the Colorado and Columbia Rivers depend for their flow on melted snowpacks in the headwaters of the basins.[4] Repeating spring flood events and high seasonal flows shaped the survival mechanisms of dominant fish species as well as other creatures over millions of years. Today, this

1. For a historic portrayal of the rivers' influence on the West, see CHARLES F. WILKINSON, CROSSING THE NEXT MERIDIAN (1992).

2. *See infra* Part II.A.4. A national environmental group, American Rivers, annually issues a list of the "Most Endangered Rivers in America." Rivers in both the Colorado and the Columbia River Basins are included in the list. *See* WORLD RESOURCES INST., ENVIRONMENTAL ALMANAC 70 (1994) (citing American Rivers' list).

3. Endangered Species Act of 1973, 16 U.S.C. §§ 1531–1544 (1994 & Supp. I 1995).

4. WILKINSON, *supra* note 1, at 223.

evolutionary adaptation continues to drive species behavior in each basin.[5] Yet current riverine conditions, far from life giving, are lethal for native fish species. Now controlled and exploited through a concrete maze of dams, reservoirs, canals, diversion facilities, tunnels, aqueducts, pumps, dikes, and navigation locks, the two rivers serve a "modern *hydraulic society*...a social order based on the intensive, large-scale manipulation of water."[6] The sudden and cataclysmic transition wrought by engineers in these basins and others across the country took place in a span of time that represents a mere blink in geologic history.[7] The supremacy of water development facilities over the natural regime has left a pattern of severe environmental degradation in river basins nationwide.[8]

The ESA is a federal statute designed to rescue imperiled species and their ecosystems. The statute was enacted over two decades ago with explicit congressional recognition that various species in the United States were threatened with extinction "as a consequence of economic growth and development untempered by adequate concern and conservation."[9] Congress enacted the comprehensive scheme to "provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved,"[10] and Congress explicitly recognized that water issues would have to be addressed "in concert with" conservation of endangered species.[11]

A focus on the ESA's application to endangered river ecosystems is particularly timely in light of the Supreme Court's recent decision in *Bennett v. Spear*.[12] There, the Court determined that plaintiffs with purely economic interests had standing under the ESA to challenge the implementation of the statute in the Klamath River Basin, another endangered river ecosystem. The decision is likely to give rise to a host of challenges in other basins with similar ecological contexts. Drawing lessons from the Columbia and Colorado Basins, this Article explores issues courts will likely encounter in addressing such claims.

The Columbia and Colorado River Basins are both subject to extensive recovery processes under section 4 of the ESA, which requires development of recovery plans for the conservation of endangered species.[13] The Columbia River Basin has three species of listed Snake River salmon,[14] and the Colorado Basin has

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5. *See infra* Parts II.A.4, II.B.2.

6. DONALD WORSTER, RIVERS OF EMPIRE 7 (1985).

7. *Id.*

8. For a comparison of the impacts of development in three river basins, see Lawrence J. MacDonnell, *Managing Reclamation Facilities for Ecosystem Benefits*, U. COLO. L. REV. 197 (1996) (focusing on Truckee–Carson, Yakima, and Upper Colorado Basins).

9. 16 U.S.C. § 1531(a) (1994).

10. *Id.* § 1531(b) (1994).

11. *Id.* § 1531(c)(2) (1994).

12. Bennett v. Spear, 117 S. Ct. 1154 (1997).

13. 16 U.S.C. § 1533(f) (1994).

14. The ESA provides a mechanism for listing species as "threatened" or "endangered" (a category of higher imperilment). *Id.* § 1533(a) (1994). The listed fish

four listed species of fish.[15] The National Marine Fisheries Service ("NMFS") administers the Act as it applies to the endangered salmon in the Columbia River Basin, and the U.S. Fish and Wildlife Service ("USFWS") implements the Act as it applies to the endangered fish of the Colorado Basin.

Endangered river ecosystems such as the Colorado and Columbia are increasingly subject to ESA protection efforts and are appropriately thought of in a class of their own, distinguishable by at least three characteristics from other common settings in which the ESA operates. First, the ecological reach of the ESA in these endangered river settings is perhaps greater than in any other setting. The hydrology of river ecosystems spans entire basins, extending from headwaters to the sea. The Columbia River system drains a basin of 259,000 square miles,[16] and the Colorado River system drains a basin of 244,000 square miles.[17] Hundreds of tributaries contribute to basin-wide ecological conditions. Fish species may migrate (as do the Columbia Basin species) thousands of miles through domestic waters and the ocean. The interlocking, mechanized water development structures in basins of the West are themselves systems that extend over thousands of river miles. This reach dwarfs even the vast forest habitat of the celebrated northern spotted owl.[18]

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stocks in the Columbia Basin are from the Snake River, a tributary of the Columbia River. Snake River sockeye salmon were listed as an endangered species on November 20, 1991. Snake River spring/summer chinook and fall chinook salmon were listed as threatened on April 22, 1992. *See* NATIONAL MARINE FISHERIES SERV., U.S. DEP'T OF COMMERCE, SUMMARY: PROPOSED RECOVERY PLAN FOR SNAKE RIVER SALMON 1 (1995) [hereinafter NMFS RECOVERY PLAN SUMMARY]. Recently, steelhead species in the Columbia River Basin were proposed for listing. Endangered and Threatened Species; Proposed Endangered Status for Five ESUs of Steelhead and Proposed Threatened Status for Five ESUs of Steelhead in Washington, Oregon, Idaho, and California, 61 Fed. Reg. 41,541 (1996) (to be codified at 50 C.F.R. pts. 222, 227) (proposed Aug. 9, 1996) (proposed listing of Snake River and Lower Columbia species as threatened, and Upper Columbia species as endangered); *see also U.S. Acts to Protect Steelhead Trout Runs Along the West Coast,* WALL ST. J., July 31, 1996, at A8.

15. The four species of Colorado River Basin fish that are listed as endangered under the ESA are: the Colorado squawfish, the humpback chub, the bonytail chub, and the razorback sucker. *See* James H. Bolin, *Of Razorbacks and Reservoirs: The Endangered Species Act's Protection of Endangered Colorado River Basin Fish,* 11 PACE ENVTL. L. REV. 35, 37 (1993).

16. JOSEPH CONE, A COMMON FATE: ENDANGERED SALMON AND THE PEOPLE OF THE PACIFIC NORTHWEST 118 (1995).

17. Lawrence J. MacDonnell & David H. Getches, *Colorado River Basin, in* 6 WATERS AND WATER RIGHTS 5, 6 (Robert Beck ed., 1995).

18. The habitat deemed critical for Pacific salmon overlaps with the forest habitat of the northern spotted owl, adding a layer of legal complexity to recovery efforts for both species. *See* TIM PALMER, THE COLUMBIA: SUSTAINING A MODERN RESOURCE 12–13 (1997).

Second, the predominant focus of the ESA in this context is on section 7, which sets forth species protection mandates for federal agencies.[19] This focus differs from the ESA's application to private development projects, which typically trigger another provision of the Act targeted towards incidental "take" of species.[20] Endangered rivers are controlled and dominated by federal agencies that have transformed the natural basin hydrology through water diversion, storage, and hydroelectricity projects, in nearly every case precipitating the loss of native species. These agencies are typically the U.S. Army Corps of Engineers, the U.S. Bureau of Reclamation, and the Federal Energy Regulatory Commission.[21] Section 7 of the ESA provides that federal agencies must "insure" that their actions are "not likely to jeopardize the continued existence" of a listed species.[22] To meet this requirement, the statute requires the action agency to engage in consultation with the Service[23] having jurisdiction over the species—NMFS for anadromous fish and marine mammals, and USFWS for other species.[24] The Service must render a biological opinion in which it determines whether the action will cause jeopardy, and, if jeopardy is likely, the Service must suggest "reasonable and prudent alternatives" the action agency may take to avoid jeopardy.[25]

Third, endangered river ecosystems are unique in that the recovery of species often presents a frontal challenge to an environmentally harmful status quo. By contrast, most other applications of the ESA involve protecting a status quo environment from further degradation. Halting the construction of a road, or blocking timber sales, or prohibiting the destruction of wetlands involves guarding the present, relatively pristine ecological state of the natural environment from further harm. While powerful vested economic interests are often opposed to ESA protection in those situations, the weight of the status quo nevertheless falls in favor of such statutory intervention. In the case of endangered river ecosystems, however, the task of recovering species will often require restoring natural habitat and altering, or in some cases eliminating, man-made structures such as dams and

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19. 16 U.S.C. § 1536(a) (1994).

20. *Id.* § 1538(a) (1994). The Supreme Court recently affirmed that section 9's prohibition on "take" of an endangered species extends protection to the habitat upon which listed species rely. *See* Babbitt v. Sweet Home Chapter of Communities for a Great Or., 515 U.S. 687 (1995).

21. State water agencies are also primary governmental actors in the river basin setting, as they allocate much of the water that is stored from federal projects. *See* Adrian Hansen, Note, *The Endangered Species Act and Extinction of Reserved Indian Water Rights on the San Juan River*, 37 ARIZ. L. REV. 1305, 1307–11, 1315–18 (1995).

22. 16 U.S.C. § 1536(a)(2) (1994). The same section includes a prohibition against "destruction or adverse modification of" critical habitat. *Id.*

23. When referred to interchangeably, this Article will use the term "the Service(s)" for either USFWS, NMFS, or both.

24. 16 U.S.C. § 1532(15) (1994).

25. *Id.* § 1536(b)(3)(A) (1994). Recently, the Supreme Court in *Bennett v. Spear*, 117 S. Ct. 1154 (1997), allowed irrigation districts and other plaintiffs to challenge a biological opinion issued by the USFWS under section 7 for the Klamath Basin in Oregon.

diversion facilities. The ESA finds a much more challenging application in this context.

A comparison of recovery efforts in the Colorado and Columbia River systems must necessarily sweep broadly in order to delineate a pattern of ESA implementation in the endangered river context. The complexity surrounding river operations in each basin presents a daunting barrier to any detailed comparison. Few observers fully understand the technical, scientific, economic, legal, and bureaucratic framework surrounding the operations of either river system, let alone both.[26] But the complexity itself is reason to engage in a broad comparison between the basins. Such a comparison lifts the focus to a level beyond the horizon of the familiar basin and may prompt new approaches to endangered river systems as a whole. Left alone, the sheer complexity that characterizes recovery efforts in each basin threatens to drown the decision-making process by creating a barrier to public scrutiny. And because complexity necessarily limits the number of participants who can influence decisions, it inherently tends to induce a myopic view of what is possible in terms of restoring ecosystems and species. As Professor Charles Wilkinson observes in his landmark *Crossing the Next Meridian*, "cries of complexity" in western water law have always been "the last refuge of the vested interests."[27]

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26. Several helpful articles address natural resource law in each of the two basins and on ESA implementation specifically. For a leading, detailed treatment of ESA issues in the Columbia River Basin, see Michael C. Blumm et al., *Beyond the Parity Promise: Struggling to Save Columbia Basin Salmon in the Mid-1990s*, 27 ENVTL. L. 21 (1997). For discussion of other Columbia Basin issues, see Michael C. Blumm, *Saving Idaho's Salmon: A History of Failure and a Dubious Future*, 28 IDAHO L. REV. 667 (1991–92); Michael C. Blumm & Andy Simrin, *The Unraveling of the Parity Promise: Hydropower, Salmon, and Endangered Species in the Columbia Basin*, 21 ENVTL. L. 657 (1991); Charles F. Wilkinson & Daniel Keith Conner, *The Law of the Pacific Salmon Fishery: Conservation and Allocation of a Transboundary Common Property Resource*, 32 KAN. L. REV. 17 (1983); John M. Volkman, Columbia River Salmon—Are Any of the ESA Tools Adequate for the Job? (presented at the Conference on Biodiversity Protection: Implementation and Reform of the Endangered Species Act, University of Colorado, June 10–12, 1996) (unpublished manuscript, on file with author).

On the Colorado River Basin, see generally Bolin, *supra* note 15; Peter Evans, *A 'Recovery' Partnership for the Upper Colorado River to Meet ESA Section 7 Needs*, 8 NAT. RESOURCES & ENV'T. 24 (1993); Eric L. Garner & Michelle Ouellette, *Future Shock? The Law of the Colorado River in the Twenty-First Century*, 27 ARIZ. ST. L.J. 469 (1995); MacDonnell & Getches, *supra* note 17; Hansen, *supra* note 21; James S. Lochhead, Upper Colorado River Fish: A Recovery Program that Is Working—Myth or Reality? (presented at the Conference on Biodiversity Protection: Implementation and Reform of the Endangered Species Act, University of Colorado, June 10–12, 1996) (unpublished manuscript, on file with author).

27. WILKINSON, *supra* note 1, at 291. Professor Wilkinson calls for a "fresh look" at the use of western river systems, pointing out that "Western water has long been the providence of 'experts,' mostly engineers and lawyers.... The engineering mentality has

With this broad comparative perspective in mind, Part II of this Article briefly examines the geographic and legal setting of the two basins. It focuses in particular on the strikingly common ecological and cultural history that continues to shape activities in each basin today. Part III describes the recovery process in both basins.[28] It begins by describing the established legal framework of resource allocation that forms a constant undercurrent to ESA implementation. Part IV makes five broad comparisons regarding ESA implementation in the two basins and draws lessons that may apply to other endangered river settings. Finally, Part V draws from the combined experience of the two basins and suggests new directions for recovering species by restoring a natural river regime more consistent with the fundamental goals underlying the ESA.

II. THE SETTING: MAGNIFICENT BASINS OF THE WEST

In examining ESA recovery processes, it is vital to maintain a focus on the histories of the two basins. Both evoke patterns of human intervention experienced in other river basins. Understanding historical, social, and ecological dimensions helps shape a framework for future restoration efforts under the ESA. Most importantly, recent history in the two basins reminds us that the water projects are not immutable parts of the social or ecological landscape. This in turn forces a more exacting scrutiny on the present and future costs and benefits of such projects.

A. Human-Induced Transformation of the Columbia and Colorado Rivers: The Shared History

In *Northwest Passage*, William Dietrich includes maps depicting the history of the Columbia River over the past two hundred years as a series of physical and conceptual transformations, each producing a different kind of river.[29] Indeed, the image of changed rivers flowing through different eras of human settlement is an apt one for many rivers, including the Columbia and Colorado. Both experienced parallel transformations from the "Aboriginal River," to the "Pioneer River," to the "Developed River," to the "Endangered River," and, potentially, to the "Normative River." This discussion draws upon those conceptual transformations in threading together the environmental history of these two basins.

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been one factor in making water policy one-sided in favor of building and extractive uses." *Id.*

28. With respect to the Colorado Basin, the focus of the Article is primarily on Upper Basin recovery efforts. The USFWS has traditionally dealt with Upper and Lower Basin species recovery issues separately. *See infra* note 202 and accompanying text.

29. WILLIAM DIETRICH, NORTHWEST PASSAGE: THE GREAT COLUMBIA RIVER (1995). Dietrich's book presents maps of the "Aboriginal River," the "Pioneer River," and the "Developed River." *Id.* at 12–17.

1. The Aboriginal Rivers

The term "Aboriginal Rivers" refers to the great rivers in their historic natural forms—river ecosystems finely balanced by evolution over millions of years. Both rivers supported a rich diversity of species and large and diverse human societies that adapted to living within natural constraints.

The Columbia River system drains a basin extending across Washington, Oregon, Idaho, and parts of Montana, Wyoming, Nevada, and Canada. The river has its headwaters in the Canadian Rockies and flows 1200 miles to the Pacific Ocean.[30] With an average annual runoff of 198 million acre-feet, it pours more water into the Pacific Ocean than any other river in the Western Hemisphere.[31] Its average annual streamflow is twice that of the Nile River and ten times greater than that of the Colorado River.[32] Its major tributary, the Snake River, has an average flow of 56,900 cubic feet per second.[33]

As described by William Dietrich, the aboriginal Columbia River landscape was "a cataract of wildly seasonal flows, impassable falls and rapids, deep canyons, desolate desert terrain, and Canadian mountains with incredible winter snows."[34] With immense rapids and a vagrant course, the river was described by one early navigator as "undoubtedly the most dangerous river on the western side of the American hemisphere."[35] Still today, the beauty of this river basin is spectacular:

> Few rivers wind through such a dramatic, primeval, and raw landscape. It runs from canyon to broad lake and back again, from wet forest to dry desert and once more to forest. High waterfalls fall off the sheer side of its windswept final gorge like music from the sky. In Canada glaciers color the river aqua with their ground flour. The Columbia is in a landscape so epic as to almost be swallowed up by it.[36]

The Colorado River Basin includes parts of Wyoming, Colorado, Utah, Nevada, New Mexico, Arizona, and California.[37] The river has its headwaters in the

30. CONE, *supra* note 16, at 118.

31. *Id.*

32. *Id.*

33. PALMER, *supra* note 18, at 32. The overall range of Snake River flows varies dramatically. For water years 1958–96, the lowest daily mean flow was 6630 (September 1, 1958), and the highest was 191,000 (June 18, 1974). 2 T.S. BRENNAN ET AL., WATER RESOURCES DATA IDAHO WATER YEAR 1996 (UPPER COLUMBIA RIVER BASIN AND SNAKE RIVER BASIN BELOW KING HILL) 197 (1996).

34. DIETRICH, *supra* note 29, at 74.

35. *Id.* at 95.

36. *Id.* at 46.

37. WILKINSON, *supra* note 1, at 225, 256 (map). The Colorado Basin's sphere of influence is even broader than the landscape it drains; an elaborate distribution system of man-made aqueducts and tunnels distributes water as far outside the basin as Albuquerque, Los Angeles, San Diego, and Salt Lake City. *Id.* at 225.

Rocky Mountains of northeast Colorado and flows 1400 miles to the Gulf of California in Mexico, producing an average yield of between thirteen and fourteen million acre-feet.[38] Historically, flows varied dramatically from year to year, ranging from a few thousand cubic feet per second to nearly 400,000.[39] As Marc Reisner describes the Aboriginal River in his epic *Cadillac Desert*:

> The virgin Colorado was tempestuous, willful, headstrong. Its flow varied psychotically between a few thousand cubic feet per second and a couple of hundred thousand, sometimes within a few days. Draining a vast, barren watershed whose rains usually come in deluges, its sediment volume was phenomenal.... There was so much silt [in the lowest reach] that it raised the entire riverbed, foot by foot, year by year, until the Colorado slipped out of its loose confinement of low sandy bluffs and tore off in some other direction, instantly digging a new course.... The river went on such errant flings every few dozen years—a vanishing moment in geologic time....[40]

Both river ecosystems supported dominant species of fish that are now on the brink of extinction. In the Colorado River system, the Colorado squawfish was the reigning predator.[41] Called the white salmon by early settlers, it grew to nearly six feet long, and is considered North America's largest fish minnow.[42] It, and another endangered fish, the razorback sucker, evolved more than three million years ago.[43] The basin also supported the bonytail chub, which can live nearly fifty years, and the humpback chub, which can survive more than thirty years.[44]

The Columbia River system provided habitat for numerous species of anadromous salmon and steelhead. The basin supported historic runs of ten to sixteen million fish.[45] The wild fish spawn in the tributary streams, and the smolts journey long distances to the sea, spending two or more years in the ocean before returning to spawn.[46] A Snake River salmon will journey nearly a thousand miles and climb 6500 feet back to its natal waters to spawn.[47]

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38. MacDonnell & Getches, *supra* note 17, at 5–6.

39. COLORADO RIVER RECOVERY PROGRAM, U.S. FISH & WILDLIFE SERV., SWIMMING UPSTREAM: THE ENDANGERED FISH OF THE COLORADO RIVER (1996) [hereinafter SWIMMING UPSTREAM].

40. MARC REISNER, CADILLAC DESERT 127 (1986).

41. SWIMMING UPSTREAM, *supra* note 39.

42. *Id.*

43. *Id.*

44. *Id.*

45. NORTHWEST POWER PLANNING COUNCIL, COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM 36 (1987).

46. KEITH C. PETERSEN, RIVER OF LIFE, CHANNEL OF DEATH: FISH AND DAMS ON THE LOWER SNAKE 193 (1995).

47. *Id.*

The Aboriginal River systems supported large human populations.[48] The native people of both basins depended on native fish for subsistence, though to different degrees. In the Colorado River Basin, the Native Americans ate razorbacks and squawfish.[49] In the Columbia River Basin, the salmon was the primary staple of subsistence and absolutely essential to survival.[50]

The dependence of tribal people on the natural environment spawned a cultural mandate to respect and comply with the natural laws of the river, and this in turn promoted human activity that was consistent with ecological sustainability.[51] The carefully controlled harvest of salmon by the Columbia River Basin peoples that endured for millennia was inspired, not by a detailed set of written laws, but by an all-encompassing reverence for the creature that sustained life in the basin.[52] Their cultural approach to the river ecosystem is aptly summarized by Deitrich: "Nature was an unpredictable spirit to be placated, not an enemy to be conquered."[53] "Salmon was not just food, it was a sacrament. The river was not a 'resource,' it was life itself."[54] Some present-day tribal members in each basin remember well the Aboriginal River, which continues to embody the spiritual mandate of living in harmony with nature.[55]

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48. For example, it is estimated that perhaps 50,000 Indian people lived in the Columbia River Basin. *Id.* at 143.

49. Bolin, *supra* note 15, at 2.

50. DIETRICH, *supra* note 29, at 147, 153–56.

51. *See id.* at 151–52. Dietrich quotes an Indian prophet, Smohalla, who instructed the Indians of the mid-Columbia: "We simply take the gifts that are freely offered. We no more harm the earth than would an infant's fingers harm its mother's breast." As Deitrich notes, "No phrase better sums up the gulf between the two cultures, the way gift-giving mirrored the Native American approach to life and non-Indian economies undermined it." *Id.* at 152.

52. WY-KAN-USH-MI WA-KISH-WIT (SPIRIT OF THE SALMON): THE COLUMBIA RIVER ANADROMOUS FISH RESTORATION PLAN OF THE NEZ PERCE, UMATILLA, WARM SPRINGS AND YAKAMA TRIBES 2–1 (1996) [hereinafter TRIBES' RECOVERY PLAN].

53. DIETRICH, *supra* note 29, at 151.

54. *Id.* at 377.

55. *See id.* at 378 ("Celilo [Falls] today has been gone nearly four decades yet still reverberates in the heart of every Native American who ever fished or lived by it."); *Natives Recall the Land Drowned by Dalles Dam*, LEWISTON MORNING TRIB. (Lewiston, Idaho), July 18, 1997, at 4(C) (gathering of Indian people to mark passing of 40 years since loss of salmon fishery at Celilo Falls); *cf.* WILKINSON, *supra* note 1, at 219 (Jicarilla Apache elder description of Navajo River). Tribal ceremonies today keep alive traditional culture, and tribal governments in the Columbia River Basin incorporate the spiritual mandate of living in harmony with nature into their resource management. Donald Sampson, Chairman of the Umatilla Tribe, describes a still-enduring native resource ethic premised on protection and limited use:

> Unlike most current management, which looks at what can be hauled away, the tribes still look at what must be left behind.
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> ....

2. The Pioneer Rivers

Colonial exploration introduced a new mindset towards the basins, described by Worster as one that "accepts the conquest of nature as humankind's highest goal."[56] The legendary expeditions of Meriwether Lewis and William Clark on the Columbia in 1805 and of John Wesley Powell on the Colorado in 1869 effectuated a conceptual transformation of the Aboriginal Rivers into the Pioneer Rivers. This first transformation was perhaps the most powerful one in human history, forming an impetus for the physical exploitation of the rivers that followed.

Both expeditions were launched with the objective of extending the American Empire. In dispatching the "Corps of Discovery" to explore for a route to the Columbia River, President Thomas Jefferson "wanted a river that led somewhere, that allowed goods and people and furs to move across the continent."[57] Donald Worster describes John Wesley Powell's attitude towards the Colorado: "He believed enthusiastically in the idea of progress, and he wanted to see progress come westward, advancing into the very canyon lands he had explored, making tame whatever was wild."[58]

The pioneer explorers found the rivers formidable and daunting.[59] But the elements of danger and the unknown that permeated both expeditions inevitably spawned a sense of conquest at their ultimate conclusion. As William Dietrich observes with regard to the Columbia: "If the natives had adapted to the river as it was, the newcomers mused about adapting the river to themselves."[60] This thinking was to be the precursor of the next transformation.

3. The Developed Rivers

In the next historical period, both rivers were transformed from Pioneer Rivers into Developed Rivers—river systems physically altered to serve a spectrum of agricultural, industrial, and municipal interests of the burgeoning non-Indian population. The rivers were swept up, almost literally, in a dam building era spearheaded by the Bureau of Reclamation and the Army Corps of Engineers.[61] The Grand Coulee Dam on the Columbia and the Hoover Dam on the Colorado, both built in the mid-1930s, serve as monumental symbols of the initial push to

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> ...This resource ethic [is] profound: It is part of the unwritten law our Creator placed on the land. It is a religious belief, a social belief, a political and economic philosophy.

Donald Sampson, *Our Bread and Our Body*, INNER VOICE, Nov./Dec. 1996, at 8.

56. DONALD WORSTER, AN UNSETTLED COUNTRY: CHANGING LANDSCAPES OF THE AMERICAN WEST 22 (1994).

57. DIETRICH, *supra* note 29, at 77.

58. WORSTER, *supra* note 56, at 12.

59. For an outstanding account of the Lewis and Clark expedition, see STEPHEN E. AMBROSE, UNDAUNTED COURAGE (1996). For a diary account of the Powell expedition, see J.W. POWELL, THE EXPLORATION OF THE COLORADO RIVERS AND ITS CANYONS (1961).

60. DIETRICH, *supra* note 29, at 74.

61. For a leading treatment of the dam-building era, see REISNER, *supra* note 40.

industrialize and populate the basins. Both monolithic structures represent achievements of human engineering that had been nearly unfathomable for that era. Together they launched what would be a water development frenzy that spared few river systems in the nation.

In just a matter of decades, the Colorado and Columbia Rivers were transformed from naturally flowing rivers into a series of stagnant reservoirs and water conveyance systems, computer manipulated to meet the demands of competing users. The destruction of the Aboriginal Rivers left haunting symbols that persist in the public's imagination. Celilo Falls, the center of a thriving native fishing economy and a place of great spiritual significance to the Columbia River tribes, was drowned by the Dalles Dam in 1957.[62] The Indian fishing community at the falls "dated back eight millennia and was the oldest continuously inhabited community on the continent."[63] Glen Canyon, a place of unparalleled beauty and mystique in the West, was inundated by Lake Powell upon completion of the Glen Canyon Dam in 1963.[64] Both sites serve as disquieting reminders of a not so distant past.[65]

The Developed River in each basin is a significant mutation of the Aboriginal River.[66] Eight monolithic dams now block the lower Columbia and Snake Rivers' course.[67] Several hundred miles of these once free-flowing rivers are now slack water, held back in a series of stagnant reservoirs computer-controlled by Army Corps of Engineers operators. Overall, there are more than 500 dams in the Columbia Basin, giving it the dubious distinction of being the most dammed

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62. John V. Byrne, *Salmon Is King—Or Is It?*, 16 ENVTL. L. 343, 348 (1986).

63. DIETRICH, *supra* note 29, at 52.

64. George Sibley, *Glen Canyon: Using a Dam to Heal a River*, HIGH COUNTRY NEWS, July 22, 1996, at 1.

65. Celilo Falls still serves as the site of an ancient native ceremony that celebrates the return of the salmon. Ted Strong, Executive Director of the Columbia River Inter-Tribal Fish Commission, says of Celilo Falls: "If you are an Indian person and you think, you can still see all the characteristics of that waterfall. If you listen, you can still hear its roar. If you inhale, the fragrances of mist and fish and water come back again." DIETRICH, *supra* note 29, at 378; *see also* Bob Baum, *Roar of Celilo Falls Still Rings in Indians' Ears*, REGISTER-GUARD (Eugene, Or.), Nov. 3, 1996, at 4B. Firm memories also remain of Glen Canyon in the Colorado Basin. *See* WILKINSON, *supra* note 1, at 276. Recently, the Sierra Club's Board of Directors passed a resolution to pursue restoration of Glen Canyon by draining the reservoir. Matthew Brown, *Sierra Club's Proposal to Drain Lake Powell Greeted by Disbelief*, AP FILE, Jan. 13, 1997, *available in* LEXIS, News Library, Allnews File.

66. Describing the present Columbia, William Dietrich notes, "No major American river has been transformed quite so grandly, quickly, and completely." DIETRICH, *supra* note 29, at 45.

67. The four dams on the Lower Columbia are Bonneville, Dalles, John Day, and McNary. The four dams on the Lower Snake are Ice Harbor, Little Goose, Lower Granite, and Snake River. *See Dollars, Sense & Salmon: An Argument for Breaching Four Dams on the Lower Snake River*, IDAHO STATESMAN (Boise, Idaho), Sept. 22, 1997, at 2 (reprint of *Idaho Statesman* opinion pages for July 20–22, 1997).

watershed in the world.[68] The Columbia of today has been described as "a technocratic battleground, a river turned on and off by valves and switches to please the competing needs of irrigators and shippers and power users and fishermen and Indian tribes and environmentalists."[69] One author calls the developed Columbia River "part plumbing, half-machine...a robo-river, a cyborg of sorts."[70]

The Colorado River mainstem is plugged by two "gargantuan" dams: Hoover Dam, which created Lake Mead, and Glen Canyon Dam, which created Lake Powell, the longest reservoir in the world (186 miles).[71] Together they hold back roughly four years flow of the Colorado River.[72] Dozens of other major dams impede the Colorado and its major tributaries: the Green River, the Gunnison River, the Dolores River, and the San Juan River.[73] The Colorado Basin is one of the most controlled water systems in the world,[74] resembling a giant faucet operated by the Bureau of Reclamation to meet consumer demands of the moment.[75] An elaborate canal and pipeline system transports the water to destinations hundreds of miles away from the river. The Colorado River Aqueduct takes water to the Los Angeles–San Diego area, the Central Arizona Project delivers water to Phoenix and Tucson, and the San Juan–Chama Project takes water to Albuquerque.[76] Nine major tunnels beneath the Colorado Divide export water from the Colorado Basin to areas east of the divide.[77] The "maze of tunnels, ditches, aqueducts, and dams...enable the basin states" to capture and divert water (out of the rivers) to serve the more than fifteen million people in the Colorado River Basin.[78] As historian Donald Worster comments: "[T]he Colorado itself had been transmogrified into an industrial artifact, an almost perfectly realized expression of the new imperial West."[79] Certainly the Developed Rivers provide benefits to the regions. In the aggregate, the projects provide electricity, irrigation, recreation, flood control, navigation, and water for industry and municipalities. But many of the projects were not built with a concern for the broad range of human

68. *Id.* at 5B–24. For an inventory of dams in the basin, see REISNER, *supra* note 40, at 171–72.

69. DIETRICH, *supra* note 29, at 47.

70. *Id.* at 44.

71. WILKINSON, *supra* note 1, at 258.

72. *Id.*

73. *Id.*; *see also* MacDonnell & Getches, *supra* note 17, at 8–9 (describing water projects).

74. MacDonnell & Getches, *supra* note 17, at 9.

75. *Id.* at 8–9.

76. WILKINSON, *supra* note 1, at 258–59.

77. *Id.*

78. Bolin, *supra* note 15, at 40.

79. WORSTER, *supra* note 6, at 276. As author Marc Reisner describes the Colorado delivery system: "In the West, it is said, water flows uphill toward money. And it literally does,...as it is shoved a thousand feet out of Colorado River canyons to water Phoenix and Palm Springs and the irrigated lands around them.... It goes in man-made rivers, in siphons, in tunnels." REISNER, *supra* note 40, at 13.

needs, or a recognition of economic losses, or a full awareness of the staggering effects of environmental destruction.[80] In the intoxicating frenzy of the era, pork-barrel projects were typically pushed through the appropriation process without regard for such matters.[81]

As a result, the projects of both basins are extravagant. The Columbia River hydrosystem encourages some of the most wasteful electric consumption in the nation.[82] The system also subsidizes navigation facilities that allow the small town of Lewiston, Idaho, located 450 miles inland on the western front of the Rocky Mountains, to serve as a deep water seaport despite the fact that the area is adequately served by rail and highway.[83] In the Colorado Basin, the water distribution system leaves the Colorado River essentially without water in its lowest reaches,[84] while municipal appropriators of the Southwest receive ample supplies to support golf courses, swimming pools, and water playgrounds.[85]

In short, the Developed Rivers of both basins maximize a limited number of demands for water, inefficiently at that, at the expense of many other demands, including fish habitat and the economies that depend on fish.[86] Accordingly, many

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80. WILKINSON, *supra* note 1, at 230; *see also* MacDonnell & Getches, *supra* note 17, at 40 (noting that none of the dams on the Colorado River were built with the benefit of an environmental impact review); Andrew S. Noonan, *Just Water over the Dam? A Look at the Endangered Species Act and the Impact of Hydroelectric Facilities on Anadromous Fish Runs of the Northwest*, 28 IDAHO L. REV. 781, 802 (1991–92) (criticizing Snake River dams).

81. REISNER, *supra* note 40, at 174–75; *see also* Andrew Murr & Sharon Begley, *Torpedo the Dams*, OREGONIAN (Portland, Or.), Nov. 16, 1997, at E3 (Daniel Beard, former director of the U.S. Bureau of Reclamation, noting that water projects were built as a way of pork-barrel spending to direct taxpayer money to congressmen's home districts, "not...because they are the right engineering solution, or the most economical solution, to a problem.").

82. PALMER, *supra* note 18, at 11; *see also* Michael T. Pyle, *Beyond Fish Ladders: Dam Removal as a Strategy for Restoring America's Rivers*, 14 STAN. ENVTL. L.J. 97, 120 n.137 (1995) (noting cheap electricity in region).

83. IDAHO RIVERS UNITED, EXTINCTION IS NOT AN OPTION 2–3 (1996) (on file with author) (noting $25 million annual subsidy to operate and maintain navigation system). *But see* Jonathan Brinckman, *Salmon Failure Forces a Hard Look at Dams*, OREGONIAN (Portland, Or.), July 28, 1997, at A1 (noting, however, that barging is cheaper than rail or highway).

84. MacDonnell & Getches, *supra* note 17, at 11 (noting "100 percent" depletion of Colorado River water "except in very high flow years").

85. WILKINSON, *supra* note 1, at 260.

86. *See* Pyle, *supra* note 82, at 121 n.144 (exploring economic benefits of removing dams on Elwha River in Washington); *Biological, Economic Facts Point to Breaching Lower Snake Dams*, IDAHO STATESMAN (Boise, Idaho), Dec. 7, 1997, at A14 (economic benefits projected from restoring $500 million salmon fishery lost as partial result of dams); *see also Put an End to Massive Elk Creek Boondoggle*, MEDFORD MAIL TRIB. (Medford, Or.), Feb. 14, 1994, at A10 (exploring benefits of removing Elk Creek Dam on Rogue River, Oregon).

question whether some of the projects would be built today,[87] and several dams are presently undergoing scrutiny for removal.[88] As William Dietrich says of the dam-building era:

> This romance could not last. In a frenzied burst of construction after World War II, the dam builders overreached themselves. In a generation America went from too many floods to too many flooded reservoirs. Hydroelectricity went from miracle to status quo. Undeveloped rivers went from something useless to something precious in their rarity. Irrigation projects struggled to justify their rising costs to farmers and taxpayers. It has been two decades now since Congress last authorized a major reclamation project.[89]

4. The Endangered Rivers

The Developed Rivers are now more accurately described as the Endangered Rivers.[90] Human destruction through dam building and other activities has pushed the dominant fish species in each basin to the brink of extinction.[91] In both basins, some species have already passed into extinction.

The imminence of extinction is unfathomable compared to the duration these species have survived and evolved in the basins. The Colorado squawfish and razorback sucker evolved more than three million years ago.[92] Salmon have inhabited the Columbia River Basin for five million years.[93] Native fish of both basins face possible extinction in five to ten years.[94] The threatened extinctions were precipitated by human activities spanning less than a century.

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87. *See* REISNER, *supra* note 40, at 505; MacDonnell & Getches, *supra* note 17, at 9; Pyle, *supra* note 82, at 100.

88. *See infra* note 538 (discussing Corps of Engineers study assessing feasibility of removing four Snake River dams); *infra* note 512 (support for dam removal in Colorado and Columbia River Basins); *infra* note 540 (describing removal of smaller dams nationwide). For an inventory of dam removal efforts nationwide and arguments supporting such efforts, see Pyle, *supra* note 82; Marc Reisner, *Deconstructing the Age of Dams,* HIGH COUNTRY NEWS, Oct. 27, 1997, at 1 (listing dams subject to removal efforts).

89. DIETRICH, *supra* note 29, at 23.

90. A national conservation group, American Rivers, compiles a list of the most "endangered rivers" in North America. *See supra* note 2.

91. *See infra* Part II.B.2.

92. SWIMMING UPSTREAM, *supra* note 39.

93. CONE, *supra* note 16, at 55.

94. *Salmon Recovery, Pacific Fisheries Issues: Hearings Before the Subcomm. on Drinking Water, Fisheries and Wildlife of the Senate Comm. on Env't and Pub. Works,* 104th Cong. 23 (1996) [hereinafter Williams Testimony] (statement of Dr. Richard N. Williams, Chair, Independent Scientific Advisory Board, regarding the Columbia River); Lorraine Bodi, *The History and Legislative Background of the Northwest Power Act,* 25 ENVTL. L. 365, 367 (1995) (Columbia River); Bolin, *supra* note 15, at 37 (Colorado River); Brinckman, *supra* note 83, at A1 (Columbia River).

The Columbia River Basin once boasted the world's largest commercial fishery. But historic runs of ten to sixteen million wild fish have now fallen by over ninety percent.[95] The Snake River coho has passed into extinction.[96] Two Snake River chinook stocks and the Snake River sockeye are listed under the ESA.[97] Wild steelhead were recently proposed for listing.[98] Scientists believe that, throughout the basin, at least fifty-nine salmon stocks have gone extinct, and another fifty are at high or moderate risk of extinction.[99] While more than four thousand adult Snake River sockeye returned to Redfish Lake (located in the Sawtooth Mountains of Idaho) in the 1950s,[100] only fourteen returned between 1991 and 1995,[101] and only one returned in 1996.[102] The year 1995 witnessed a record low number of wild salmon returning to spawn in the Snake River Basin.[103]

In the Colorado Basin, four species of indigenous basin fish are listed as endangered: the Colorado squawfish, the humpback chub, the bonytail chub, and the razorback sucker.[104] All are reduced to a few remnant populations.[105] The Colorado squawfish is totally extirpated in the Lower Basin area.[106] Wild bonytail chubs are nearly extinct, or as one commentator puts it, "functionally extinct; only a few rare individuals exist."[107] Few if any young razorback suckers are left in the

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95. TRIBES' RECOVERY PLAN, *supra* note 52, at 3–1.

96. Notice of Determination, 56 Fed. Reg. 29,553 (1991).

97. *See supra* note 14; *see also* Mary Christina Wood, *Fulfilling the Executive's Trust Responsibility Toward the Native Nations on Environmental Issues: A Partial Critique of the Clinton Administration's Promises and Performance*, 25 ENVTL. L. 733, 764 & n.148 (1995).

98. Endangered and Threatened Species; Proposed Endangered Status for Five ESUs of Steelhead and Proposed Threatened Status for Five ESUs of Steelhead in Washington, Oregon, Idaho, and California, 61 Fed. Reg. 41,541 (1996) (to be codified at 50 C.F.R. pts. 222, 227) (proposed Aug. 9, 1996) (proposed listing of Snake River and Lower Columbia species as threatened, and Upper Columbia species as endangered); *see also U.S. Acts to Protect Steelhead Trout Runs Along the West Coast, supra* note 14, at A8.

99. NATIONAL MARINE FISHERIES SERV., U.S. DEP'T OF COMMERCE,: PROPOSED RECOVERY PLAN FOR SNAKE RIVER SALMON I–C (1995) [hereinafter NMFS DRAFT RECOVERY PLAN]; *see also* Wood, *supra* note 97, at 764 n.149.

100. *Dollars, Sense & Salmon*, *supra* note 67, at 5.

101. KEITH A. JOHNSON & JAY J. PRAVECEK, IDAHO DEP'T OF FISH & GAME, RESEARCH AND RECOVERY OF SNAKE RIVER SOCKEYE SALMON 7 (1996).

102. *1 Sockeye Returns to Redfish Lake,* IDAHO STATESMAN (Boise, Idaho), Sept. 7, 1996, at B3.

103. Larry Swisher, *Neither the Year Nor the Politicians Have Been Good for Salmon*, LEWISTON MORNING TRIB. (Lewiston, Idaho), Dec. 17, 1995, at C3.

104. Bolin, *supra* note 15, at 37 & n.6.

105. *Id.*

106. MacDonnell & Getches, *supra* note 17, at 39.

107. Bolin, *supra* note 15, at 37 (quoting R.J. Behnke & D.E. Benson, *Engangered and Threatened Fishes of the Upper Colorado Basin,* 503A COLO. ST. U. COOP. EXT. SERV. BULL. 1, 20 (1980)).

wild.[108] These four species represent roughly one-third of the native fish species in the entire Colorado River ecosystem.[109]

In both basins, the fish species are indicators of greater ecosystem trauma. Federal water projects have radically altered and simplified the natural hydrology of both river systems, posing a threat to the greater biodiversity of the regions.[110] In the Columbia River Basin, NMFS has concluded that habitat degradation is so extensive that "[f]ew examples of naturally functioning aquatic systems (watersheds) now remain in the Pacific Northwest."[111]

5. The Normative Rivers

The greatest challenge now facing both basins—and others across the country—is how to bring about the next transformation of the rivers. In both the Colorado and Columbia River Basins, independent scientists have been retained to review the scientific literature on the endangered species, assess the various ongoing recovery efforts, and suggest new approaches to recovery. In 1994, Dr. Jack A. Stanford, an independent scientist, completed his study for the National Biological Survey on the Upper Colorado Basin.[112] In 1996, an independent team of scientists commissioned by the Northwest Power Planning Council and NMFS (called the "Independent Scientific Advisory Board," or the "Independent Scientific Group") issued a draft report on the Columbia River Basin ("Williams Report").[113] Both reports suggest a strikingly similar paradigm shift towards what could be called a "Normative River."[114] Urging a more holistic, ecosystem approach than that which characterized recovery efforts of the past, both reports recommend restoring critical components of the natural regime in which the species evolved.[115] In both basins, this would entail reclaiming critical natural habitat and flow conditions.

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108. SWIMMING UPSTREAM, *supra* note 39.

109. John Hamill, The Upper Colorado River Basin Endangered Fish Recovery Initiative 1 (Working Paper 93–12, Conflict Resolution Consortium, University of Colorado, Sept. 27, 1993) (on file with author).

110. *See* MacDonnell & Getches, *supra* note 17, at 38–39 (discussing hydrological changes caused by dam operations).

111. NMFS DRAFT RECOVERY PLAN, *supra* note 99, at V–1–2 to V–1–3; *see also* Wood, *supra* note 97, at 767 n.165.

112. JACK A. STANFORD, NATIONAL BIOLOGICAL SURVEY, INSTREAM FLOWS TO ASSIST THE RECOVERY OF ENDANGERED FISHES OF THE UPPER COLORADO RIVER BASIN (1994) [hereinafter STANFORD REPORT].

113. Williams Testimony, *supra* note 94, at 23; Independent Scientific Group (Richard N. Williams et al.), Return to the River: Restoration of Salmonid Fishes in the Columbia River Ecosystem (September 10, 1996) (prepublication copy on file with author) [hereinafter Williams Report].

114. Williams Report, *supra* note 113, at xvii; *see generally* STANFORD REPORT, *supra* note 112.

115. *See* STANFORD REPORT, *supra* note 112, at 2 (offering recommendations that "reflect an ecosystem approach" and that constitute "a new, holistic instream flow

Species survival in both basins depends upon a very complex interaction among a multitude of factors, including food webs, predator-prey relationships, water temperatures, streambed composition, wetland habitat, flow velocities, migratory routes, and much more.[116] The multitude of natural dynamics that contribute to species survival and the perpetuation of life in the basins is a matter well beyond the ability of scientists to inventory, much less fully understand their synergistic relationships. The underlying premise of a Normative River approach is that reclaiming basic natural features of the historic river will do much to accomplish the restoration of a functioning ecosystem.[117] The ecosystem, once functioning again as a natural unit, is expected to confer a greater set of ecological benefits than would result from isolated measures directed at separate components of the fish's life cycle.[118]

By restoring fundamental natural components of the river ecosystem, the Normative River approach differs substantially from prior recovery efforts in both basins. As a later section of this Article discusses in more detail, past recovery efforts have focused primarily on ecologically minor adjustments to the water delivery and hydroelectric systems.[119] The efforts have also relied heavily on artificial propagation.[120] In the Columbia River Basin, rather than restoring in-river conditions necessary for natural migration, fish have been put on barges to

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methodology"); Williams Report, *supra* note 113, at xvii (recommending return to a "normative" ecosystem in which "specific functional norms or standards that are essential to maintain diverse and productive populations are provided"). For a general discussion of restorative efforts towards a normative river paradigm in both basins, see Jim Simon, *Do Endangered Salmon Equal Endangered Dams?*, SEATTLE TIMES, Apr. 20, 1997, at A1.

116. STANFORD REPORT, *supra* note 112, at 6–23; Williams Report, *supra* note 113, at 13–21.

117. *See* STANFORD REPORT, *supra* note 112, at 2; Williams Report, *supra* note 113, at xvi–xvii.

118. *See* Williams Report, *supra* note 113, at xxiii ("While technology will continue to be a part of any restoration effort in the Columbia River, we recommend that the region move from a strategy of 'fixing' ecosystem damage to one that places greater reliance on re-expression of the natural biological and physical processes of the Columbia River salmon-bearing ecosystem.").

119. *See* Jonathan Brinckman, *$3 Billion Later, Columbia Basin Salmon Dwindle,* OREGONIAN (Portland Or.), July 27, 1997, at A1 ("The efforts have two things in common: They seek to save fish without disrupting the river's power generation, navigation, irrigation and other industrial uses. And they fail to reverse the decline of salmon."); *see also infra* Part IV.E.

120. *See* Williams Report, *supra* note 113, at xxiv (discussing Columbia Basin); FISH AND WILDLIFE SERV., U.S. DEP'T OF THE INTERIOR, SECTION 7 CONSULTATION, SUFFICIENT PROGRESS, AND HISTORIC PROJECTS AGREEMENT AND RECOVERY ACTION PLAN (RIPRAP): RECOVERY IMPLEMENTATION PROGRAM FOR ENDANGERED FISH SPECIES IN THE UPPER COLORADO RIVER BASIN 9 (1996) [hereinafter 1996 UPPER COLORADO RECOVERY PROGRAM] (discussing the Colorado Basin).

circumvent the lethal dams.[121] As the Williams Report concludes, such restoration actions "are best characterized as technological substitutes for ecological processes."[122]

Rejecting such technological solutions and restoring integral natural processes will require major changes in river management operations.[123] In both basins, the progression towards a Normative River would be a progression "from the current state of the river toward historic conditions."[124] In the Colorado River Basin, such a paradigm shift could involve greatly increased flows that "reestablish seasonality."[125] Restoring peak flows that are more characteristic of the natural river regime is expected to reconnect the current river environment with highly productive side channel and flood-plain habitat that became isolated when the river flows were regulated.[126] Ultimately, long-term recovery options may include dam removal or enhanced fish passage as well.[127]

In the Columbia River Basin, creating a Normative River will mean restoring conditions necessary for in-river migration. Measures will necessarily focus on river flow quantities and timing, as well as the existence of the dams themselves, which presently create lethal conditions for migration.[128] While the Williams Report stopped short of providing specific recommendations, options currently under study in other quarters include removal of or mothballing all four

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121. Blumm et al., *supra* note 26, at 34–36; Charles Ray, *1995 River Operations Under the Endangered Species Act: Continuing the Salmon Slaughter*, 26 ENVTL. L. 675, 678–79 (1996); *see also infra* notes 214–17 and accompanying text.

122. Williams Report, *supra* note 113, at xvi.

123. Neither report offers specific recommendations; rather, both are conceptual in nature. *See* O. Eugene Maughan, *River Flow Management Suggested as Basis for Managing Native Fishes in the Upper Colorado River Basin*, 5 RIVERS 140, 142 (1995) (reviewing STANFORD REPORT); Williams Report, *supra* note 113, at xvi.

124. Williams Report, *supra* note 113, at xvii (discussing the Columbia River Basin); *see also* STANFORD REPORT, *supra* note 112, at 37 (discussing the Colorado Basin) (recommending that "peak flows should approach the range and frequency of preregulation events in relation to precipitation within each subbasin").

125. STANFORD REPORT, *supra* note 112, at 2. Restoring more natural, seasonally based flows is expected to achieve a variety of interactive effects beneficial to native fishes; effects may include restoring food webs, reconnecting habitat, reestablishing historic water temperatures, and reducing the number of exotic fishes. *See* Maughan, *supra* note 123, at 141; Robert Wigington & Dale Pontius, Toward Range-Wide Integration of Recovery Implementation Programs for the Endangered Fishes of the Colorado River (prepared for the Colorado River Workshop 10, Apr. 22, 1996) (on file with author).

126. STANFORD REPORT, *supra* note 112, at 37 (but acknowledging scientific uncertainty involved with recommended approach); *see also* Wigington & Pontius, *supra* note 125, at 10.

127. STANFORD REPORT, *supra* note 112, at 41 (noting that the "feasibility of removing diversion dams or providing fish passage around them" were options not studied in the Stanford report but that should be considered).

128. *See infra* notes 160–61 and accompanying text (discussing mortality attributable to dams).

lower Snake River dams (as well as some smaller tributary dams throughout the basin),[129] lowering the John Day Reservoir (the most lethal reservoir on the Columbia River) to spillway levels,[130] and implementing other operational modifications of the system, such as "spilling" water through the dams during peak migratory periods.[131]

Two essential conceptual features define the priorities inherent in a Normative River paradigm. The first operative premise is that the species' survival needs can and should be met with an acceptable level of security. In the Endangered River regime, river operations are managed first and foremost to provide immediate and certain response to human economic demands. Water from the Colorado River Basin is appropriated to meet water consumption needs, and flows in the Columbia are manipulated to meet hydroelectric demands. This often comes at the expense of the species' needs, which are typically characterized as indeterminable. The Normative River regime reestablishes a baseline of natural parameters in an effort to create more security for the imperiled species. While precise biological needs will always elude science, independent scientists in both basins believe that the species will benefit from resuming critical components of a natural system that provided security of survival for millennia.[132]

The second, and corollary, feature of the Normative River paradigm is a continued emphasis on meeting human needs through the technological systems in place. But to the extent that some components of such systems must be dismantled, modified, or their operations altered to provide for species' needs, the Normative River paradigm readjusts electricity and water delivery by tapping the economic and technical flexibility inherent in the system. As Charles Wilkinson notes:

> Ironically, one of the greatest aids in correcting the excesses of western water development is those excesses themselves. The West is so extravagantly overbuilt—so much water has been developed, and so many water users are so wasteful—that the water supplies in the present system, if used sensibly, can meet most or all future needs for the foreseeable future.... [T]he current situation affords an extraordinary amount of flexibility, a powerful ability to create new supplies of water from existing supplies.[133]

Across the West, there are efforts to explore alternative economic regimes for the distribution of water and electricity. Conservation programs, water pricing, water-saving technologies, and alternative energy sources represent just a few of the avenues available to compensate for investing water resources back into the

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129. *See infra* notes 512, 538 and accompanying text (describing dam removal initiatives).

130. *See* Blumm et al., *supra* note 26, at 77 (discussing Tribes' recovery plan).

131. *See id.* at 30–34.

132. *See* STANFORD REPORT, *supra* note 112, at 2; Williams Report, *supra* note 113, at xvi–xvii.

133. WILKINSON, *supra* note 1, at 286–87.

river systems.[134] Additionally, critical reexamination of some projects reveals that they are not crucial to public welfare, and that the economic benefits of removal would be significant.[135] Salmon restoration efforts in the Columbia River Basin, for example, have focused on the possible retirement of the four huge dams that block salmon migration on the Snake River in Washington.[136] The dams provide only five percent of the power capacity in the Northwest,[137] confer irrigation to only thirteen farmers,[138] and provide no flood control benefits.[139] Operation of the dams is primarily for the purpose of maintaining the navigation system for Lewiston, Idaho, at a federal subsidy of ninety-eight million dollars yearly.[140] Removal of the four dams, while not jeopardizing any human needs in the region, is expected to restore imperiled Snake River salmon to 1960s (predam) levels within twenty-four years.[141]

In prioritizing needs of species while at the same time meeting human needs by capturing the inherent economic and technological flexibility in the system, the Normative River paradigm has as its driving force the premise that the species' needs and human needs are not irreconcilable. The ESA also embodies this approach.[142] In some sense, the ideal Normative River regime is a form of river management that should have evolved anyway but was precluded by the frenzied pace that characterized the development era.[143] But despite its appeal, the Normative River paradigm remains in the conceptual stage: the rivers in both basins are very much still the Endangered Rivers.

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134. *See id.* at 287–91 (discussing a conservation approach to western water policy).

135. *See* sources cited *supra* note 86.

136. *See infra* notes 512, 538. For a fuller discussion of this option, see IDAHO RIVERS UNITED, *supra* note 83, at 1, 3; *Dollars, Sense, and* Salmon, *supra* note 67.

137. *Biological, Economic Facts Point to Breaching Lower Snake Dams, supra* note 86, at A14; *When Will Idaho Leaders Acknowledge Breaching Lower Snake Dams Best for Region?*, IDAHO STATESMAN (Boise, Idaho), Nov. 2, 1997, at A18. The electricity is replaceable at competitive prices. *Biological, Economic Facts Point to Breaching Lower Snake Dams, supra* note 86, at A14.

138. *Biological, Economic Facts Point to Breaching Lower Snake Dams, supra* note 86, at A14; *When Will Idaho Leaders Acknowledge Breaching Lower Snake Dams Best for Region?, supra* note 137, at A18.

139. *Biological, Economic Facts Point to Breaching Lower Snake Dams, supra* note 86, at A14.

140. *Dollars, Sense & Salmon, supra* note 67, at 2; *see also* IDAHO RIVERS UNITED, *supra* note 83; *Biological, Economic Facts Point to Breaching Lower Snake Dams, supra* note 86, at A14.

141. *Dollars, Sense & Salmon, supra* note 67, at 4. According to the state and tribal fisheries agencies' analytical team, the probability of such restoration is 80% to 100% in 24 years. *Id.*

142. See section 7 of the ESA, 16 U.S.C. § 1536(b)(3)(A) (1994), which requires the Service to identify "reasonable and prudent alternatives" to actions that would otherwise jeopardize a species' continued survival.

143. *See* Noonan, *supra* note 80, at 801.

As the above discussion demonstrates, it is against a shared historical and ecological context that the ESA must confront the current crisis of endangered river ecosystems. In both the Colorado and Columbia River Basins, the ESA mandates changes in the Developed River system to restore the critical web of life that evolved under the Aboriginal River regime—without, presumably, jeopardizing vital human needs. The next section compares the species that are subject to ESA protection efforts in each basin.

B. The Species

1. Role in Regional Economy and Culture

The Columbia Basin salmon and the Colorado native fish species are similar in that they both have complex life cycles and face multiple threats from human activity, largely river operations. But the species contrast markedly in their role in the economy and culture of their respective regions. In juxtaposition, they serve as fitting symbols of the widely divergent public sentiment towards these species.

The Columbia River salmon are the signature species of the Northwest, a powerful symbol of the rich ecological and cultural heritage of the region.[144] As one author describes the relationship between salmon and the human inhabitants of the Pacific Northwest:

> Indeed the salmon is at least the soul of this biome....
>
> ....
>
> The salmon is a kind of current between the forest and sea.... The salmon travels in our heart.... The deep resonance between the salmon of the heart and the salmon of the world is the note of our dwelling here.[145]

The salmon have played a vital role in native culture for thousands of years. Prior to white settlement of the region, tribes harvested up to five million fish annually.[146] Tribes have treaty rights, interpreted in the landmark cases *Washington v. Washington Passenger Fishing Vessel*[147] and *Sohappy v. Smith*,[148] to take up to fifty percent of the harvestable quantities of salmon. The non-Indian economic interest in the fishery is also substantial. Prior to destruction of the runs, the basin's salmon fishery was the largest commercial fishery in the world.[149] According to the Institute for Fisheries Resources, an estimated five-hundred

144. Wilkinson & Conner, *supra* note 26, at 21.

145. Tom Jay, *The Salmon of the Heart*, *in* DALMO'MA VI: AN ANTHOLOGY OF NORTHWEST WRITING 100, 101, 111 (Finn Wilcox & Jeremiah Gorsline eds., 1986).

146. Wood, *supra* note 97, at 769 n.174.

147. 443 U.S. 658, 664–69 (1979).

148. 302 F. Supp. 899, 904 (D. Or. 1969).

149. REISNER, *supra* note 40, at 164, 250.

million dollars is lost annually due to salmon decline, and twenty-five thousand jobs in the commercial and sport fishing industry have been eliminated.[150] Salmon recovery efforts are supported by the Columbia River Basin Tribes (Yakama, Warm Springs, Nez Perce, and Umatilla), the states, and a broad-based coalition of environmental and fishing groups known as the Save Our Wild Salmon Coalition, which has forty-seven member organizations.[151]

Neither "majestic nor cuddly,"[152] the Colorado fishes do not enjoy such a central position in the culture and economy of the region. Some species were used by Native Americans of the region and commercially fished until the 1940s, but today none of the fish are sought by anglers.[153] In fact, native Colorado fish were widely considered "trash fish" until recently and even poisoned in the mid-1960s to make way for nonnative sport fish.[154]

While salmon protection efforts in the Pacific Northwest draw upon the exalted and sacred status of the fish, native fish protection efforts in the Colorado Basin typically appeal to the philosophy of Aldo Leopold: "If the land mechanism as a whole is good, then every part is good, whether we understand it or not."[155] The contrast reflects the full scale of benefits Congress attached to species in passing the ESA, as expressed in the findings of the statute: "Congress finds and declares that...species of fish, wildlife, and plants are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people." [156]

2. Human Threats

Both the Columbia Basin salmon and the Colorado fish species face threats at various points in their life cycle; recovery, therefore, must reach across the full basins. While the species face multiple threats, an overriding cause of decline is the river operations that have transformed the free-flowing rivers to a series of slack, lake-like environments.[157]

Four human activities mortally threaten the Columbia River species: hydropower operations, habitat degradation (such as logging, mining, and grazing),

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150. *Dollars, Sense & Salmon, supra* note 67, at 2; *see also* IDAHO RIVERS UNITED, *supra* note 83.

151. Bob Baum, *Corps, BPA Want to Halt Spills, Boost Fish Barging*, IDAHO STATESMAN (Boise, Idaho), Jan. 24, 1998, at A1; *see also* Rocky Barker, *Salmon: To Barge or to Breach*, IDAHO STATESMAN (Boise, Idaho), Jan. 24, 1998, at A1.

152. Bolin, *supra* note 15, at 38.

153. *Id.*

154. *Id.* at 36; *see also* SWIMMING UPSTREAM, *supra* note 39.

155. ALDO LEOPOLD, ROUND RIVER: FROM THE JOURNALS OF ALDO LEOPOLD 146 (Luna P. Leopold ed., 1993).

156. 16 U.S.C. §1531(a)(3) (1994).

157. CONE, *supra* note 16, at 32; MacDonnell & Getches, *supra* note 17, at 38.

hatchery operations, and harvest.[158] The salmon also face a relatively unknown set of threats in their ocean environment, in which they spend up to six years.[159] Of the human-caused threats, the hydrosystem accounts for the primary source of mortality.[160] Dams can kill over ninety percent of the juvenile smolts that migrate downstream.[161] Federal river managers prefer to barge the baby salmon around the dams so that transportation and electricity production are not disrupted.[162] However, after over twenty years of operation, the barging program has not halted the decline of the species, and it is highly controversial as a recovery measure.[163]

Colorado fishes also face threats from throughout the basin. Like the Columbia River salmon, their habitat has been radically altered by project construction and operation. As one commentator notes, "The alteration of the Colorado River Basin rivers' hydrographs has...disrupted almost every phase of

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158. TRIBES' RECOVERY PLAN, *supra* note 52, at 3–20. These four causes of decline are known as the "4 H's." *Id.*; *see also* Wood, *supra* note 97, at 762–70.

159. CONE, *supra* note 16, at 7.

160. *Id.* at 32. In litigation over tribal fishing in the fall of 1995, the tribes submitted evidence that, even if all tribal fishing were to end, the species would not recover without significant improvements to the hydrosystem. *See* Wood, *supra* note 97, at 774 n.202; *see also* Joan Laatz Jewett, *Dams Far Deadlier than Fishing,* OREGONIAN (Portland, Or.), Sept. 19, 1997, at E4.

161. IDAHO DEP'T OF FISH & GAME, SAVING IDAHO'S SALMON (no date) [hereinafter SAVING IDAHO'S SALMON]; TRIBES' RECOVERY PLAN, *supra* note 52, at 5B–24; *New Plan for Rescuing the Salmon,* N.Y. TIMES, Apr. 21, 1997, at B8.

162. Baum, *supra* note 151, at A1; Brinckman, *supra* note 119, at A1; *New Plan for Rescuing the Salmon, supra* note 161, at B8.

163. Williams Testimony, *supra* note 94, at 23–24 ("Instead of looking for ecosystem-level solutions, we have sought technological band-aids to repair lost ecosystem functions.... Efforts to date to separate salmon from their ecosystem through the use of...transportation and other engineering 'fixes' which have proven ineffective."); SAVING IDAHO'S SALMON, *supra* note 161, at 2; Williams Report, *supra* note 113, at xxv; Ray, *supra* note 121, at 678–79; Don Sampson, *One Tribe's Perspective on "Who Runs the Reservoirs,"* 26 ENVTL. L. 681, 682–83, 687 (1996); Barker, *supra* note 151, at A1 (Article quotes Ed Bowles, a fisheries manager with the Idaho Department of Fish and Game: "The emerging science clearly indicates that the transportation system is not adequate to recover the fish.... In spite of that, NMFS continues to pursue a program for recovery that is indefensible on either an empirical or theoretical basis."); *Biologists Say Breaching Is Good for the Fish,* LEWISTON TRIB. (Lewiston, Idaho), Dec. 6, 1997, at A5 (noting Idaho state biologists' opposition to barging fish); Brinckman, *supra* note 119, at A1 (Article describes barging program and notes "many such 'experiments' continue long after most scientists agree they are failing."); Ted Strong, *Fed's Dominance Imperils Fish,* DAILY ASTORIAN, May 16, 1997, at A6. For newspaper editorials criticizing barging as salmon recovery strategy, see *Clinton Administration Should Look to Idaho for Sensible Recovery Plan,* IDAHO STATESMAN (Boise, Idaho), Feb. 1, 1998, at A14; *Relying on More Barging Won't Help Save Fish Runs,* IDAHO ST. J., Feb. 1, 1998, at B2; Marty Trillhaase, *A Fish Killing Strategy,* POST–REG. (Idaho Falls, Idaho), Feb. 4, 1998, at A5.

the fishes' life cycle."[164] Dams and reservoirs have blocked fish migration routes, altered the rivers' natural temperature and sedimentation characteristics, and changed the natural food webs upon which the fish depend.[165] Nonnative fish prey on the native fish, also posing a significant threat.[166]

III. THE RECOVERY PROCESS IN THE COLORADO AND COLUMBIA RIVER BASINS

A. The "Law of the River"

In both basins, the ESA is a statutory overlay to an already complicated system of natural resource allocation and management. The Colorado Basin fish were first listed under the ESA in 1973,[167] and the Snake River salmon in the Columbia Basin were first listed in 1992.[168] Up until that time, both river systems were managed pursuant to a complex set of laws that could be generically referred to as the "Law of the River."[169] The Law of the River is comprised of treaties, statutes, compacts, and court cases setting forth federal and state obligations with respect to the primary natural resources of the river.

In many ways, the Law of the River in both basins has been shaped to allocate rights to the primary resources offered by the river. In the Colorado River Basin the primary resource has been water, and so, not surprisingly, the Law of the River revolves around water allocation. In the Columbia River Basin, the Law of the River developed around another primary resource: fish (along with hydroelectricity and water). In that basin, the ESA is only one of three sources of law protecting fish, and NMFS is only one of a multitude of agencies with fish protection as its mission.[170] It is vital to have a general understanding of the Law of

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164. Bolin, *supra* note 15, at 39; *see also* Garner & Ouellette, *supra* note 26, at 483 n.110 (citing 58 Fed. Reg. 6578, 6579 (proposed critical habitat determination, Jan. 29, 1993) (noting that dams and diversions have "greatly altered the river environment and little or no unaltered habitat remains in the Basin for the four Colorado River endangered fish species")).

165. *See* Garner & Ouelette, *supra* note 26, at 483 n.110.

166. Bolin, *supra* note 15, at 39.

167. Hamill, *supra* note 109, at 1 (noting that the squawfish, humpback chub, and bonytail chub were listed when the ESA was first passed in 1973, and that the razorback sucker was listed in 1991).

168. Policy on Applying the Definition of Species Under the Endangered Species Act to Pacific Salmon, 57 Fed. Reg. 58,612 (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. 14,653 (1992) (to be codified at 50 C.F.R. pt. 227).

169. The term "Law of the River" is often used to describe the legal scheme of water allocation in the Colorado Basin, but has not yet been used widely to describe natural resource allocation in the Columbia River Basin. The term, in its generic sense, seems appropriate for both.

170. *See infra* Part III.A.1.

the River because, both in these basins and others nationwide, it poses a difficult and constant legal undercurrent to ESA implementation.

1. The Columbia River Basin

In the Columbia River Basin, the rights to water and hydroelectricity are governed by a series of treaties, statutes, and cases.[171] Unlike the Colorado Basin, there is no interstate water allocation compact, but states generally follow the doctrine of prior appropriation and engage in basin-wide adjudications of water rights.[172] Under the landmark ruling in *Winters v. United States*,[173] tribes hold treaty rights to water throughout the basin. The United States is also subject to a treaty with Canada that allocates rights and responsibilities with respect to storage of water.[174] Production and distribution of hydroelectricity is regulated pursuant to federal statutes such as the Pacific Northwest Electric Power Planning and Conservation Act ("NPA") and the Pacific Northwest Coordination Agreement.[175]

The fishery resource has always been subject to competing interests in the basin, and the Law of the River has responded to allocate rights to the salmon. International rights and obligations are determined pursuant to the Pacific Salmon Treaty.[176] Interstate allocations are governed by an interstate compact.[177] Tribal rights to the fishery are established under treaties and case law. Courts have consistently found that these rights secure up to fifty percent of the harvestable runs to the tribes.[178]

Most important to note for purposes of the ESA, the Law of the River has developed two distinct processes by which management and protection of fish occur. Both predate the ESA and grant authority to agencies other than NMFS. The first is a court-devised process established to ensure that states and tribes would

171. For helpful background, see Michael C. Blumm, *Implementing the Parity Promise: An Evaluation of the Columbia Basin Fish and Wildlife Program*, 14 ENVTL. L. 277 (1984) [hereinafter Blumm, *Implementing Parity*]; Michael C. Blumm, *The Northwest's Hydroelectric Heritage: Prologue to the Pacific Northwest Electric Power Planning and Conservation Act*, 58 WASH. L. REV. 175 (1983); Wilkinson & Conner, *supra* note 26.

172. Ongoing adjudications with tremendous importance to fish are the Yakima Basin adjudication in Washington and the Snake River adjudication in Idaho. *See* Dar Crammond, *Northwest Water Right Adjudications: A Status Report*, 2 BIG RIVER NEWS 8, 10, 11 (1996).

173. 207 U.S. 564 (1907).

174. *See* Blumm & Simrin, *supra* note 26, at 665 n.30.

175. *See id.* at 704.

176. For background, see Thomas C. Jensen, *The United States–Canada Pacific Salmon Interception Treaty: A Historical and Legal Overview*, 16 ENVTL. L. 363 (1986).

177. *See* Wood, *supra* note 97, at 770; *see also* United States v. Oregon, 699 F. Supp. 1456, 1459 (D. Or. 1988), *aff'd*, 913 F.2d 576 (9th Cir. 1990).

178. Washington v. Washington State Passenger Fishing Vessel Ass'n, 443 U.S. 658, 685–86 (1970) (interpreting treaties); Sohappy v. Smith, 529 F.2d 570, 572–73 (9th Cir. 1976) (same).

comanage their shared fishery for their mutual benefit. A federal court determined that tribes were entitled to up to fifty percent of the harvestable portion of the runs[179] and directed the establishment of a judicially supervised mechanism to carry out the mandate.[180] States, tribes, and federal agencies negotiated the Columbia River Fish Management Plan ("CRFMP") to create an ongoing structure for comanagement of the harvest aspects of their shared fishery.[181] The CRFMP is subject to the ongoing jurisdiction of the court, which retains authority to resolve irreconcilable disputes among the parties.[182] Because the harvest of hatchery fish and strong stocks inevitably involves an incidental taking of the imperiled Snake River stocks, the CRFMP includes measures for protecting these weaker stocks as well.[183] Through the CRFMP process, the states and tribes have gained considerable experience in managing the fisheries and understanding, though not controlling, the river operations.[184] The CRFMP is widely deemed a model arrangement for implementing a judicial decree in a manner responsive to the complexities of modern management challenges.[185]

The other leading source of law governing river management in the basin is the NPA,[186] passed by Congress in 1980. That statute created an interstate body, the Northwest Power Planning Council ("Council"), consisting of state-appointed representatives from the Columbia River Basin states; the Council is charged with developing a program to accommodate hydropower needs while providing for the recovery of fish.[187] In managing projects, federal river operators must take into account "to the fullest extent practicable" the Council's program and act "consistent with" the fish and wildlife conservation purposes of the NPA.[188] The statute created a significant role for state and tribal fisheries managers in providing recommendations to the Council in developing the program.[189] The Council's program, known as the Strategy for Salmon, was overturned by the Ninth Circuit in

179. Sohappy v. Smith, 302 F. Supp. 899 (D. Or. 1969); Sohappy v. Smith, Civ. No. 68–409 (D. Or. Aug. 20, 1975).

180. *See United States v. Oregon*, 699 F. Supp. 1456.

181. *See id.* at 1460 (describing plan).

182. *Id.*

183. *See* TRIBES' RECOVERY PLAN, *supra* note 52, at 4–4 (describing CRFMP).

184. *See id.* at 4–3 to 4–5 (describing CRFMP and tribal comanagement role in fisheries); *see also infra* Part III.B.1 (describing Tribes' recovery plan recommendations for river operations).

185. Charles F. Wilkinson, *To Feel the Summer in the Spring: The Treaty Fishing Rights of the Wisconsin Chippewa*, 1991 WIS. L. REV. 375, 406–07.

186. Pacific Northwest Electric Power Planning and Conservation Act, 16 U.S.C. § 839 (1994 & Supp. 1 1995).

187. *Id.* § 839b(h)(1)(A) (1994). For background, see Michael C. Blumm, *Fulfilling the Parity Promise: A Perspective on Scientific Proof, Economic Cost, and Indian Treaty Rights in the Approval of the Columbia Basin Fish and Wildlife Program*, 13 ENVTL. L. 103 (1982).

188. 16 U.S.C. § 839b(h)(11)(A).

189. *Id.* § 839b(h)(2)–(7); *see also* Northwest Resource Info. Ctr., Inc. v. Northwest Power Planning Council, 35 F.3d 1371, 1384–88 (9th Cir. 1994).

1994, partially on the basis that the Council had failed to give adequate deference to state and tribal fisheries managers in developing recommendations.[190] Shortly after the ruling, the Council issued an amended program that drew substantially from recommendations submitted by tribal and state fisheries managers on river operations.[191]

In sum, both the CRFMP and the NPA create for the states and tribal agencies a significant role in harvest management and river operations planning. As discussed in Part III.B.1, these agencies have recommended changes in river management to benefit fisheries that reach beyond the more modest proposals from NMFS' quarters. In large part, the processes established by the Law of the River to manage the shared fishery is at odds with the ESA statutory regime. While the Law of the River supports tribal and state participation in a comanagement regime, the ESA vests exclusive authority in NMFS to determine recovery objectives for the imperiled species.

2. The Colorado River Basin

The Colorado River Basin fisheries issues focus largely on the delivery of water through federal projects. Water allocation issues among the several states in the basin have been resolved according to a complex set of interstate compacts, state laws, federal statutes, and court cases. A central agreement is the Colorado River Compact ("Compact"), negotiated in 1922, which divided the Colorado River into an Upper and Lower Basin, delineated at Lee's Ferry in northern Arizona.[192] The Compact allocated 7.5 million acre-feet of the river system per year each to the Upper Basin and the Lower Basin.[193] Water allocations within each state are determined according to state law, which generally follows the prior appropriation system. Relying on this system of allocation, states throughout the basin promoted projects to develop their water rights for municipal and agricultural uses.[194]

There are more than thirty Indian reservations located partially or totally within the Colorado River Basin.[195] These reservations have senior water rights under the *Winters* doctrine.[196] A landmark case, *Arizona v. California*, established the reservation entitlement as an amount of water necessary to serve "practicably irrigable acreage."[197] While Congress authorized multiple projects in the basin to

190. *Northwest Resource Info. Ctr.*, 35 F.3d at 1384–88.

191. Michael C. Blumm, *Columbia Basin Salmon and the Courts: Reviving the Parity Promise*, 25 ENVTL. L. 351, 360–64 (1995).

192. MacDonnell & Getches, *supra* note 17, at 14–15.

193. David J. Guy, *When the Law Dulls the Edge of Chance: Transferring Upper Basin Water to the Lower Colorado River Basin*, 1991 UTAH L. REV. 25, 33.

194. Hansen, *supra* note 21, at 1316–17.

195. MacDonnell & Getches, *supra* note 17, at 24.

196. Hansen, *supra* note 21, at 1311.

197. 373 U.S. 546, 549 (1963).

develop non-Indian water, projects for Indian water development came late in the process, typically following settlements of the Indian water right.[198]

The ESA forms an overlay to this complex set of water allocation agreements and Indian-reserved *Winters* rights to water. While the ESA may provide a preemptive federal water right to favor endangered fish,[199] the USFWS has been reluctant to disturb the regime established by the Law of the River.

B. Recovery Approaches in Each Basin

The ESA recovery process in the Columbia River Basin is an integrated one, extending across the full reach of the basin and managed by NMFS.[200] By contrast, the recovery process in the Colorado Basin is divided into three separate programs: one for the Upper Colorado Basin (excluding the San Juan River); one for the San Juan River in the Upper Basin; and one for the Lower Basin.[201] The division falls roughly along jurisdictional lines between separate regions of the USFWS and the U.S. Bureau of Reclamation.[202] The discussion below focuses in large part on the Upper Basin program, as it provides a model process that has gained national attention.[203]

There is an immediately obvious contrast between the recovery processes in the Upper Colorado River Basin and the Columbia River Basin: the former is fundamentally consensus based, while the latter is conflict ridden. Both are products of the prevailing Law of the River. In the Colorado Basin, the Law of the River engendered expectations of continued rights to water depletions. The USFWS' role was to protect habitat for fish, which inevitably meant limiting diversions.[204] To appease state water agencies and users, the federal agency was forced politically to develop a consensus-based recovery process.[205]

In the Columbia River Basin, the Law of the River developed in part to protect settled expectations for continued allocations of fish (while at the same time

198. Hansen, *supra* note 21, at 1317.

199. *See* Bolin, *supra* note 15, at 53–54.

200. For background, see Blumm et al., *supra* note 26, at 62–75, 83–98; Wood, *supra* note 97, at 762–78.

201. Wigington & Pontius, *supra* note 125, at 1. For general discussion of the ESA process in the Colorado River Basin, see Bolin, *supra* note 15; Hansen, *supra* note 21; Lochhead, *supra* note 26; Wigington & Pontius, *supra* note 125.

202. The Upper Basin program is directed by Region 6 of the USFWS. Wigington & Pontius, *supra* note 125, at 1. The San Juan Program falls within the jurisdiction of both Region 2 and Region 6 of the USFWS. *Id.* The Lower Basin is primarily within Region 2 of the USFWS. *Id.* The split jurisdiction has prompted concern that the recovery goals for the fishes do not address the full geographic range of the species. *Id.*

203. *See* Evans, *supra* note 26; Hamill, *supra* note 109; Karen Hopfl, Case Study of the Endangered Fish Recovery Program of the Upper Colorado River (Working Paper 94–57, Conflict Resolution Consortium, University of Colorado, Feb. 1994) (on file with author).

204. Hamill, *supra* note 109, at 2; Lochhead, *supra* note 26, at 1–4.

205. Hamill, *supra* note 109, at 2–3; Lochhead, *supra* note 26, at 5–6.

addressing hydropower and water resources). Long before the ESA listings were made, tribal and state agencies had developed important roles in managing the shared fisheries resource; the roles are embodied in the court-supervised CRFMP and the NPA. In that basin, NMFS is but one of three agencies developing recovery plans, and its approach conflicts with that taken by the tribes and states. Within this more pluralistic setting, conflict often prevails.

1. Columbia River Basin Recovery

Recovery planning in the Columbia River Basin requires a broad, "gravel to gravel" approach addressing the impact of all "4 H's" in the full life-cycle of the salmon.[206] Nevertheless, salmon advocates and fishery managers emphasize improvement of migratory conditions for salmon—particularly juveniles. This focus is inescapable because the death toll caused by hydropower and reservoir operations is so high that altering those conditions becomes a necessary, though perhaps not entirely sufficient, requisite to recovery.[207] Losses to the migrating juvenile population average fifteen to twenty percent at each dam.[208] The turbine operations injure many of the juveniles, and the slack water in the reservoirs doubles their migration time from natal waters to the sea, increasing risk of predation, disease, and residualism (loss of urge to migrate).[209]

The various migration enhancement strategies can be categorized into two basic approaches: (1) altering in-river conditions (by breaching some dams and drawing down other reservoirs) to restore a more natural flow regime; or (2) maintaining present dam and reservoir conditions and transporting juvenile smolts to the ocean by barge or truck (the "transportation" option).[210] Much of the present controversy over the recovery of the salmon boils down to fundamental disagreements over the scientific and economic merits of these two options.[211]

The first option of restoring in-river migration is supported by tribal and state biologists, the Independent Scientific Group, and environmental groups.[212] It

206. TRIBES' RECOVERY PLAN, *supra* note 52, at iv, 3–20; *see also supra* note 158 and accompanying text (describing "4 H's"—hydrosystem, habitat, hatchery, and harvest). The term "gravel to gravel" describes a management approach that addresses all phases of the salmon's life cycle. The inception of life occurs as eggs are deposited in gravelled spawning beds, and the end of life occurs in those same gravelled beds when adults return to their natal waters to spawn and then die. TRIBES' RECOVERY PLAN, *supra* note 52, at iv.

207. *See supra* note 160.

208. Northwest Resource Info. Ctr. v. Northwest Power Planning Council, 35 F.3d 1371, 1376 (9th Cir. 1994).

209. *Id.*; Blumm & Simrin, *supra* note 26, at 671. The juvenile salmon do not swim to the sea, but instead rely on a swift current to push them. *Northwest Resource Info. Ctr.*, 35 F.3d at 1376.

210. *See* Blumm et al., *supra* note 26, at 29–36.

211. *Id.* at 27–28.

212. IDAHO RIVERS UNITED, *supra* note 83; Affiliated Tribes of Northwest Indians, Resolution #97–28: Endorsement of Natural River Restoration to Protect and Enhance Fish & Wildlife Populations in the Columbia River Basin (1997 Winter

is not endorsed by industrial river users, because the effect on hydropower production and river transportation would result in economic harm to those interests.[213] The second "transportation" option was developed nearly twenty years ago as an experimental program to respond to fish mortality associated with dams.[214] Supported by NMFS and implemented by the U.S. Army Corps of Engineers, the program involves capturing as many as ninety percent of juvenile fish and loading them onto barges or trucks for transportation around the dams.[215] Sharply criticized by independent scientists, state fisheries agencies, tribes, and environmental advocates, transportation has failed to demonstrate any improvement in species survival after more than twenty years of operation.[216] But because the transportation option causes less disruption in current river practices, it is supported by industrial and power groups as well as federal river managers.[217]

Recovery planning in the Columbia River Basin is not limited to the ESA framework. In 1995, three separate plans emerged from various authorities within the basin. The plans differ fundamentally over the issue of in-river operations. One plan, developed by the four tribal governments with treaty rights in the basin, is entitled "Wy-Kan-Ush-Mi Wa-Kish-Wit (The Spirit of the Salmon)."[218] The plan calls for an aggressive change in dam operations to mimic natural flows, thereby facilitating juvenile migration to the sea.[219] The plan sets long-term recovery levels to restore the fishery resource to harvestable quantities sufficient to fulfill tribal treaty rights.[220] It includes a detailed supplemental plan that focuses on hydrooperations.[221] That plan sets forth firm time tables for dam removal and other

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Conference, Portland, Or.) (on file with author); Williams Report, *supra* note 113, at xxiv, xxv; *see also* Barker, *supra* note 151, at A1; Brinckman, *supra* note 119, at A1; *F&G Favors Breaching Dams,* IDAHO STATESMAN (Boise, Idaho), Dec. 5, 1997, at A1; *New Plan for Rescuing the Salmon, supra* note 161, at B8.

213. *See* PALMER, *supra* note 18, at 63–66; Brinkman, *supra* note 119, at A1 (describing impacts).

214. *See* Barker, *supra* note 151, at A1 (noting that barging program originated with NMFS scientists nearly 30 years ago); *see also* Blumm et al., *supra* note 26, at 34–36 (discussing program).

215. Brinckman, *supra* note 119, at A1. In 1997, despite high flows on the Columbia River conducive to in-river transportation, NMFS insisted on barging two-thirds of the juvenile salmon. *See*; Trillhaase, *supra* note 163, at A5; American Rivers et al., Five Years of Failure: A Performance Review of the Clinton Administration's Snake and Columbia River Salmon Recovery Efforts, 1993–1997, at 12 (1998) (unpublished manuscript on file with author).

216. See sources cited *supra* note 163.

217. Baum, *supra* note 151, at A1; Brinckman, *supra* note 119, at A1; *New Plan for Rescuing the Salmon, supra* note 161, at B8.

218. TRIBES' RECOVERY PLAN, *supra* note 52.

219. Laura Berg, *Tribes Release Salmon Restoration Plan,* 2 & 3 WANA CHINOOK TYMOO 13, 16 (Columbia River Inter-Tribal Comm'n ed., 1995) (explaining technical recommendations of plan).

220. TRIBES' RECOVERY PLAN, *supra* note 52, at v (goal to "restore anadromous fishes to historical abundance in perpetuity").

221. *Id.* at 5B–24 to 5B–31.

structural alterations and operational modifications to existing hydrofacilities.[222] The tribal plan has been formally presented to the Council, members of Congress, environmental coalitions, and federal agencies.[223]

The second recovery plan is the amended plan issued by the Council.[224] It also suggests less reliance on transportation and calls for bold changes in in-river conditions. The plan reflects the recommendations of the state and tribal fisheries agencies. It was issued after the Ninth Circuit overturned an earlier plan and severely criticized the Council in dicta, stating its recovery planning had been too heavily geared towards protecting the status quo.[225]

The third recovery plan stems from the ESA. In March, 1995, NMFS issued a proposed recovery plan for the Snake River salmon.[226] The plan remains in draft form, but NMFS has calibrated its ongoing section 7 determinations to the long-term objectives set forth in the plan.[227] The recovery plan allows for substantial continued reliance on artificial transportation methods.[228] It has been criticized for not requiring alterations to in-river conditions to the extent deemed necessary by state and tribal fishery managers.[229]

The legal relationship among the states, tribes, and NMFS is one of the most complex and unsettled aspects of Columbia River Basin salmon recovery. The situation is complicated by the fact that the federal river operating agencies that maintain control of the hydrofacilities have resisted altering their operations as urged by state and tribal fisheries managers.[230] For them, the NMFS plan, which continues substantial reliance on artificial transportation, is the most palatable of the three.[231]

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222. *Id.*; *see also* Brinckman, *supra* note 119, at A1 (noting tribal support for breaching four Snake River dams); *New Plan for Rescuing the Salmon, supra* note 161, at B8 (same).

223. Berg, *supra* note 219, at 21 (noting that tribes also accepted public comment on the plan).

224. NORTHWEST POWER PLANNING COUNCIL, 1994 COLUMBIA BASIN FISH AND WILDLIFE PROGRAM (1994).

225. Northwest Resource Info. Ctr., Inc. v. Northwest Power Planning Council, 35 F.3d 1371, 1395 (9th Cir. 1994).

226. NMFS DRAFT RECOVERY PLAN, *supra* note 99.

227. Wood, *supra* note 97, at 783 n.241.

228. Blumm et al., *supra* note 26, at 71–73 (noting NMFS' admission that it was relying primarily on transportation rather than in-river migration).

229. Letter from Eugene Green, Sr., Chairman, Columbia River Inter-Tribal Fish Commission, to Mr. William Stelle, Jr., Regional Director, National Marine Fisheries Service (Dec. 11, 1995) (on file with author) (tribal comments on proposed recovery plan); *see also* sources cited *supra* note 216.

230. Blumm, *supra* note 191, at 351–60; Brinckman, *supra* note 119, at A1 (quoting William Stelle, Regional Director of NMFS: "The system was operated to maximize power consistent with flood control.... The fish got what was left over.").

231. Brinckman, *supra* note 119, at A1 (noting, however, that even anticipated drawdown in NMFS plan had not been achieved).

The three plans derive from different sources of legal authority, giving rise to a reoccurring question in the basin, Who runs the river?[232] In short, the plan that enjoys the clearest implementation framework (the NMFS recovery plan) requires the most minimal changes in river operations, while the tribal and Council plans, which are the most ambitious in restoring the natural river regime, presently lack a clear implementation structure.

2. Upper Colorado Basin Recovery

The Upper Colorado Recovery Program is a consensus-based program produced in the wake of intense conflict over USFWS' regulatory actions in the 1970s that limited the states' and water users' ability to fully use and develop Compact-guaranteed water.[233] In 1983, the USFWS issued recovery plans for the imperiled species which set forth a coordinated approach to section 7 consultations on water projects in the basin.[234] Controversial elements included flow

232. The question is the title of an annual symposium sponsored by Northwestern School of Law. *See* Colloquium, *Who Runs the River?*, 25 ENVTL. L. 349 (1995). The three plans differ in their mandate and enforceability. The Council's plan derives from the Northwest Power Act. While this federal statute clearly applies to federal river operators, its mandate is somewhat less than clear: action agencies must take the Council's program into account "to the fullest extent practicable." 16 U.S.C. § 839b(h)(11)(A)(ii) (1994). Moreover, the statute lacks a firm regulatory mechanism for assuring fulfillment of the mandate.

The Tribes' plan finds legal grounding in the tribal treaty rights. Case law and commentary suggest that treaty rights include a duty of environmental protection for the treaty resource, although the question has not yet been subject to litigation in the context of Columbia River treaty rights. *See* Wood, *supra* note 97, at 762–78. The Tribes' plan represents a determinative and clear tribal expression of the level of protection deemed by tribes necessary to restore their fisheries to harvest levels. While the plan has no immediate enforcement or regulatory mechanism, courts have enforced treaty rights in the past through negotiated remedies and consent decrees. *See, e.g.*, United States v. Oregon, 699 F. Supp. 1456, 1459 (D. Or. 1988). Yet, until a suit is brought by the Tribes asserting a right of environmental protection, the Tribes are relying on consensual and political mechanisms to gain support for the plan.

Finally, the NMFS recovery plan stems from the ESA, a federal statute. Courts have been reluctant to enforce every aspect of recovery plans promulgated under the ESA. *See* DANIEL J. ROHLF, THE ENDANGERED SPECIES ACT: A GUIDE TO ITS PROTECTIONS AND IMPLEMENTATION 90–92 (Stanford Environmental Law Society ed., 1989); Federico Cheever, *The Road to Recovery: A New Way of Thinking About the Endangered Species Act*, 23 ECOL. L.Q. 1 (1996). Nevertheless, the section 7 framework provides a clear regulatory mechanism for implementing at least the broad objectives of the plan. However, it is far from clear whether the NMFS recovery plan would somehow preempt either the Tribes' plan or the Council's plan. The question of whether the ESA preempts tribal treaty rights is wholly unsettled, and the separate mandates of the ESA and the Northwest Power Act, both federal statutes, arguably stand on at least equal footing.

233. Hamill, *supra* note 109, at 2; Lochhead, *supra* note 26, at 4–6.

234. *See* Lochhead, *supra* note 26, at 5.

recommendations that would have prevented the Upper Basin from fully depleting the Colorado River of its Compact-guaranteed water.[235]

In response to political outcry over the draft conservation plan, the USFWS agreed to enter into a negotiated settlement process to develop a recovery plan.[236] The USFWS formed a coordinating committee in 1984 consisting of the USFWS; the Bureau of Reclamation; the States of Colorado, Utah, and Wyoming; organizations of water users from Colorado, Utah, and Wyoming; and two representatives from national environmental groups.[237] The committee ultimately developed a plan, known as the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin ("RIP"), which was adopted in 1988 as part of a cooperative agreement among the three states, the Secretary of Interior, and the Administrator of the Western Area Power Administration.[238]

The RIP combines five principle elements: habitat management (flows), habitat development, native fish stocking, nonnative species management, and research.[239] Not surprisingly, the most controversial aspect of the RIP involves flows that are deemed critical to fish survival. The RIP generally allows new projects to continue depleting the Colorado River Basin but contains measures to offset the water loss by seeking instream appropriations through state water appropriation laws.[240] Depletion charges are assessed against new projects.[241] A Recovery Implementation Committee consisting of federal, state, water development, and environmental representatives was established to implement the RIP.[242] The RIP is supplemented by a Recovery Action Plan ("RAP"), which establishes specific action plans to achieve the five RIP program elements in each of the major subbasins of the Colorado River.[243]

IV. LESSONS FROM COMPARING THE RECOVERY PROCESSES IN THE BASINS

A comparison of recovery efforts in the Colorado and Columbia River Basins must be general due to substantial institutional and ecological differences between the two basins. This Part focuses on those contrasts and commonalities that provide general insights into the nature of ESA implementation across varied endangered river contexts. The fact that a different agency implements the Act in each basin renders the comparisons all the more intriguing and suggests that shared

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235. *Id.*

236. Hamill, *supra* note 109, at 2.

237. *Id.*

238. *Id.* at 2–3.

239. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, RIPRAP at 3; *see also* Lochhead, *supra* note 26, at 8–9.

240. *See* Lochhead, *supra* note 26, at 8–9.

241. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, Agreement at 3; *see also* Lochhead, *supra* note 26, at 9.

242. *See* Hamill, *supra* note 109, at 2; *see also* Lochhead, *supra* note 26, at 8.

243. Lochhead, *supra* note 26, at 11.

outcomes (where they exist) are driven by the structure of the Act itself, or the administrative process generally, rather than by the idiosyncratic behavior of either USFWS or NMFS.

A. The ESA as a Statutory Tool to Protect River Ecosystems

In both basins, the ESA process addresses huge, complex ecosystems. While the Colorado Basin recovery process is dichotomized between the Upper and Lower Basins,[244] the integration of ecosystemic dynamics across the far-flung geography of both basins is impressive. While some have claimed that the ESA is ill suited to the ecosystem-wide context, and should be limited instead to site-specific projects,[245] the Colorado and Columbia experience demonstrates otherwise.

In both basins, the recovery planning process serves as the statutory tool that makes possible a broad, ecosystemic approach. In both basins, the recovery planning process has proved procedurally elastic enough to respond to the myriad threats facing the imperiled species.[246] The Snake River Recovery Plan, for example, addresses hydrosystem operations, habitat management on federal lands, harvest, and hatchery practices.[247] The Upper Colorado Basin plan addresses habitat, migration, artificial propagation, and nonnative species competition.[248] As the agencies appear to have recognized, a full life-cycle approach to recovery is vital as a strategy to recover both species.

As an administrative matter, the recovery planning process also affords an opportunity for the Services to coordinate their actions with those of the many other federal, state, and tribal agencies with jurisdiction over the waterways. In the Columbia River Basin, a salmon may pass through seventeen separate

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244. This jurisdictional fractionalization has been criticized as an impediment to comprehensive, range-wide recovery planning. *See* Wigington & Pontius, *supra* note 125, at 21.

245. *See* Mark Hatfield, *Human Factor Has Been Lost in Endangered Species Act*, AUSTIN AMERICAN–STATESMAN, June 27, 1992, at A21 ("There is no question that the act is being applied in a manner far beyond what any of us envisioned when we wrote it 20 years ago. It was originally conceived as a law to ensure the survival of species threatened with or in danger of extinction because of specific actions such as road-building, observatories, sewer systems, buildings, dams or other such projects. But today the act is being applied across states and regions, with the result that it now affects millions upon millions of acres of publicly and privately owned land, and many thousands of lives.").

246. There is one notable exception, however. Neither recovery plan responds to levels of toxins in the water that may impair the reproductive functions of the fish. Since the U.S. Environmental Protection Agency has jurisdiction over water pollution issues under the Clean Water Act, the Services may, as a practical matter, have simply deferred the issue to that agency.

247. NMFS DRAFT RECOVERY PLAN, *supra* note 99.

248. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, RIPRAP at 12, 13; *see also* Lochhead, *supra* note 26, at 8–9.

jurisdictions,[249] and a multitude of interagency agreements and recovery processes operate outside of the ESA.[250] In the Colorado Basin, recovery planning requires the participation of several state water agencies and federal project agencies.[251] The recovery plans in both basins have tremendous potential value as frameworks for multijurisdictional coordination.

To be effective at all, the plans must have an implementation mechanism, and yet courts have refrained from holding that recovery plans are binding regulations.[252] In each basin the Service has responded by tapping the mandate of section 7's jeopardy standard[253] and treating the recovery program as a template for section 7 determinations on federal actions. While courts have stopped short of holding that biological opinions issued under section 7 are per se binding on the action agency, there is nevertheless a presumption to that effect.[254] In the Columbia River Basin, the section 7 process is directly linked to the draft Recovery Plan;[255] NMFS' reasonable and prudent alternatives for hydrosystem operations are calibrated to the measures identified in that plan.[256] In the Upper Colorado River Basin, the RIP serves as a broad "reasonable and prudent alternative" to jeopardy caused by water projects in the Upper Basin.[257] If the recovery implementation process identified in the RIP/RAP is progressing at a reasonable pace, the project for which consultation is sought may go forward.[258]

In sum, the experience of the Columbia and Colorado Basins affirms that the Services have tools already existing in the ESA to approach species protection on an ecosystem level that makes biological sense. It should be noted, too, that the Services could tap the flexibility in the process to create innovative economic strategies that will cushion financial losses in the basins, as well as more fairly allocate the conservation burden among the various sources of mortality; so far, however, the Services have largely refrained from doing so. In that sense, they may be underutilizing the mechanism.

B. ESA Recovery Process Models

Comparison of the two basins also reveals that the process can yield two very different recovery models, one conflict based, the other consensus based. The

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249. Wilkinson & Conner, *supra* note 26, at 61 (describing migratory journey of Lochsa River chinook).

250. *See supra* Part III.A.1.

251. *See* SWIMMING UPSTREAM, *supra* note 39; Hamill, *supra* note 109, at 2 (describing process and participants); *supra* note 237 and accompanying text.

252. *See* ROHLF, *supra* note 232, at 90–92; Cheever, *supra* note 232, at 26.

253. *See supra* note 22 and accompanying text (describing section 7 jeopardy standard).

254. *See* Pyramid Lake Paiute Tribe v. United States Dep't of Navy, 898 F.2d 1410, 1415 (9th Cir. 1990); *see also* Blumm et al., *supra* note 26, at 84 n.435.

255. Wood, *supra* note 97, at 770.

256. *Id.* at 787 and accompanying notes.

257. Lochhead, *supra* note 26, at 7–8; Cheever, *supra* note 232, at 70.

258. Cheever, *supra* note 232, at 70.

two have strikingly different implications for the role of the Services in species recovery and for the future of the fish.

In the Colorado Basin, the USFWS' unilateral federal authority under the ESA to force protective measures for fish[259] has given way to a consensus-based process in which states, water users, and environmental interests all participate to some degree.[260] While the USFWS has been careful to make clear that it maintains regulatory authority under the ESA—authority that may trump the RIP consensus agreement if measures are not implemented according to plan[261]—the agency has seemingly abdicated, as a practical and political matter, part of its regulatory role in the basin. Equally significant, no other federal or state agencies have developed independent plans to ensure protection of the Colorado native fish species.[262] Indeed, state water agencies are motivated primarily by a desire to deplete the river to the extent of their entitlement under the Law of the River, and in that sense have interests directly adverse to fish.

In the Columbia River Basin, the opposite paradigm of competing authority prevails over the recovery process. NMFS, claiming authority under the ESA, is actually the last agency to gain a regulatory handle over fisheries management in the basin. As explained earlier, two other governmental bodies have substantial, potential authority over recovery under different sets of laws.[263] The Northwest Power Planning Council has a statutorily defined role in salmon recovery under the NPA.[264] The treaty tribes and states have a role under that act as well, in that the Council's plan must be based in part on their recommendations—a requirement that received resounding application by the Ninth Circuit in 1994.[265] Moreover, the tribes and states play a key role in salmon harvest management as set forth in the CRFMP.[266]

Several consequences flow from the particular recovery structure in the basins. The first concerns the role of the ESA in establishing recovery objectives for the species. In the Colorado River Basin, the ESA is the best—and only—hope for species recovery. As a consequence of the consensus-based administrative framework, there are no government-sponsored recovery plans that compete with the RIP/RAP. Recovery objectives deriving from that process will therefore

259. 16 U.S.C. § 1536(b) (1994).

260. *See* Hamill, *supra* note 109, at 2 (describing process and participants).

261. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, Agreement at 3, 4.

262. There are endangered species programs in the state fish and wildlife agencies of Utah, Colorado, and Wyoming, but those agencies have opted to be part of the consensus-based process headed by the USFWS, and are not pursuing the development of separate plans. Telephone Interview with Angela Kentola, Acting Director, Colorado Fish Recovery Program, USFWS Region 6 (Mar. 12, 1997).

263. *See supra* Part III.A.1.

264. 16 U.S.C. § 839b(h)(1)(A), (h)(10)(A) (1994).

265. Northwest Resource Info. Ctr., Inc. v. Northwest Power Planning Council, 35 F.3d 1371 (9th Cir. 1994).

266. *See supra* notes 180–82 and accompanying text.

amount to a de facto ceiling of protection for the species. The ESA objectives are modest and survival based. The revised RIP/RAP for the Upper Colorado Basin sets recovery goals for the Colorado squawfish and the humpback chub to "establish and maintain natural self-sustaining populations and their habitat."[267] For the bonytail chub and the razorback sucker, the recovery goal is, simply, to "prevent their extinction."[268]

In marked contrast, in the Columbia River Basin, the recovery goals established under the ESA amount to a low floor, rather than a ceiling, of protection. Other competing plans envision considerably more ambitious recovery levels and ecosystem restoration. While the NMFS recovery program goal is to improve the survival of the species,[269] the Council's plan calls for doubling salmon and steelhead runs, and the Tribes' plan calls for ultimately restoring fish populations to historic levels.[270] The three plans together reflect a continuum of choices in recovery levels ranging from populations just high enough to allow survival of the species to historic levels reminiscent of what the Aboriginal River once yielded. In the Columbia Basin, one of the most pressing challenges for fish advocates is to prevent the salmon recovery effort from being swallowed up by a NMFS-dominated process that focuses on mere survival of the species. Far from offering the best hope for species in the basin, the ESA offers the most minimal recovery objectives and poses the risk of trumping other more generous plans. The risk is particularly acute since the ESA process contains the clearest implementation mandate.[271]

A second consequence of the recovery structure concerns the method by which recovery is to be achieved. In the Colorado Basin, the USFWS approach has been largely to adapt the recovery process to the mandates of state law. The RIP/RAP's key objective of protecting instream flows for the fish is achieved by acquiring instream water rights through the state water appropriation process.[272]

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267. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, RIPRAP at 1.

268. *Id.* The Service evidently felt that any more far-reaching objective would be impractical because of the critical population status of the species and limited success of reintroduction efforts. *Id.*

269. NMFS RECOVERY PLAN SUMMARY, *supra* note 14, at 7; *see also* Snake River Salmon Recovery Team, Draft Recovery Plan Recommendations for Peer Review IV–1 (Oct. 1993) (on file with author) ("The recovery goal for all three listed 'species' of Snake River salmon is the restoration of these distinct populations and their genetic and demographic subunits to viable, naturally self-sustaining numbers which will remove them from the serious risk of extinction that caused their listing as threatened or endangered under the ESA."). For more detailed discussion of NMFS' recovery objectives for the listed salmon, see Blumm et al., *supra* note 26, at 74–75 & n.346. The recovery plan also pays lip service to the United States' commitment to uphold tribal treaty fishing rights but does not establish harvest-based recovery objectives to achieve that result. *See* Wood, *supra* note 97, at 784 n.245, 785 n.249.

270. *See* TRIBES' RECOVERY PLAN, *supra* note 52, at v (discussing Tribes' goals); *see also* Blumm et al., *supra* note 26, at 52 & n.181 (discussing Council's goals).

271. *See supra* note 232.

272. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, RIPRAP at 5.

The 1996 revised RIP/RAP states that instream flow protection rests on "state acceptance of flow recommendations.... These levels of state acceptance will control the specific flow amounts to be legally protected by a variety of mechanisms."[273] Rather than asserting federal preemptive water rights under the ESA, the ESA has instead produced a procedural structure in the RIP/RAP to gain fish protection efforts through the very legal system and river management structure that produced the extinction crisis in the first place. In the Colorado Basin where a consensus regime prevails, no other federal or state agencies are likely to challenge this approach in court. Nor are the participating environmental groups likely to bring a judicial challenge to the RIP/RAP. Accordingly, there is no alternative, well-developed vision for recovering the species.

The situation in the Columbia River Basin stands in marked contrast. There, a more pluralistic process governing species recovery prevails. NMFS is one of three agencies with fish recovery as its mandate; the Council's plan and the Tribes' plan rival the NMFS plan in credibility.[274] The most recent Council plan was developed with the input of state and tribal fisheries agencies and is based on a series of formal public hearings.[275] The Tribes' plan emerged from a tribal fish management agency well known for its leading expertise in salmon management and conservation.[276] While not subject to formal hearings, the tribes received public comment on the plan and presented it through a process of government-to-government consultation with state and federal fisheries agencies.[277]

The Council's plan and the Tribes' plan envision a much different system of river operations than does the NMFS recovery plan.[278] NMFS' recovery plan continues heavy reliance on artificial transportation, while the other plans call for a return to a more natural river regime suitable for in-river migration.[279] Far from the Colorado River model, which has produced a singular approach to fish recovery largely adapted to existing Developed River conditions, the Columbia River model has produced two alternatives to the NMFS approach that would significantly change the Developed River system. The presence of these other agencies in the basin with well-developed plans ensures that NMFS' plan will undergo continual scrutiny and challenge. While the salmon recovery process often seems hopelessly deadlocked due to the uncertainty surrounding implementation of these various plans, the pluralistic, conflict-ridden structure nevertheless brings competing visions of what is likely to achieve recovery. Moreover, the presence of three separate governmental bodies having jurisdiction over salmon recovery and accountable to different constituencies ensures that, at least on a general level,

273. *Id.* (referring to Colorado instream flows).

274. Blumm et al., *supra* note 26, at 49–83 (comparing the three plans).

275. Northwest Power Planning Council, Update (Sept. 1994) (on file with author) (listing hearings).

276. WILKINSON, *supra* note 1, at 213.

277. Berg, *supra* note 219, at 13, 21.

278. For a richly detailed comparison of the three recovery plans, see Blumm et al., *supra* note 26, at 49–83.

279. *Id.* at 83.

political motivations of any one agency will be counterbalanced by those of the other two. Additionally, courts will take a more active role in enforcing the ESA in a conflict-based paradigm.

Finally, a third, and closely related, consequence flowing from the different recovery models is the role of science in the recovery process. The ESA requires the Service to premise its section 7 determination on the "best scientific and commercial data available."[280] Recovery efforts in both basins are mired in scientific uncertainty. In the Upper Colorado Basin, the consensus-based process has resulted in the USFWS assuming a nearly exclusive role in determining the scientific needs of the species. While at least one independent scientific report (the Stanford Report) has been influential, the scientific determinations of the agency are rarely subject to challenge outside the process. In contrast, the conflict-based setting in the Columbia River Basin has produced a system of scientific checks and balances. Rarely do scientific determinations made by NMFS go unchallenged by the states and tribes. In particular, the agencies disagree on the effectiveness of the transportation option, the merits of "spilling" water over dams to benefit fish, and the effects of artificial supplementation on native populations.[281] The presence of leading scientists working in administrative structures outside of NMFS provides an opportunity for continual challenge of NMFS' science-based conclusions. Moreover, scientific critiques and reports arising from outside of NMFS are heavily used by citizens in challenging NMFS decisions.[282] Finally, as discussed in more detail in Part V.A., the scientific expertise of these other agencies creates a potentially expanded role for courts in reviewing NMFS' actions. While traditionally courts have deferred to scientific and technical conclusions of an agency charged with implementation of a federal statute, a court reviewing NMFS' action in the Columbia Basin has a selection of other agencies to which it could choose to give deference in interpreting the "best scientific and commercial data available" mandate of the ESA.[283]

Only time will tell which paradigm—the consensus-based or the conflict-based one—will result in greater protection for the species. The Upper Colorado consensus-based paradigm lacks a "watchdog" element and fresh vision that could come from agencies and environmental advocates outside of the process, but it may benefit from the streamlined approach that can result from consensus. The Columbia conflict-based regime no doubt benefits from independent scientific

280. 16 U.S.C. § 1536 (1994). The standard is similar to that contained in the NPA, which requires the Council to develop a plan based on the "best available scientific knowledge." *Id.* § 839b(h)(6)(B) (1994).

281. *See* Blumm et al., *supra* note 26, at 80–83.

282. Telephone Interview with Charles Ray, Salmon Program Director, Idaho Rivers United (Nov. 8, 1997).

283. *See infra* notes 484–90 and accompanying text (discussing a shifting deference approach); *see also* Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886, 900 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995) (finding that NMFS, in carrying out section 7 of the ESA, should consider information and data from qualified state and tribal biologists).

challenges and the pluralistic visions of recovery, but it is hindered by the gridlock that inevitably dominates a conflict setting.

Whatever the outcome in each basin, a comparison at this point makes clear that the ESA recovery process in the Endangered River context molds itself to the underlying Law of the River. In the consensus-based setting of the Upper Colorado Basin, the ESA recovery process is likely to adapt species recovery goals to accommodate the Developed River. While the same may be true in the Columbia Basin, the presence of other governmental bodies deriving authority for fish management from the preexisting Law of the River at least juxtaposes the Developed River paradigm implicit in the NMFS recovery approach against a Normative River paradigm pressed for by competing agencies.

C. False Optimism, Regulatory Delay, and Ineffectiveness

The most striking similarity between the two basins is a clear pattern of historical behavior on the part of the Services and river operating agencies marked by false optimism, regulatory delay, and resistance to implementing statutory mandates. The pattern has led to declining fish populations in both basins. Species in both basins have received regulatory attention under the ESA or other statutes for approximately two decades, yet in neither case has regulatory protection reversed the trend towards extinction.

The first feature in this pattern is false optimism on the part of the Services that ESA protection for the species could be delayed based on the projected benefits resulting from other regulatory processes. In the case of the Colorado species, the ESA has applied to three out of four of the fish species since it was first enacted in 1973.[284] The razorback sucker was not listed with the other three native species.[285] The recovery goals of the RIP, established in 1987, were designed to manage the razorback sucker so that listing would not be needed.[286] The program was unsuccessful, and the razorback sucker was listed in 1991.[287] The most recent comprehensive monitoring report, issued May 1994, indicates "catch rates [have] declined considerably in recent years.... The basin-wide trend for the razorback sucker population is down."[288]

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284. Hamill, *supra* note 109, at 1. Those species are the Colorado squaw fish, the humpback chub, and the boneytail chub.

285. *Id.*

286. Lochhead, *supra* note 26, at 9.

287. Hamill, *supra* note 109, at 1.

288. RECOVERY IMPLEMENTATION PROGRAM FOR THE ENDANGERED FISHES OF THE UPPER COLORADO RIVER BASIN, U.S. DEP'T OF THE INTERIOR, INTERAGENCY STANDARDIZED MONITORING PROGRAM: SUMMARY OF RESULTS, 1986–1992, at viii (1994). An update reports the presence of "spawning population of razorbacks in the lower Green River" but "few adults" and "limited recruitment" in the Yampa and Colorado Rivers. Recovery Implementation Program for the Endangered Fishes of the Upper Colorado River Basin, U.S. Dep't of the Interior, Update (March 1997) (on file with author) [hereinafter Update].

In the case of the Snake River salmon, the USFWS and NMFS initiated a status review of the species in 1978.[289] NMFS deferred listing, however, when Congress passed the NPA, in which it devised a new river management planning structure that would place fish protection goals "on par" with hydroelectric operations.[290] The listing process commenced under the ESA was consequently terminated on the assumption that the prescriptions for recovering Columbia Basin fish would be carried out faithfully under the new mandates of the NPA.[291] The listing of salmon species was not reinitiated until 1991.[292] By that time, the Snake River coho was functionally extinct.[293] While the Snake River sockeye species was initially listed as endangered, a more serious category of imperilment than "threatened" status, the listing came far too late to save the species. As the U.S. District Court of Oregon recently observed: "[T]he number of returning adults is now so low that, absent miraculous success from the captive brood stock program, the species is virtually extinct."[294] In the same vein, the Snake River fall chinook was initially listed in 1992 as "threatened."[295] This status reflected an optimism later shattered when the species population plummeted in 1994, at which time NMFS had to promulgate an emergency, temporary reclassification of the species to the more severe "endangered" status.[296] In both basins, the false optimism of the Services caused regulatory delay that has resulted in irreparable consequences to some of the species.

The second feature in this pattern is one of wholesale resistance to implementing the mandates of the ESA. In both basins, citizens have sued the Services to force them to carry out their regulatory mandates. In the Colorado River Basin, citizens successfully forced designation of critical habitat for the razorback sucker.[297] In the Columbia River Basin, a suit brought by the State of

289. Blumm & Simrin, *supra* note 26, at 659–60.

290. *Id.* at 660.

291. *Id.*

292. *Id.* at 660–61; Endangered and Threatened Wildlife and Plants; Notice of Public Hearing and Extension of Public Comment Period on Proposed Endangered Status for Plant Limnathes floccosa ssp. californica (Butte County meadowfoam), 56 Fed. Reg. 14,055 (to be codified at 50 C.F.R. pt. 17) (proposed Apr. 5, 1991) (proposed listing of Snake River sockeye as endangered); Endangered and Threatened Species; Proposed Threatened Status for Snake River Spring and Summer Chinook Salmon, 56 Fed. Reg. 29,542 (to be codified at 50 C.F.R. pt. 227) (proposed June 27, 1991) (proposed Snake River fall chinook and Snake River spring/summer chinook as threatened; rejecting petition to list Columbia coho).

293. *See* Notice of Determination, 56 Fed. Reg. 29,553 (1991).

294. American Rivers v. National Marine Fisheries Serv., No. 96–384–MA, 1997 U.S. Dist. LEXIS 5337, at *12 (D. Or. Apr. 3, 1997).

295. *See* NMFS RECOVERY PLAN SUMMARY, *supra* note 14, at 1. Snake River spring/summer chinook were also listed as threatened. *Id.*

296. *Id.*

297. Colorado Wildlife Fed'n v. Turner, No. 92–F–884, slip op. at 8 (D. Colo., October 27, 1992). One commentator notes, "The decision should have ended a long season of foot-dragging by [the Fish and Wildlife Service]." Bolin, *supra* note 15, at 82.

Idaho successfully challenged the 1993 biological opinion NMFS rendered on the operation of the hydrosystem—an opinion that found no jeopardy although dams caused over eighty percent of fish mortalities.[298] More recently, NMFS' revised jeopardy opinion was the subject of another, yet unsuccessful, court challenge.[299] While in both basins environmental groups have resorted to the citizen suit process, in the Columbia River Basin such groups are often accompanied by tribal and state agencies as main parties, intervenors, or amicus parties.[300]

Intense resistance to in-river changes in both basins has hindered planned recovery implementation. In the Colorado River Basin, the pace of implementation under the RIP/RAP has been far slower than originally projected.[301] States have resisted augmenting instream flows as contemplated by the RIP;[302] consequently, planned instream flows are well behind schedule.[303] Several RIP/RAP items of high priority, including actions to provide flows in critical reaches, are lagging behind schedule as well.[304] The Regional Director of USFWS has indicated some doubt as to whether the RIP could continue to serve as a reasonable and prudent alternative to jeopardy.[305]

In the Columbia River Basin, significant measures set forth as reasonable and prudent alternatives in the most recent hydrosystem biological opinion were not implemented.[306] Citizens filed suit to force the Army Corps of Engineers, the Bureau of Reclamation, and NMFS to comply with the terms of the opinion, but the court in *American Rivers v. National Marine Fisheries Service* rejected their claims, finding that the failure to implement the measures would likely not recur.[307] The parallel statutory regime of the NPA has also suffered from a long history of weak implementation due to a "cavalier long-term attitude" by federal agencies resisting the measures in the Council's program.[308] Federal river operators are continuing to contest the enforceability of the Council's most recent plan issued

298. Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995).

299. *American Rivers*, 1997 U.S. Dist. LEXIS 5337, at *12.

300. *See, e.g., id.* (States of Oregon and Montana intervened, and States of Alaska, Washington, Idaho, and Columbia River Tribes were amicus parties); *Idaho Dep't of Fish & Game*, 850 F. Supp. 886 (State of Oregon intervened, and State of Alaska and Columbia River Tribes were amicus parties).

301. Cheever, *supra* note 232, at 71; *see also* Bolin, *supra* note 15, at 79–80; Garner & Ouellette, *supra* note 26, at 484.

302. *See* Lochhead, *supra* note 26, at 13.

303. Hopfl, *supra* note 203, at 5.

304. Lochhead, *supra* note 26, at 15.

305. *Id.*

306. *See* Blumm et al., *supra* note 26, at 83–97; Ray, *supra* note 121, at 676–78. The district court in *American Rivers*, however, did not find that failure to implement a violation of the ESA. American Rivers v. National Marine Fisheries Serv., No. 96–384–MA, 1997 U.S. Dist. LEXIS 5337, at *33 (D. Or. Apr. 3, 1997).

307. *See American Rivers*, 1997 U.S. Dist. LEXIS 5337, at *38.

308. Blumm et al., *supra* note 26, at 109.

under the NPA, and the main provisions of the revised plan have not been implemented by river operators.[309]

The tragic outcome, and third shared feature, of the pattern in both basins is the continued decline of the species. In both basins, as implementation flounders, the extinction crisis becomes more imminent. In the Columbia, since initiation of the first status review in the late 1970s, the Snake River coho has passed into extinction, and the Snake River sockeye species (listed as endangered under the ESA) dwindled to a return of just one individual in 1994.[310] In 1990, prior to listing under the ESA, adult returns of wild Snake River spring/summer chinook that escaped to spawning grounds numbered over 6500.[311] By 1995, the number had dropped to 1852.[312] Recent run size estimates for many basin stocks were the lowest in recorded history.[313] A 1997 review of the salmon recovery process by a regional newspaper reveals that, despite three billion dollars spent over the past decade and a half, "overall, the record is of failure."[314]

The situation in the Colorado is similar, although populations in that basin are more elusive to counting procedures. The Colorado squawfish has been totally extirpated from the Lower Basin, though populations persist in the Upper Basin.[315] The bonytail chub is now "very rare" throughout the basin.[316] The humpback chub has only small populations in the Upper Basin.[317] The razorback sucker has isolated populations consisting of a few adults, with little or no recruitment necessary for the survival of the species.[318] Critics maintain that the recovery program for the Upper Colorado has done little to improve the well-being of fish, and that flows in critical reaches have not been attained.[319]

The pattern emerging from a comparison between the basins is apparent nationally as well. Commentators have documented the severe resistance on the part of the USFWS and NMFS to carrying out mandatory procedures under the ESA. In his seminal work on the implementation of the ESA by the two agencies, Professor Houck describes USFWS' approach to implementing the jeopardy standard on a national scale: "Taken together, Interior's regulations present a composite picture of an agency doing everything possible within law, and beyond,

309. *Id.* at 61–62.

310. *See American Rivers*, 1997 U.S. Dist. LEXIS 5337, at *12.

311. WASHINGTON DEP'T OF FISH & WILDLIFE, OREGON DEP'T OF FISH & WILDLIFE, STATUS REPORT: COLUMBIA RIVER FISH RUNS AND FISHERIES, 1938–95, at 49, 61 (1996) (adult spring chinook populations and adult summer chinook populations).

312. *Id.*

313. Blumm et al., *supra* note 26, at 28.

314. Brinckman, *supra* note 119, at A1.

315. Wigington & Pontius, *supra* note 125, at 1.

316. Update, *supra* note 288.

317. *Id.*

318. *Id.*

319. *See* Bolin, *supra* note 15, at 86 (noting that the recovery process is not meeting "even its own limited goals").

to limit the effect of protection under section 7(a)(2).... Interior has translated an act of mandatory requirements into concentric rings of discretion."[320]

Particularly problematic is the Services' approach to designing the "reasonable and prudent alternatives" the action agency may take to avoid jeopardy.[321] As Professor Houck describes, "the biological agencies are bending over backward to identify alternatives that send the project forward in the face of potential jeopardy—at some risk to the species."[322] He notes the "remarkable infrequency" with which either agency finds jeopardy,[323] and reports that the number of projects actually arrested by the ESA is "nearly nonexistent."[324] In a description that could easily apply to the Upper Colorado recovery process, Professor Houck notes a nationwide tendency of the Services to develop "'compromise approaches' that allow the projects to proceed through fees for 'conservation and research,' monitoring, and stocking programs."[325] Such soft alternatives, while allowing a project to go forward, may be inadequate to ensure the survival of the species.[326]

Accompanying the apparent regulatory recalcitrance of the Services is a sometimes entrenched resistance on the part of federal action agencies to carry out environmental mandates under the ESA and other protective statutes. In a high-profile case involving another celebrated species of the Pacific Northwest, the northern spotted owl, one federal district court observed that federal agencies (USFWS and the Forest Service) had manifested "a deliberate and systematic refusal...to comply with the laws protecting wildlife."[327]

The product of failed implementation of the ESA on a national scale is continued wildlife extinctions, as in the Colorado and Columbia River Basins. Nationally, the wildlife crisis has reached staggering proportions. A 1990 report issued by the Council on Environmental Quality concludes that a total of nine thousand U.S. plant and animal species may currently be at risk of extinction. The report notes that "the problem is national in scope, with every region of the country reporting losses of native species,...more than species are being lost. Whole plant and animal communities—integrated, resilient systems—are threatened."[328] Unfortunately, the experience of ESA implementation in the Colorado and

320. Oliver A. Houck, *The Endangered Species Act and Its Implementation by the U.S. Departments of Interior and Commerce,* 64 U. COLO. L. REV. 277, 326–27 (1993).

321. 16 U.S.C. § 1536(b)(3)(A) (1994).

322. Houck, *supra* note 320, at 319.

323. *Id.* at 322.

324. *Id.* at 317.

325. *Id.* at 321.

326. *See id.* at 323 (Such alternatives "reflect the bare minimum...necessary to keep those species that are listed hanging on, unrecovered, for an indeterminate time.").

327. Seattle Audubon Soc'y v. Evans, 771 F. Supp. 1081, 1090 (W.D. Wash. 1991).

328. Houck, *supra* note 320, at 280 n.13 (quoting COUNCIL ON ENVTL. QUALITY, ENVIRONMENTAL QUALITY, 21ST ANNUAL REPORT (1990)).

Columbia Basins appears congruent with emerging patterns of dysfunction at the national level.

D. Politicization and the Role of Agency Science

Another striking common feature of the recovery efforts in the two basins is the degree to which both the USFWS and NMFS have been subject to intense political pressure against ESA implementation. In both basins, the statutory mandates of the ESA challenge vested economic interests that have enjoyed a legal regime designed to allocate the benefits of the Developed River without due regard to ecosystem protection. In both basins, the ESA recovery process has confronted enormous political resistance mounted by those vested interests, a factor that has severely undercut the agencies' posture in the recovery process.[329]

In the Colorado Basin, political resistance to recovery efforts reached a high point in the early 1980s, when states and water users were faced with possible curtailments of their water in favor of a de facto instream federal right for fish.[330] They sought an amendment of the Act to exclude the Colorado River fish from the provisions of the ESA.[331] The program director for the Colorado fish recovery program has stated that the Service lacked the political support and adequate funding at that time to achieve fish recovery.[332] The consensus-based recovery strategy in the RIP was born of that conflict.[333]

Similarly, in the Columbia River Basin, powerful river interests have sought outright exemptions from the Act.[334] Ranking senators from the region, supported by subsidized river industries, have further politicized the context in which the ESA is implemented.[335] In 1995, Republican senators introduced a bill

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329. *See generally* Hamill, *supra* note 109 (discussing the Colorado Basin). For Columbia Basin commentary, see PALMER, *supra* note 18, at 60–65 (reporting extreme political influence on salmon management by subsidized river interests, including irrigation, navigation, and aluminum industries); *see also* Sampson, *supra* note 163; Swisher, *supra* note 103, at 3C; Larry Swisher, *Sen. Gorton Is Trying to Sell His Salmon Cap Scheme Again*, LEWISTON MORNING TRIB. (Lewiston, Idaho), Mar. 11, 1996, at 9A.

330. Hamill, *supra* note 109, at 2; Lochhead, *supra* note 26, at 5–6.

331. Hamill, *supra* note 109, at 2; Lochhead, *supra* note 26, at 5–6.

332. Hamill, *supra* note 109, at 2.

333. *See id.*

334. *See* PALMER, *supra* note 18, at 59; Blumm et al., *supra* note 26, at 108; Swisher, *supra* note 103, at 3C; Swisher, *supra* note 329, at 9A; Brent Walth, *BPA Deal's Waiver of Fish Law Risks Veto*, OREGONIAN (Portland, Or.), Oct. 20, 1995, at D1.

335. Three Senators in particular took initiatives to undermine ESA protection: Senator Mark Hatfield from Oregon, Senator Slade Gorton from Washington, and Senator Larry Craig from Idaho. *See* PALMER, *supra* note 18, at 59, 69–71; *Craig Squelches Timber Sale Objections*, TWIN FALLS TIMES, Apr. 17, 1996, at A1 (reporting pressure from Senator Craig to withdraw Department of the Interior's objections that timber sale could harm habitat for ESA-listed Snake River chinook salmon); Joan Laatz & Brent Walth, *BPA May Get a Break from Environmental Laws*, OREGONIAN (Portland, Or.), Sept. 12, 1995, at A1 (reporting that Senators Hatfield, Gorton, and Craig each drafted bills to exempt the

that would have exempted river operations from the ESA altogether, and would have imposed a cost cap on Bonneville Power Administration ("BPA") spending for fish recovery.[336] While the bill was not enacted into legislation, the effort did result in a negotiated agreement among federal agencies establishing a budget for BPA with many of the effects of a cost cap.[337] Northwest Republican senators also sought reform bills that could remove the salmon from ESA listing; Senator Gorton went so far as to initiate an industry-funded public relations program to undercut public support for salmon recovery.[338] In the Columbia River Basin, political pressure from river interests on the regulating agencies has been substantial and unrelenting since the Council first embarked on fish recovery.[339] The Ninth Circuit noted the politicization in its decision overturning the Council's earlier recovery plan:

> The Council's approach seems largely to have been from the premise that only small steps are possible, in light of entrenched river user claims of economic hardship. Rather than asserting its role as a regional leader, the Council has assumed the role of a consensus builder, *sometimes sacrificing the Act's fish and wildlife goals for what is, in essence, the lowest common denominator acceptable to power interests....*[340]

The extent of political influence is certainly not limited to these basins; it plays out across the national landscape of ESA implementation. In his analysis of the Services' implementation of section 7, Professor Houck notes "recurring evidence that—whatever the law—the [reasonable and prudent] alternatives found for controversial projects have been strongly influenced by local and national

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Bonneville Power Administration from environmental laws and to set a cap on salmon recovery spending); *New Plan for Rescuing the Salmon, supra* note 161, at B8; Swisher, *supra* note 329, at 9A (reporting efforts by Senator Gorton to limit ESA protection for salmon); Brent Walth, *Exemptions for Salmon Become Key to BPA Plan*, OREGONIAN (Portland, Or.), Sept. 29, 1995, at A1 (noting Senator Hatfield's key role in pushing for exemptions from environmental laws that protect salmon).

336. Blumm et al., *supra* note 26, at 26, 99, 103, 108; *see also* PALMER, *supra* note 18, at 59.

337. PALMER, *supra* note 18, at 59; Blumm et al., *supra* note 26, at 26, 99, 103, 108.

338. *See* PALMER, *supra* note 18, at 64–65; Swisher, *supra* note 329, at 9A.

339. *See* PALMER, *supra* note 18, at 64 (reporting reflections of former NMFS division chief on political pressure exerted by Columbia River Alliance against agency); *id.* at 65 (noting longstanding pressure by river industries on BPA and Army Corp of Engineers); *id.* at 68 (noting influence on NMFS decisions by subsidized industries); Brinckman, *supra* note 83, at A1. Bruce Lovelin, the leading lobbyist on behalf of the industrial river users, has said that the economic powers in the basin have been able to (in reporter's paraphrase) "virtually dictate river operations," and (quoting Lovelin) "With the power of the industrial users, we were able to control [river operations] from the board rooms." *Id.*

340. Northwest Resource Info. Ctr., Inc. v. Northwest Power Planning Council, 35 F.3d 1371, 1395 (9th Cir. 1994), *cert. denied*, 116 S. Ct. 50 (1995) (emphasis added).

politics."[341] Other commentators have noted the intrusion of politics into other aspects of the ESA implementation process.[342] The General Accounting Office has thoroughly documented improper political influence in the struggle over protection of the northern spotted owl.[343]

The potential for political influence exerted by Congress and vested river interests on the agencies is a matter of serious concern. Agencies such as USFWS and NMFS are vested with a mandatory duty under section 7 of the ESA to determine whether federal actions will "jeopardize" a listed species; the statute explicitly states that the determination must be based on the "best available scientific and commercial data available."[344] The jeopardy determination is highly technical, and presumably one that Congress delegated to the Services on the assumption that they will exercise their professional judgment within parameters set by Congress, not according to political persuasion exerted by special interests.[345] The faith in agency neutrality—however idealistic—underlies the federal system of administrative law, and excessive politicization of agency decisions threatens the integrity of the entire process.[346] Where the agencies hold considerable discretion to implement a provision in contexts that are by nature highly technical and permeated with scientific uncertainty, there is an enhanced risk that essentially political decisions will be hidden behind a facade of science.[347] That is the charge tribal agencies, state biologists, and environmental advocates make regarding NMFS' implementation of the ESA in the Columbia River Basin.[348] Moreover, they claim that NMFS' emphasis on barging juvenile salmon[349]

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341. Houck, *supra* note 320, at 319; *see also* MARTY BERGOFFEN, ENDANGERED SPECIES ACT REAUTHORIZATION: A BIOCENTRIC APPROACH 46 (Elissa C. Lichtenstein ed., 1995).

342. Daniel J. Rohlf, *Six Biological Reasons Why the Endangered Species Act Doesn't Work—And What to Do About It*, 5 CONSERVATION BIOLOGY 273, 276 (1991).

343. U.S. GEN. ACCOUNTING OFFICE, ENDANGERED SPECIES: SPOTTED OWL PETITION EVALUATION BESET BY PROBLEMS 12 (1989) (The Office reports that the initial decision not to list the northern spotted owl was made partially because top U.S. Fish and Wildlife Officials "would not accept [such] a decision.... These problems raise serious questions about whether FWS maintained its scientific objectivity during the spotted owl petition process."); *see also* Houck, *supra* note 320, at 295.

344. 16 U.S.C. § 1536(a)(2) (1994).

345. *See* Rohlf, *supra* note 342, at 276.

346. *See, e.g.*, Sierra Club v. Thomas, 105 F.3d 248, 250–52 (6th Cir. 1997), *cert. granted sub nom.* Ohio Forestry Ass'n, Inc. v. Sierra Club, 118 S. Ct. 334 (U.S. Oct. 20, 1997) (No. 97–16) (noting excessive politicization and potential for bias surrounding Forest Service decisions).

347. *See* Rohlf, *supra* note 342, at 280.

348. *See* Sampson, *supra* note 163, at 681 (statement of Chairman of the Umatilla Tribes); Barker, *supra* note 151, at A1. The Tribes' Recovery Plan states:

> Given the proposed role of NMFS in recovery, it is appropriate to ask whether the agency...has played a constructive role, historically, in the recovery of naturally-spawning upriver stocks.... [T]he work of the NMFS Seattle-based research program, with its focus on captive broodstock technology and its massive research contracts with the Corps

stems in part from an inherent bias in NMFS' scientific team: sixty-nine percent of the funding for NMFS scientists comes from the very dam operators and power marketing interests that are strongly opposed to breaching the dams.[350]

Hidden political bias in agency decisions may elude exposure in court proceedings. Because of the standard principle according judicial deference to agencies' technical determinations,[351] courts rarely examine political motivations or conflicts of interest that may have shaped the agencies' scientific conclusions.[352] This is in marked contrast to the nonadministrative realm of trial practice, where expert opinions are routinely examined for inherent bias.[353]

In sum, the politically charged context surrounding ESA implementation in both the Columbia and Colorado Basins presents a danger that the Services' decisions under section 7—decisions that should be strictly based on technical and scientific determinations—may instead amount to political compromises to avoid disrupting entrenched interests in the basin. Since the vested interests in these and other basins nationwide draw their economic power from a Developed River regime, a politically based recovery approach is not likely to significantly disrupt the status quo.[354] The next section further explores that dimension.

E. Recovery and the Status Quo

In both basins, the Services have taken an approach to fish recovery that would largely accommodate the status quo in river operations. In the Columbia River Basin, NMFS entered the ESA arena by issuing no-jeopardy opinions on the 1992 and 1993 operation of the hydrosystem—astonishing decisions in light of the staggering percentage of direct mortality attributed to the system.[355] The State of Idaho challenged the 1993 NMFS biological opinion, and Judge Marsh of the U.S. District Court of Oregon held it invalid, stating that NMFS' approach had focused on "system capabilities tending to the status quo rather than the stabilization of the

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of Engineers, has compromised itself as an honest broker on production and hydro operations issues.

TRIBES' RECOVERY PLAN, *supra* note 52, at 4–23 n.136.

In the Colorado Basin, the Stanford Report criticizes the methodology underlying certain flow recommendations of the USFWS, stating: "[E]mphasis on professional judgment was overemphasized, given the general high quality of the ecological studies that were available.... And perhaps the biological opinion process overshadowed the science." STANFORD REPORT, *supra* note 112, at 34.

349. *See supra* note 215.

350. *See* Barker, *supra* note 151, at A1; *see also* Baum, *supra* note 151, at A1. The NMFS fisheries science team is based in the Northwest Fisheries Science Center, which has a budget of $20 million dollars. Barker, *supra* note 151, at A1.

351. *See infra* notes 420–21 and accompanying text.

352. *See* Rohlf, *supra* note 342, at 276.

353. *See infra* notes 448–57 and accompanying text (discussing *Daubert* approach to expert evidence).

354. *See* PALMER, *supra* note 18, at 65, 67–68.

355. *See* Wood, *supra* note 97, at 771 n.189.

species."[356] The court ordered NMFS to reinitiate consultation and produce a new biological opinion.[357] In March 1995, NMFS issued a subsequent biological opinion that covered system operations from 1994 to 1998; the agency concluded that the operations would likely result in jeopardy to the species but recommended a "reasonable and prudent alternative" to avoid jeopardy.[358] That opinion was recently challenged in *American Rivers*.[359]

While styled as a "jeopardy" opinion, tribal representatives, environmental groups, and commentators criticize it heavily, contending that the reasonable and prudent alternatives it offers would allow the hydrosystem to function, at least in the next few critical years, without the changes deemed necessary to restore salmon populations.[360] While the reasonable and prudent alternatives do call for increased water flows, the measures may actually place more reliance on artificial transportation of juvenile smolts than the prior biological opinion found invalid by Judge Marsh.[361] And, notably, while other plans call for drawdowns of the most lethal reservoirs (or dam removal) in the

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356. Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886, 890–91 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995).

357. *Id.* at 900; *see also* Wood, *supra* note 97, at 190 (explaining court's decision).

358. Blumm et al., *supra* note 26, at 62–63.

359. American Rivers v. National Marine Fisheries Serv., No. 96–384–MA, 1997 U.S. Dist. LEXIS 5337, at *12 (D. Or. Apr. 3, 1997).

360. *See* Ray, *supra* note 121, at 680; Sampson, *supra* note 163, at 681–82. For a detailed analysis of the biological opinion, see Blumm et al., *supra* note 26, at 62–75.

361. *See* Analysis of 1995 NMFS Biological Opinion, Memorandum to the Northwest Power Planning Council Files from Chip McConnaha 2, 3 (Jan. 30, 1995) (on file with author) (noting that, under the 1995 biological opinion, between 85% and 90% of surviving juveniles would be transported, whereas the 1994 Biological Opinion called for transportation of only 40–60% of the juveniles, and concluding: "If overall survival of juvenile fish through the hydroelectric system is relatively low...then the 1995 Biological Opinion is less effective at rebuilding Snake River spring chinook than...the 1994 Biological Opinion.... Regardless of the transportation assumption used, the 1995 NMFS Biological Opinion did not result in rebuilding of Snake River spring chinook."); *see also* Additional Comments on the Biological Opinion, Memorandum from Michele DeHart, Fish Passage Center, to Jack Donaldson & Wally Steucke, Columbia Basin Fishery Agencies and Tribes 18 (Feb. 3, 1995) (on file with author) ("Implementation of the 1995 Opinion measures in 1994 would have resulted in less spill and a greater number of fish transported. In-stream migration would be decreased from the number which migrated instream in 1994."). For a full discussion of the 1995 Biological Opinion, see Blumm et al., *supra* note 26, at 62–75. Professor Blumm and his colleagues summarize the NMFS' approach to river management following the *Idaho Department of Fish & Game v. National Marine Fisheries Service*, 850 F. Supp. 886, 900 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995), remand: "This compromised approach [in the 1995 Biological Opinion] resulted in failure to meet mainstem flow targets, widespread failure to shape flows to maximize salmon migration, and a wholesale commitment to barging and trucking salmon on the Snake." Blumm et al., *supra* note 26, at 121. Professor Blumm and his colleagues also note that "these results....invite renewed judicial scrutiny." *Id.*

immediate or near future to assist in juvenile migration, NMFS' most recent biological opinion postpones a decision on Snake River drawdowns until 1999—a critical time lag given the collapse of fish populations in recent years.[362] In short, NMFS is enforcing the no-jeopardy and critical habitat provisions of the ESA by allowing even more imperiled fish to be taken out of their critical habitat during peak periods of migration.[363] While the reasonable and prudent alternatives adopted by NMFS are legally required to set forth measures that will, in the agency's opinion, avoid jeopardy,[364] the incidental-take statement accompanying the biological opinion[365] casts considerable doubt on whether the reasonable and prudent alternatives are sufficient. NMFS has estimated that during the years 1994 to 1998, implementation of the measures could result in upper-end mortality rates of one hundred percent for juvenile fall chinook, and eighty-six percent for juvenile spring/summer chinook and sockeye salmon.[366] Moreover, the incidental-take scenarios under the reasonable and prudent alternatives are not dramatically different from under the alternative NMFS found would result in jeopardy. Reasonable and prudent alternative mortalities for adult spring, summer, and fall chinook and for juvenile fall chinook are identical or nearly the same as the jeopardy alternative, and the projected reasonable and prudent alternative mortality rates for juvenile spring and summer chinook have only a ten percent difference in range from the jeopardy alternative.[367] In sum, NMFS, while repackaging its biological opinion from a jeopardy to a no-jeopardy opinion with reasonable and prudent alternatives, has—in relative terms—essentially perpetuated a status quo

362. Blumm et al., *supra* note 26, at 66.

363. Andrea Widener, *Fisheries Service Opts for Barging Young Fish*, OREGONIAN (Portland, Or.), Apr. 5, 1997, at C3. For critical commentary, see Sampson, *supra* note 163, at 687 (noting that the federal government's "primary 'solution' to the salmon crisis is to remove the fish entirely from the river"); sources cited *supra* note 216. NMFS argues that the merits of transportation are yet unknown. The court in *American Rivers* seemingly agreed. *American Rivers*, 1997 U.S. Dist. LEXIS 5337, at *32. *But see* Blumm et al., *supra* note 26, at 122 (citing independent peer review study of transportation program finding virtually no evidence that transportation benefits salmon under normal river flow conditions).

364. 16 U.S.C. § 1536(b)(3)(A) (1994) (if jeopardy is found, Service must suggest reasonable and prudent alternatives that would not violate *id.* § 1536(a)(2) (1994)).

365. *Id.* § 1536(b)(4)(B)(i) requires the Service to provide the action agency with a written statement specifying the impact of "incidental taking" of species caused by the proposed action.

366. NATIONAL MARINE FISHERIES SERV., U.S. DEP'T OF COMMERCE, ENDANGERED SPECIES ACT SECTION 7 BIOLOGICAL OPINION ON THE REINITIATION OF CONSULTATION ON 1994–1998 OPERATION OF THE FEDERAL COLUMBIA RIVER POWER SYSTEM AND JUVENILE TRANSPORTATION PROGRAM 159 (1995) [hereinafter 1995 HYDROSYSTEM BIOLOGICAL OPINION]. The lower-end mortality estimates are as follows: juvenile spring/summer chinook—24%; juvenile fall chinook—62%; adult spring/summer chinook—21%; adult fall chinook—39.3%. *Id.*; *see also American Rivers*, 1997 U.S. Dist. LEXIS 5337, at *13–14.

367. *American Rivers*, 1997 U.S. Lexis 5337, at *13–14 (citing 1995 HYDROSYSTEM BIOLOGICAL OPINION, *supra* note 366).

system of operations, resulting in high incidental take of the imperiled species. Nevertheless, the approach was recently upheld by the U.S. District Court of Oregon in *American Rivers*.[368]

A similar theme can be drawn from the recovery process in the Upper Colorado Basin—a process that represents a hyperextension of status quo accommodation. While the USFWS emphasizes that instream flows are "key" to protecting the imperiled species,[369] the agency remarkably has endorsed a recovery approach that allows continued, and even further, depletion of instream flows. In the Upper Basin program, USFWS has agreed to implement section 7 in a way that allows historic and future projects to deplete water if they comply with the RIP, as supplemented by the RAP.[370] The RIP/RAP, which serves as a "reasonable and prudent alternative" to a jeopardy finding,[371] has as its express purpose to allow water projects to continue depleting the basin's water.[372] Essentially, projects may go forward upon payment of a "depletion" fee to help fund the recovery program[373] and upon a determination by the USFWS that "sufficient progress" is being made on recovery plan objectives to offset the impacts of water depletion from the project.[374] The USFWS has recently determined that "sufficient progress" has been made on the RIP/RAP to allow new projects that deplete less than 1500 acre-feet per year to go forward.[375] Other projects are to be determined on a case-by-case basis, and some historical projects are seemingly exempt from the inquiry, absent extenuating circumstances.[376] Naturally, a central component of the RIP/RAP is gaining instream flows to protect the fish; these instream flows must compensate for the depletions that result, not only from ongoing historical projects, but also from new, projected depletions resulting from continued development of water rights. By the terms of the RIP/RAP, recovery efforts must gain instream flows by resort to the state law appropriation processes, not by invoking federal preemptive

368. *American Rivers*, 1997 U.S. Dist. LEXIS 5337, at *32.

369. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, RIPRAP at 5.

370. *Id.* Agreement at 1; Garner & Ouellette, *supra* note 26, at 484.

371. *See* 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, Agreement at 2; Garner & Ouellette, *supra* note 26, at 484.

372. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, RIPRAP at 1 (Purpose of recovery program is to "recover the endangered fishes while providing for existing and new water development to proceed in the Upper Basin."); *see also* Hamill, *supra* note 109, at 4.

373. *See* LAWRENCE J. MACDONNELL, NATURAL RESOURCES LAW CTR., THE ENDANGERED SPECIES ACT AND WATER DEVELOPMENT WITHIN THE SOUTH PLATTE BASIN 30–39 (1985); MacDonnell & Getches, *supra* note 17, at 40; Lochhead, *supra* note 26, at 9–11.

374. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, Agreement at 3; Garner & Ouellette, *supra* note 26, at 484.

375. Lochhead, *supra* note 26, at 16. The USFWS' earlier position had been that sufficient progress had been made to allow projects depleting less than 3000 acre-feet a year to go forward. The USFWS lowered the acre-feet limit in light of sluggish progress on the RIP/RAP. *Id.*

376. 1996 UPPER COLORADO RECOVERY PROGRAM, *supra* note 120, Agreement at 3.

water rights.[377] One state, Colorado, plays a particularly critical role in the scheme because much of the volume of water necessary for species recovery originates in that state.[378] Yet instream filings in that state are particularly uncertain and will be challenged in state water court.[379] Progress on securing water rights for fish has, not at all surprisingly, fallen far behind schedule.[380]

Indeed, the burden on the RIP/RAP approaches the fantastical: it must restore an amount of previously appropriated water to the river and, further, gain new quantities at roughly the same pace that water is being taken out to serve development.[381] Therefore, not only does the recovery approach in the basin protect the status quo of historical water development, it actually extends the pattern of water depletion into the future, with the overall goal of allowing full diversion and use of the Compact entitlement.[382] The status quo protected by the RIP/RAP, therefore, is not only the physical and structural status quo but also the legal status quo that rests on deeply entrenched expectations of water depletion engendered by the 1922 Compact. In keeping with this approach, through fiscal year 1995, the Service issued biological opinions under the RIP for depletions totaling 209,000 acre-feet of water.[383]

In both basins, the Services have crafted reasonable and prudent alternatives that essentially preserve the Developed River with minor operational changes. In neither basin, then, is the Service forcing immediate, far-reaching changes towards restoring a Normative River regime. Four years ago, Judge Marsh sharply criticized NMFS' approach to implementing section 7 of the ESA, finding that the no-jeopardy opinion was "arbitrary and capricious."[384] In words that may well apply to the Services' approach in other river basins, Judge Marsh wrote:

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377. *Id.* RIPRAP at 5 (instream flow protection to be gained through "state acceptance of flow recommendations."). For discussion of preemptive water rights under the ESA, see Hansen, *supra* note 21, at 1326–27. Some federal projects, most notably the Flaming Gorge Dam, have released water to benefit fish. *See* Bolin, *supra* note 15, at 55–78.

378. *See* Lochhead, *supra* note 26, at 14.

379. *See* Wigington & Pontius, *supra* note 125, at 9 (noting that Colorado water law forbids the establishment of instream water rights that would deprive Colorado of its Compact water entitlements); *see also* Lochhead, *supra* note 26, at 14 ("Colorado's prior appropriation system is based on the premise that water users make water development decisions based on economic and market considerations.").

380. *See* Lochhead, *supra* note 26, at 16 (noting that the USFWS has questioned whether the RIP could continue serving as a reasonable and prudent alternative to projects, as originally envisioned).

381. *See id.* at 18 (noting controversy over the "concurrency" issue—a "debate over the right balance between the pace of new depletions vis-à-vis the pace of implementation of recovery measures").

382. Hamill, *supra* note 109, at 2; Lochhead, *supra* note 26, at 14.

383. Lochhead, *supra* note 26, at 17.

384. Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886, 900 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995).

> This process is seriously, "significantly" flawed because it is too heavily geared towards a status quo that has allowed all forms of river activity to proceed in a deficit situation—that is, relatively small steps, minor improvements and adjustments—when the situation literally cries out for a major overhaul. Instead of looking for what can be done to protect the species from jeopardy, NMFS and the other action agencies have narrowly focused their attention on what the establishment is capable of handling with minimal disruption.[385]

Underlying the approach in both basins is reliance on "scientific uncertainty" to justify maintaining the status quo. Because changes to the Developed River system are costly, opponents argue that such changes are not justified while there remains "scientific uncertainty" as to the needs of the species.[386] Interestingly, this approach runs counter to generally accepted scientific methodology, which is not geared towards proving hypotheses but rather disproving them.[387] As commentators have noted, scientists will never be able to prove precisely what the fish need in order to survive in the short time frame remaining before likely extinction (indeed, if at all).[388] Requiring scientific certainty as a prerequisite to changing river operations may amount to a death knell for a species in crisis.[389]

In large measure, scientific uncertainty is a by-product of any regulatory approach that adheres to a status quo system that has proved lethal to species. As

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385. *Id.*

386. *See* Hopfl, *supra* note 203, at 6 (Colorado River Basin); Al Wright, *Should the Courts Run the River?*, 25 ENVTL. L. 403 (1995) (Columbia River Basin); *see also* Brinckman, *supra* note 83, at A1 (quoting leading lobbyist for industrial river users in Columbia River Basin: "The Achilles' heel of dam removal is that no one can warranty the outcome."); Hamill, *supra* note 109, at 4 (noting, with respect to the Colorado Basin, "It is hard to get the Bureau of Reclamation to agree to reoperate their dam and risk losing $5 million a year in power revenues when there is limited hard data to support the request."). Professor Rohlf has noted that, on a nationwide level, "[r]ather than treating uncertainty in a probabilistic manner...[the Services and action agencies] use the existence of uncertainty to justify inaction." Rohlf, *supra* note 342, at 279.

387. *See* Sierra Club v. Marita, 46 F.3d 606, 622 (7th Cir. 1995) (Amici scientific societies, in another environmental context, commented on the nature of scientific uncertainty, noting, "all scientific propositions are inherently unverifiable and at most falsifiable."); *see also* Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 590 (1993) ("[I]t would be unreasonable to conclude that the subject of scientific testimony must be 'known' to a certainty; arguably, there are no certainties in science.").

388. *See* Blumm et al., *supra* note 26, at 125–26.

389. *See Idaho Dep't of Fish & Game*, 850 F. Supp. at 892 n.18 (quoting scientists who noted, in salmon context: "[O]pportunities to save fisheries have been squandered because of concerns for adequate data. This lesson was clearly noted for another Pacific fishery. The California sardine fishery is a monument to the failure to act in time, and the insistence of having conclusive scientific evidence before acting." (citation omitted)).

noted by a National Academy of Sciences committee convened to examine the role of science in ESA implementation, the Services constantly face limited information and uncertainty in making biological determinations.[390] Accordingly, the agencies confront a policy decision as to how much of a safety cushion they will provide to "insure" against jeopardy.[391] The ESA's lack of explicit biological criteria leaves the Services tremendous discretion in making this determination.[392] There is a plethora of risk combinations that a Service could choose from in drawing its jeopardy line. At some point, the line it draws represents the agency's view of a "balanced" biological and economic risk.[393] When the Service makes a policy choice in favor of reducing economic risk by adopting measures that do not significantly alter the lethal status quo, it consequently narrows the safety cushion for the species and increases biological risk. Such an approach maximizes "scientific uncertainty" that the measures will result in benefits to the species.

The Normative River regime embodies a different approach to scientific uncertainty and risk. That approach presumes that, in light of uncertainty, a return to more natural river conditions will likely result in more benefits to the species than the highly uncertain "technological fixes" that allow a continued economic status quo.[394] A Normative River approach may accept increased risk of an economic nature[395] in order to provide a greater safety cushion for the species and, consequently, decreased biological risk.[396] This risk-preference approach, which favors the species, is predicated on the assumption that adverse economic consequences can be mitigated through adjustments to the water and hydroelectric distribution system and markets, while adverse biological consequences to the species may be irreversible and unmitigable.

As this discussion illustrates, the Services in both basins may be straying far from the ESA's mandate of conserving ecosystems upon which imperiled species depend.[397] In each basin, scientific uncertainty is employed as a justification for reducing biological security for the species. Applying section 7 in this way, the ESA becomes, in effect, statutory permission for perpetuating a status

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390. COMMITTEE ON SCIENTIFIC ISSUES IN THE ENDANGERED SPECIES ACT, NATIONAL RESEARCH COUNCIL, SCIENCE AND THE ENDANGERED SPECIES ACT 14, 159 (1995) [hereinafter NATIONAL RESEARCH COUNCIL COMM.].

391. *See* 16 U.S.C. § 1536(a)(2) (1994); NATIONAL RESEARCH COUNCIL COMM., *supra* note 390, at 14 (discussing similar policy decision in context of listing species).

392. *See* Rohlf, *supra* note 342, at 276.

393. NATIONAL RESEARCH COUNCIL COMM., *supra* note 390, at 14.

394. Williams Report, *supra* note 113, at 507–12.

395. As outlined in the Williams Report on Columbia River management, a Normative River approach would bring social and economic tradeoffs of an uncertain nature. *Id.* at 510. The report recommends evaluating such costs and benefits as a first step towards moving the river "to a more normative state." *Id.*

396. Of course no scientific approach to fish recovery can eliminate all biological risk, even if the policy preference is to favor biological security over economic security. This is readily admitted by the Independent Scientific Group in the context of the Columbia River Basin recovery. *See id.* at 511.

397. 16 U.S.C. § 1531(b) (1994).

quo harmful to species. Moreover, at least in the Columbia River Basin where other credible recovery plans call for a return to more natural riverine conditions, the ESA may have preemptive effect against these plans. Ironically, if the Services continue to implement the ESA in this fashion, the statute passed by Congress to protect species of "incalculable value" to the nation may actually amount to a federal permit system allowing, in the form of "reasonable and prudent alternatives," conditions that are driving species into extinction.

V. RESTORING THE NORMATIVE RIVER

As Part IV suggests, comparison of the two river basins reveals broad similarities from which lessons can be drawn regarding implementation of the ESA. In both basins, independent scientists suggest changes in river project operations to restore more natural river conditions. Yet in both basins, strong vested interests resist changes to the status quo. A critical question is the extent to which the ESA, a statute passed by Congress to recover imperiled species, can force restorative changes to a federally operated river system. The section 4 recovery process and the section 7 no-jeopardy mandate, which are applicable to all federal actions, together provide an ample regulatory mechanism within the ESA to restore the Normative River in a way that could fairly allocate the conservation responsibility among all sources contributing to mortality.[398] Yet the present approach of the Services in implementing the ESA is to use the broad section 7 discretion to craft "reasonable and prudent alternatives" to jeopardy that largely perpetuate and protect the status quo.[399] If the Services' implementation of the ESA in these basins is consistent with the national pattern, the broad scientific discretion afforded in the section 7 "jeopardy" mandate has invited considerable political influence and has compromised the purely scientific approach Congress mandated in the Act itself.[400]

The systemic implementation failures in the two basins and nationwide calls into question the role of the courts in enforcing the ESA. Traditionally, courts have vigorously enforced the statute, beginning with the landmark *Tennessee Valley Authority v. Hill*, in which the Supreme Court halted the construction of the Tellico Dam because it would adversely affect the critical habitat of the

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398. *See supra* Part IV.A.

399. In the Columbia River Basin, while NMFS found that the present operation of the hydrosystem would pose jeopardy to the survival of the salmon, the agency crafted a "reasonable and prudent alternative" that continues heavy reliance on artificial transportation, offers only modest changes in river operations, and results in nearly the same amount of projected incidental take of salmon as the jeopardy alternative. In the Upper Colorado River Basin, the "reasonable and prudent alternative" to a jeopardy finding for a multitude of water projects is the RIP/RAP, which allows for continued depletion of water from the rivers, presumably to the full extent of Compact entitlement. *See* discussion *supra* Part IV.E.

400. *See* 16 U.S.C. § 1536(a)(2) (1994) (requiring that the Service use the "best scientific and commercial data available" in making the jeopardy determination).

endangered snail darter.[401] Faced with fifty million dollars sunk in the construction of the dam, the Court stated: "The plain intent of Congress in enacting [the ESA] was to halt and reverse the trend toward species extinction, whatever the cost."[402] The role of courts in ESA implementation is a vital one because courts, while reluctant to substitute their judgment for that of the agencies, can and do set parameters that force agencies to carry out their mandates more faithfully. Particularly where the implementation of a statute such as the ESA is often colored by political considerations, a court's role in enforcing the statute is critical to ensure the proper functioning of the administrative state and to maintain the balance of power between the three branches of government.[403] Equally important, where treaty rights are threatened by agency action, the court plays a paramount role in ensuring fulfillment of the government's trust obligation towards the native nations.[404]

Nevertheless, a court's role in enforcing the ESA in the river operations context is markedly different and more challenging than in other contexts involving proposed projects or land management actions. In all contexts, a court's role in enforcing section 7 is two-fold: the court must first determine whether the agencies complied with section 7's mandate, and, second, if it finds a violation, the court must fashion appropriate relief. Courts face an aggravated set of circumstances in carrying out these two steps in the river operations context.

With respect to the first step, the section 7 mandate itself has two components: a procedural one and a substantive one. The procedural component requires action agencies to follow proper consultation procedures with the Service;[405] indeed, the procedural handle of section 7 has resulted in many of the sweeping judicial decisions overturning agency action under the ESA.[406] Assessing whether the procedural aspect of section 7 has been complied with is a relatively easy determination for a court to make.[407] The second component of section 7 is a substantive one: the duty to "insure" that actions are "not likely to jeopardize" the

401. 437 U.S. 153, 184 (1978).

402. *Id.*

403. *See* Sierra Club v. Thomas, 105 F.3d 248, 250 (6th Cir. 1997), *cert. granted sub nom.* Ohio Forestry Ass'n, Inc. v. Sierra Club, 118 S. Ct. 334 (U.S. Oct. 20, 1997) (No. 97–16).

404. *See* Wood, *supra* note 97, at 743–46.

405. 16 U.S.C. § 1536(b), (c) (1994).

406. *See, e.g.*, Pacific Rivers Council v. Thomas, 30 F.3d 1050 (9th Cir. 1994) (enjoining timber harvest activities in salmon habitat on national forests in eastern Oregon pending consultation under ESA); Lane County Audubon Soc'y v. Jamison, 958 F.2d 290 (9th Cir. 1992) (enjoining timber sales in northern spotted owl habitat on Bureau of Land Management land pending section 7 consultation); Silver v. Babbitt, 924 F. Supp. 976 (D. Ariz. 1995) (enjoining timber harvest activities on Mexican spotted owl habitat in national forests in the Southwest pending consultation under section 7).

407. *See* Greenpeace Action v. Franklin, 14 F.3d 1324, 1337 (9th Cir. 1992) (distinguishing procedural consultation obligations under section 7 from the substantive jeopardy determination).

continued existence of the species or adversely affect critical habitat.[408] Here, courts face a far more difficult task in enforcing the mandate; they must determine whether the Service appropriately exercised its technical and scientific discretion under section 7 of the ESA in making a finding of "no jeopardy" or, alternatively, in fashioning "reasonable and prudent alternatives" to avoid jeopardy. In this inquiry, the current standard of review is whether the Service conducted a reasoned evaluation "based on a consideration of the relevant factors" and reached a decision that was not "arbitrary or capricious."[409]

Here, a court squarely confronts the enormous complexity engendered by Developed River operations. When the Services fashion "reasonable and prudent alternatives" to jeopardy that fail to incorporate a cushion of security for the species, the section 7 determination treads precariously close to the highly uncertain line between survival and extinction,[410] thereby increasing the difficulty of judicial review. Moreover, in the context of reviewing agency determinations of a technical nature, the courts often lean heavily on the agency deference principle.[411] Such a principle is most alluring to courts when the scientific or technical subject matter subject to review is inordinately complex,[412] as is typically the case in river operations. But the deference principle applied in a section 7 context could effectively insulate from judicial review decisions that may be improperly based on political considerations and in violation of the ESA.[413] A strong deference principle in this context could thwart enforcement of a broad class of agency action that is vitally important to species.

The second part of section 7 enforcement is to craft appropriate relief if a violation has occurred. This, too, is fraught with more problems in the river basin context than in other applications. Where the action violating section 7 is a proposed project (such as a highway or a new dam) or a federal land management action (such as timber sales or grazing activity on federal lands), courts typically fashion relief in the form of an injunction prohibiting the action from going forward until the proper consultation procedures have been fulfilled.[414] Often the effect of such judicial relief can be sweeping; federal courts in the Pacific Northwest and Southwest recently shut down logging and other harmful activities on millions of acres of federal forests upon finding that the land management agencies had failed to comply with section 7 consultation procedures for the listed

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408. 16 U.S.C. § 1536(a)(2) (1994).

409. Mt. Graham Red Squirrel v. Espy, 986 F.2d 1568, 1571 (9th Cir. 1993) (citation omitted); *see also* Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886, 891–92 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995) (applying standard to NMFS' "no jeopardy" determination with respect to Columbia River hydrosystem operations).

410. *See supra* notes 391–93 and accompanying text.

411. *See infra* notes 420–21 and accompanying text.

412. *See infra* note 421 and accompanying text.

413. *See supra* Part IV.D.

414. *See* cases cited *supra* note 406.

salmon and Mexican spotted owl, respectively.[415] In these contexts, where the status quo favors protection of the species, a court's injunction, while viewed as Draconian by some, nevertheless enjoys the simplicity afforded by preserving the status quo.

In the river basin context, the status quo is lethal to fish, and fashioning a meaningful remedy to an ESA violation may require an injunction that forces dramatic changes to river operations. While courts may opt to use their equitable powers in a limited fashion by forcing the Service to reinitiate consultation,[416] such a procedural remedy may simply return the section 7 regulatory determination to the same processes that resulted in a flawed and illegal output in the first place; moreover, the time consumed in a procedural remand may well be too costly for a species that may have just a few years remaining before extinction.[417]

In light of the very short survival time frame facing both the Colorado native fish and the Snake River salmon, only the sweeping and bold remedies offered by courts may provide the relief necessary to save the species from extinction. Recent judicial opinions from the Columbia River Basin reflect a sense of the scope of recovery measures necessary to restore fish populations. In 1994, the U.S. District Court of Oregon underscored the need for a "major overhaul" of the Columbia River hydrosystem.[418] Yet courts may eschew the role of forcing changes to the structure and/or operation of the system for fear of assuming perpetual management of a broad and complex natural resource system.[419] Without injunctive relief geared towards changing river operations, however, even the most stern judicial admonitions towards the Services could fail to provide the needed impetus. This Part more fully explores these problems and suggests approaches for courts to take in enforcing the ESA in the river basin context.

A. Reviewing Section 7 Determinations: Science, Technology, and Appropriate Limits on the Agency Deference Principle

The overriding barrier to judicial review of section 7 jeopardy determinations is the agency deference rule. Scores of opinions establish the principle that courts are not to substitute their judgment for that of the agency in reviewing decisions that involve substantial agency expertise.[420] In cases involving

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415. Pacific Rivers Council v. Thomas, 30 F.3d 1050 (9th Cir. 1994) (salmon); Silver v. Babbitt, 924 F. Supp. 976 (D. Ariz. 1995) (Mexican spotted owl).

416. This was the approach taken by the court in *Idaho Department of Fish & Game v. National Marine Fisheries Service*, 850 F. Supp. 886, 901 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995).

417. In some cases, only the sweeping relief afforded by a judicial injunction may create adequate protection for a species quickly slipping into extinction.

418. *Idaho Dep't of Fish & Game*, 850 F. Supp. at 900.

419. *See* Natural Resources Defense Council v. Hodel, 624 F. Supp. 1045, 1062 (D. Nev. 1985).

420. *See, e.g.*, Marsh v. Oregon Natural Resources Council, 490 U.S. 360, 378 (1989); Baltimore Gas & Elec. Co. v. Natural Resources Defense Council, 462 U.S. 87, 96 (1983) ("When examining [an agency's] scientific determination, as opposed to simple

wildlife management, this principle has carried extra force since agency decisions are likely to be highly technical.[421] Moreover, in the context of a lawsuit under the National Environmental Policy Act ("NEPA"), the Supreme Court indicated that courts must defer to agencies even where their scientific conclusions are controversial. In *Marsh v. Oregon Natural Resources Council*, the Court stated: "When specialists express conflicting views, an agency must have discretion to rely on the reasonable opinions of its own qualified experts even if, as an original matter, a court might find contrary views more persuasive."[422]

At the heart of the deference principle is a faith in nonbiased administrative expertise, and a corresponding perception that courts are no match in the scientific and technical realm.[423] As one commentator notes:

> The proliferation of administrative agencies emerging from the New Deal reflected a faith that modern social and economic problems required an expert's attention: "Those who rationalized the New Deal's regulatory initiatives regarded expertise and specialization as the particular strengths of the administrative process." That expertise was not shared by judges, since it "springs only from that continuity of interest, that ability and desire to devote fifty-two weeks a year, year after year, to a particular problem. [A] month of experience will be worth a year of hearings."[424]

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findings of fact, a reviewing court must generally be at its most deferential."); Industrial Union Dep't. v. American Petroleum Inst., 448 U.S. 607 (1980); Northwest Forest Resource Council v. Pilchuck Audubon Soc'y, 97 F.3d 1161, 1168 (9th Cir. 1996) (finding that the district court erred in "substituting its own judgment [for that of the agency] on a question requiring highly specialized or scientific expertise"); Mt. Graham Red Squirrel v. Espy, 986 F.2d 1568, 1571 (9th Cir. 1993) (finding judicial deference "especially appropriate where, as here, the challenged decision implicates substantial agency expertise"); *Idaho Dep't of Fish & Game*, 850 F. Supp. at 893.

421. *See Northwest Forest Resource Council*, 97 F.3d at 1167 (applying deference principle in reviewing scientific protocol for determining nesting behavior of marbled murrelets); Greenpeace Action v. Franklin, 14 F.3d 1324, 1330, 1332 (9th Cir. 1993) (applying deference principle to NMFS' environmental assessment of impacts to pollock fishery); *Mt. Graham Red Squirrel*, 986 F.2d at 1571 (applying deference principle to monitoring program for Mt. Graham red squirrel, noting, "deference to an agency's technical expertise and experience is particularly warranted with respect to questions involving...scientific matters" (quoting United States v. Alpine Land & Reservoir Co., 887 F.2d 207, 213 (9th Cir. 1989))).

422. *Marsh*, 490 U.S. at 378. *But see infra* note 490 (distinguishing *Marsh* rationale from ESA context).

423. *See, e.g., Mt. Graham Red Squirrel*, 986 F.2d at 1576 (judgments as to adequacy of squirrel monitoring program "require technical expertise that courts do not possess").

424. RONALD A. CASS ET AL., ADMINISTRATIVE LAW: CASES AND MATERIALS 141 (Little Brown 2d ed. 1987) (citations omitted).

But the widespread romance with agency expertise began to fade somewhat in the late 1960s.[425] In 1971, the Court in *Citizens to Preserve Overton Park v. Volpe* signalled heightened judicial scrutiny of agency action when it stated that while the standard of review under the Administrative Procedure Act's arbitrary and capricious test is "a narrow one," judicial inquiry into the facts must be "searching and careful."[426] Underlying many commentators' waning faith in agencies was a perception that agencies' scientific and technical expertise was too often transformed into political agendas set by the industries they regulated.[427] The reality of "captured agencies" entered the administrative arena.[428]

Overall, the agency deference doctrine has remained remarkably resilient to change despite a deeper understanding of agency behavior that calls into question the justifications of the doctrine. But there is some indication that the doctrine is fraying around the edges. In a stunning opinion authored by Chief Judge Boyce F. Martin, Jr., the Sixth Circuit recently set parameters on the doctrine, recognizing its potential to otherwise insulate essentially political decisions of an agency from judicial review.[429] In *Sierra Club v. Thomas*, the court reviewed a challenge to the Forest Service's forest management plan for the Wayne National Forest, issued pursuant to the National Forest Management Act.[430] In reviewing the plan, the court directly acknowledged the political forces that shaped the agency and, in the court's view, accounted for a severe bias in the agency's planning process to favor timber production as a dominant use of the forest.[431] The court observed:

> [T]he Forest Service has a history of preferring timber production to other uses. Rather than being a neutral process which determines how the national forests can best meet the needs of the American people, *forest planning, as practiced by the Forest Service, is a political process replete with opportunities for the intrusion of bias and abuse....* The relationship of the Forest Service to the timber industry also constrains the Forest Service's planning freedom. Rural constituencies reliant on timber sale revenues may provoke politicians to place pressure on the Forest Service to sustain that revenue.
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> ...Consequently, *decisions may be made, not because they are in the best interest of the American people but because they benefit the Forest Service's fiscal interest.*

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425. *Id.* at 141–42.

426. Citizens to Preserve Overton Park, Inc. v. Volpe, 401 U.S. 402, 416 (1971); *see also* Sierra Club v. Marita, 46 F.3d 606, 619 (7th Cir. 1995) ("[D]eference does not mean obeisance.").

427. CASS ET AL., *supra* note 424, at 142.

428. *Id.*

429. Sierra Club v. Thomas, 105 F.3d 248 (6th Cir. 1997), *cert. granted sub nom.* Ohio Forestry Ass'n, Inc. v. Sierra Club, 118 S. Ct. 334 (U.S. Oct. 20, 1997) (No. 97–16).

430. *Id.* at 249.

431. *Id.* at 250–52.

> Each of these biases undermines even the facial neutrality of the National Forest Management Act.[432]

The court's recognition of political bias in the agency decision-making process prompted the court to rein in the agency deference doctrine and hold that the forest plan was arbitrary for preferring clearcut harvest over other uses of the forest.[433] In language that cuts to the heart of the agency deference problem, the court proclaimed:

> While it is generally accepted that federal agencies are entitled to a presumption of good faith and regularity in arriving at their decisions, that presumption is not irrebuttable. *We would be abdicating our Constitutional role were we simply to "rubber stamp" this complex agency decision rather than ensuring that such decision is in accord with clear congressional mandates.* It is our role to see that important legislative purposes are not lost or misdirected in the vast hallways of the federal bureaucracy.[434]

Similar policy concerns may warrant limiting the agency deference doctrine in the context of challenges to a Service's section 7 jeopardy determination. As noted in Part IV.D, that determination is particularly susceptible to improper political influence. There is some precedent in the Columbia River Basin for strictly scrutinizing the technical and scientific conclusions of the Service. In *Idaho Department of Fish & Game v. National Marine Fisheries Service*, the U.S. District Court of Oregon, while iterating the standard deference doctrine, nevertheless held that the 1993 no-jeopardy biological opinion on hydrosystem operations was arbitrary and capricious because the agency had, among other things, failed to consider relevant facts,[435] failed to adequately explain its preference for a certain predictive model,[436] and failed to adequately consider significant information and data from fisheries biologists in state and tribal agencies.[437]

There are at least three justifications for limiting the deference principle in the context of section 7 jeopardy review. First, the ESA expressly directs the Services to make their jeopardy determinations using the "best scientific and

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432. *Id.* at 251–52 (emphasis added). The concurring opinion, however, criticized the "majority's largely undocumented broadside against the Forest Service," noting that "speculation about the motives and biases of the Forest Service, even if accurate, is unnecessary." *Id.* at 252.

433. *Id.*

434. *Id.* at 250 (emphasis added).

435. The agency failed to consider the drought condition and low run numbers of the species in establishing a base period from which it would compare survival rates of salmon. Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886, 893 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995).

436. *Id.* at 899.

437. *Id.* at 900.

commercial data available."[438] As the court in *Idaho Department of Fish & Game* noted, this is a "substantive obligation."[439] Arguably, then, the quality of the evidence underlying the jeopardy determination must meet an independent legal standard—the "best scientific and commercial data available" measure. By deferring to the agency's factual conclusions, a court would be abdicating its judicial responsibility to ensure that this legal mandate was fulfilled. Indeed, it is this language that distinguishes the ESA context from many of the recent cases applying the deference principle with full force to agency actions arising under other environmental laws. The Court in *Marsh* declared a strong deference principle in the context of a NEPA challenge to agency action.[440] Notably, NEPA lacks any requirement that decisions be based on the best scientific methodology available, a factor noted in two recent Ninth Circuit cases in which both ESA and NEPA claims were at issue.[441]

A second justification for limiting the agency deference principle in the context of a jeopardy determination relates to the nature of that determination itself. The deference principle finds its most compelling application in questions of pure fact that involve the agency's expertise.[442] Yet the jeopardy determination, as recognized in *Idaho Department of Fish & Game*, is not purely one of fact; it is one of policy, fact, and law.[443] Section 7 of the ESA requires agencies to "insure" that their actions are not likely to jeopardize the continued survival of the species.[444] Decisions as to whether the species will survive a given set of actions is hardly a mechanical determination, but instead turns in large part on the Service's decision as to appropriate risk to the species. The level of acceptable risk in determining "survival" is, as NMFS admitted in *Idaho Department of Fish & Game*, "a policy decision."[445] In turn, the selected risk level must be assessed for compliance with section 7's mandate that agencies "insure" that their actions not jeopardize the species—clearly a legal standard. While courts are reluctant to second-guess a Service's selection of appropriate risk levels in determining survival to the species,[446] it seems doubtful that the "insure" standard can be enforced without such meaningful judicial review.[447]

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438. 16 U.S.C. § 1536(a)(2) (1994).

439. *Idaho Dep't of Fish & Game,* 850 F. Supp. at 900.

440. Marsh v. Oregon Natural Resources Council, 490 U.S. 360, 378 (1989).

441. Greenpeace Action v. Franklin, 14 F.3d 1324, 1333 (9th Cir. 1993); Friends of Endangered Species v. Jantzen, 760 F.2d 976, 985 (9th Cir. 1985).

442. *See* Mt. Graham Red Squirrel v. Espy, 986 F.2d 1568, 1571 (9th Cir. 1993); *Idaho Dep't of Fish & Game,* 850 F. Supp. at 893.

443. *Idaho Dep't of Fish & Game,* 850 F. Supp. at 897 ("The controversy surrounding [population] stabilization confidence levels involves a mixed question of policy, law and science and therefore, must be distinguished from the more typical scientific differences of opinion addressed in *Mt. Graham Red Squirrel v. Espy....*").

444. 16 U.S.C. § 1536(a)(2) (1994).

445. *Idaho Dep't of Fish & Game*, 850 F. Supp. at 898–99.

446. *Id.* at 898.

447. Nevertheless, some may argue that the "insure" mandate, unaccompanied as it is by any definition in the statute itself, is precisely the type of mandate that "necessarily

A third justification for limiting the deference principle in the context of section 7 jeopardy review draws upon the broad transformation in judicial approaches to addressing scientific questions in general. Even as courts seek refuge in the deference doctrine from review of agencies' scientific decisions, they are assuming bold new roles in reviewing scientific and technical evidence in cases not involving agency action. As a result of the decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,[448] judges now serve as active gatekeepers in choosing whether to admit scientific evidence in an exploding realm of cases that turn on scientific proof.[449] Prior to *Daubert*, courts followed the common law *Frye* rule, which allowed scientific evidence to be admitted if it was generally accepted in the pertinent scientific community.[450] In that pre-*Daubert* world, courts simply deferred to the scientific community in much the same fashion that they continue to defer to administrative agencies under the deference doctrine.[451] In *Daubert*, however, the Court held that the Federal Rules of Evidence require judges to make an independent determination that the scientific evidence meets a certain standard of reliability before it is admitted.[452] In the words of the Ninth Circuit panel applying *Daubert* on remand: "This means that the expert's bald assurance of validity is not enough."[453] The court's task is to "determine nothing less than whether the experts' testimony reflects 'scientific knowledge,' whether their findings are 'derived by the scientific method,' and whether their work product amounts to 'good science.'"[454] The Court declined to set forth a specific test to determine the admissibility of scientific evidence, but did mark the post-*Daubert* judicial terrain by listing several factors courts should take into account. These factors are "whether the theory or technique employed by the expert is generally accepted in the scientific community; whether it's been subjected to peer review and publication; whether it can be and has been tested; and whether the known or potential rate of error is acceptable."[455]

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requires the formulation of policy and the making of rules to fill any gap left, implicitly or explicitly, by Congress." Chevron U.S.A., Inc. v. Natural Resources Defense Council, 467 U.S. 837, 843 (1984). To this date, however, the Services have failed to articulate a national standard risk level by which to fill any such gap.

448. 509 U.S. 579 (1993).

449. *See* Susan R. Poulter, Daubert *and Scientific Evidence: Assessing Evidentiary Reliability in Toxic Tort Litigation*, 1993 UTAH L. REV. 1307.

450. 3 CHRISTOPHER B. MUELLER & LAIRD C. KIRKPATRICK, FEDERAL EVIDENCE 656, 659 (2d ed. Supp. 1995).

451. *Id.* at 658 (noting that the *Frye* standard "looked deferentially to the scientific community for the answer").

452. *See* Daubert v. Merrell Dow Pharms., Inc., 43 F.3d 1311 (9th Cir. 1995) (remand opinion, interpreting *Daubert's* requirements) [hereinafter Daubert II].

453. *Id.* at 1316.

454. *Id.* at 1315 (citing Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 581 (1993)).

455. *Id.* at 1316 (citing *Daubert*, 509 U.S. at 580–81).

Needless to say, courts have approached their new role with a certain amount of trepidation.[456] The Ninth Circuit panel noted in a section of the *Daubert* remand opinion aptly entitled "Brave New World":

> Our responsibility, then, unless we badly misread the Supreme Court's opinion, is to resolve disputes among respected, well-credentialed scientists about matters squarely within their expertise, in areas where there is no scientific consensus as to what is and what is not "good science," and occasionally to reject such expert testimony because it was not "derived by the scientific method." Mindful of our position in the hierarchy of the federal judiciary, we take a deep breath and proceed with this heady task.[457]

The *Daubert* development in jurisprudence is technically limited to cases where agency action is not at issue; it arises from an application of the Federal Rules of Evidence, which set the standards for admission of evidence.[458] In proceedings challenging agency action, the Federal Rules of Evidence have a very limited role. Traditional administrative law doctrine limits the court's review to evidence contained in the administrative record already in existence, rather than a new record made initially in district court.[459] Although courts will allow parties to submit evidence from outside the record where it is "necessary as background to determine the sufficiency of the agency's consideration,"[460] the administrative record provides a fairly firm fortress in which agency science is protected from routine, direct applications of *Daubert*. Still, even if *Daubert* is not obviously applicable to challenges to agency determinations, the landmark ruling affords justification for reconfiguring the agency doctrine in section 7 cases for at least two reasons.

First, *Daubert* has, albeit indirectly, deflated the driving rationale behind agency deference. Judicial deference to agencies' factual and scientific determinations is premised, first and foremost, on the traditional notion that courts are ill equipped to scrutinize the merits of science.[461] The judicial leap into the scientific realm as a result of *Daubert* establishes a new role for courts by presuming competence to make at least initial determinations as to the validity of

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456. Some commentators echo these sentiments. *See* 3 MUELLER & KIRKPATRICK, *supra* note 450, at 657 ("The main difficulty is that courts are ill-equipped to make independent judgments on the validity of science.").

457. *Daubert II*, 43 F.3d at 1316.

458. *Daubert*, 509 U.S. 579.

459. *See* Greenpeace Action v. Franklin, 14 F.3d 1324, 1334 n.12 (9th Cir. 1993) (citing Animal Defense Council v. Hodel, 840 F.2d 1432, 1436 (9th Cir. 1988)); National Audubon Soc'y v. United States Forest Serv., 4 F.3d 832, 841–42 (9th Cir. 1993); Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886, 893 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995).

460. Inland Empire Public Lands Council v. United States Forest Serv., 88 F.3d 754, 760 n.5 (9th Cir. 1996) (allowing plaintiff's affidavit from outside the record); *see also Greenpeace Action*, 14 F.3d at 1334 (same).

461. *See supra* notes 423–24 and accompanying text.

science. While the technical expertise of courts will never match that of agencies, judges are now making gatekeeping determinations under *Daubert* as to how much deference to accord expert opinions, and this function seems readily transferable to agency experts.

Second, the *Daubert* standard is likely to have a strong influence on another section of the ESA—section 9, which has points of confluence with section 7. While section 7 addresses only federal agency action, section 9 establishes a prohibition against "take" of species applicable to habitat modification on private lands.[462] Scores of citizen suits invoke section 9's prohibition to challenge unpermitted habitat destroying activities carried out on private land.[463] Such suits often do not involve the Service as a party and do not have an administrative record;[464] instead, the evidence showing "take" of species is admitted as an initial matter in federal district court pursuant to the Federal Rules of Evidence.[465] In those cases, *Daubert* requires the court to perform a gatekeeping role for the admission of scientific evidence.[466] Yet the administrative deference principle would preclude the same judicial role in the closely related context of section 7 determinations. Ultimately, this disparity in treating scientific evidence under two parallel, closely intertwined, sections of the Act will cause untenable conflicts. Where a species has a range extending over private and public land, for example, section 7 and section 9 extend concurrent protection for the species' survival. The factual issue of species survival lies at the heart of the prohibitions in each section and typically brings forth the same body of scientific evidence, yet under current practice, courts may treat such evidence very differently depending on which section of the Act they invoke.

An illustration arises from the marbled murrelet of the Pacific Northwest, a bird that inhabits vast areas of both private and publicly owned forest land. In a section 7 challenge to the U.S. Forest Service's timber harvest activities that affect the bird, any judicial review would presumably apply the standard agency deference doctrine to the Service's section 7 jeopardy determination. Yet the same type of harvest activities undertaken on geographically adjacent private land would be subject to challenge by citizens under section 9,[467] and scientific conclusions

462. Babbitt v. Sweet Home Chapter of Communities for a Great Or., 515 U.S. 687, 698–99 (1995).

463. For background, see Federico Cheever, *An Introduction to the Prohibition Against Taking in Section 9 of the Endangered Species Act of 1973: Learning to Live with a Powerful Species Preservation Law*, 62 U. COLO. L. REV. 109 (1991).

464. This, of course, is not the case where the Service has examined the action and has issued an incidental take permit pursuant to its authority in section 10 of the ESA. 16 U.S.C. § 1539(a)(1)(B) (1994).

465. *See, e.g.*, Marbled Murrelet v. Pacific Lumber Co., 880 F. Supp. 1343 (N.D. Cal. 1995), *aff'd* 83 F.3d 1060 (9th Cir. 1996), *cert. denied*, 117 S. Ct. 942 (1997) (evidence of effects of timber harvest on listed marbled murrelet).

466. *See id.* at 1351 n.15 (applying *Daubert* standard to nesting protocol for marbled murrelet).

467. 16 U.S.C. §§ 1538 (take prohibition), 1540(g) (citizen suits) (1994).

would first have to pass through the *Daubert* gate. Predictably, in two recent cases involving the marbled murrelet, the scientific protocol for determining the bird's nesting behavior ("PSG protocol") has been treated in different fashion due to the gulf between the *Daubert* and administrative realms. In *Marbled Murrelet v. Pacific Lumber Co.*,[468] where citizen plaintiffs brought a section 9 action challenging harvest activities on private land, the court engaged in a brief *Daubert* analysis of the PSG protocol.[469] Yet in *Northwest Forest Resource Council v. Pilchuk Audubon Society*,[470] a case involving an agency's assessment of marbled murrelet behavior on public lands,[471] the PSG protocol was also at issue, and the Ninth Circuit applied the deference principle wholesale, finding that the court should defer to the agency's biological expertise.[472] Juxtaposed, the two cases demonstrate that precisely the same scientific protocol can be treated in vastly different ways by courts depending on what section of the ESA (or other statute, such as the Salvage Rider) triggers the lawsuit.

In the case of the marbled murrelet, this discrepancy in treatment may not pose a problem. Both courts recognized that the PSG protocol is the "generally accepted" scientific methodology to determine nesting behavior,[473] and that there is no other reliable, scientifically accepted methodology.[474] But in other situations, the disparity may result in severe contradiction. Where an agency's scientific methodology is not wholly endorsed by independent scientists, a court applying the deference doctrine would likely adopt the agency's methodology, while a court applying the *Daubert* test may well reject it. This potential exists, for example, in the Columbia River Basin, where there are several competing models for assessing juvenile salmon survival during migratory periods, and the NMFS model is sharply criticized by tribal and state biologists.[475]

Despite the foreseeable problems on the horizon, only one court has addressed the issue of whether the *Daubert* approach should be imported to the context of reviewing agencies' scientific determinations. In *Sierra Club v. Marita*, plaintiffs challenged the Forest Service's issuance of forest plans for two national forests, claiming that the agency failed to properly consider ecological principles of biodiversity.[476] The amici parties (associations of conservation scientists) suggested that the court borrow the *Daubert* test and apply it to the Forest Service's scientific

468. *Marbled Murrelet*, 880 F. Supp. 1343.

469. *Id.* at 1364–65.

470. 97 F.3d 1161 (9th Cir. 1996).

471. The case arose under section 2001 of the Rescissions Act, 109 Stat. 194, 240 (1995) (codified at 16 U.S.C. § 1611 (Supp. I 1995)), also known as the Salvage Rider. *Northwest Forest Resource Council*, 97 F.3d at 1164.

472. *Id.* at 1168.

473. *Marbled Murrelet*, 880 F. Supp. at 1350 n.15.

474. *Northwest Forest Resource Council*, 97 F.3d at 1168.

475. *See* Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995).

476. Sierra Club v. Marita, 46 F.3d 606 (7th Cir. 1995).

conclusions underlying the plan.[477] The court summarily dismissed the suggestion with no real analysis of the problem: "While such a proposal might assure better documentation of an agency's scientific decisions, we think that forcing an agency to make such a showing as a general rule is intrusive, undeferential, and not required."[478]

In sum, the agency deference principle strictly applied in section 7 review may insulate the Services from review of decisions that, while technical in nature, may nevertheless be heavily influenced by improper political considerations. While the deference principle is lodged in judicial respect for the agency's technical expertise, some considerations weigh in favor of adopting a modified deference doctrine in the section 7 context. That section requires the Service to base its jeopardy decisions on the "best scientific and commercial data available"[479]—a standard that necessarily carves out a more active role for courts than the strict agency deference doctrine would permit. In the post-*Daubert* landscape, courts are increasingly assuming the task of scrutinizing science.

While the precise contours of a modified deference doctrine in the section 7 context are not perfectly clear, a new judicial approach might have as its focus a more pluralistic analysis of agency science. Rather than swallowing wholesale agency conclusions that are technical in nature, courts may consider variations in scientific approach much as they are called upon to do in *Daubert*. Of course, it would be improper and ill-advised for courts to substitute their own ad hoc scientific judgment for that of the agency.[480] Instead, courts should develop ways of providing a check on the agency's science by looking to alternative approaches accepted by independent scientists and other agencies. This enhanced judicial role in scrutinizing agency science could be pivotal in judging section 7 determinations in the river basin context, where agency decisions may be contrary to other scientific approaches (as they are in the Columbia River Basin).

A judicial check on agency science can be accomplished in a number of ways. First, a court could retain an independent scientist to consult with the court on matters of technical agency conclusions. This is the long-standing approach of

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477. *Id.* at 621–22.

478. *Id.* at 622.

479. 16 U.S.C. § 1536(a)(2) (1994).

480. An example of this judicial error is noted in *Northwest Forest Resource Council v. Pilchuck Audubon Society*, 97 F.3d 1161 (9th Cir. 1996), where the lower court rejected the Forest Service's protocol for determining nesting behavior of marbled murrelets, and instead, remarkably, formulated its own protocol. *Id.* at 1168. The protocol accepted by the Forest Service was not only universally accepted by the scientific community and a number of federal agencies, but it was also the only reliable scientifically accepted method. *Id.* In reversing the district court, the Ninth Circuit held: "The district court erred...in failing to defer, in the face of uncertainty, to the Secretaries' interpretation, and in substituting its own judgment on a question requiring highly specialized or scientific expertise." *Id.*

the U.S. District Court of Oregon in managing the salmon treaty harvest cases.[481] Second, the court might convene its own panel of independent experts to provide assistance on technical aspects of a section 7 case. This procedural approach was innovated in the breast implant cases to enable the court to fulfill its *Daubert* gatekeeping role.[482] Third, a court might accept into evidence, and defer to, reports issued by independent scientists. In both the Columbia and Colorado River Basin settings, independent scientists have suggested approaches to river operations that differ markedly from the Services' approach.[483] Fourth, a court might look to the conclusions of other federal, tribal, or state agencies that have legal mandates requiring expertise of a sort similar to the federal agency whose action is being challenged.

Following the fourth approach, a court would accord a type of deference to these other agencies similar to that it accords the defendant agency. A modified doctrine of "shifting deference" could essentially put the various agencies on equal footing on certain scientific or technical questions,[484] and the court in a gatekeeping fashion would select the most credible methodology, much as it does pursuant to *Daubert*. This may be a particularly appealing approach for the Columbia River Basin, where another federal statute, the NPA, expressly provides a significant role for states and tribes in providing technical and scientific input on hydrosystem operations and salmon management.[485] In the context of that statute, the Ninth Circuit affirmed that the Council should accord tribal and state conclusions considerable deference in developing a salmon management plan.[486] The traditional agency deference principle, if applied in its strict form to ESA section 7 proceedings, would exclude the considerable expertise of these other agencies which offer credible scientific and technical conclusions that conflict with NMFS'

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481. Mary Christina Wood, *Tribal Management of Off-Reservation Living Resources: Regaining the Sovereign Prerogative, in* THE WAY FORWARD 34, 49–51 (Gary Meyers ed., 2d ed. 1995).

482. *See* Hall v. Baxter Healthcare Corp., 947 F. Supp. 1387, 1392–93 (D. Or. 1996) (describing procedure). The experts were appointed under FED. R. EVID. 104 pursuant to the court's inherent authority. *Hall*, 947 F. Supp. at 1392 n.8.

483. *See supra* Part II.A.5, III.B.1.

484. Obviously a court could tailor the shifting deference doctrine to the unique circumstances before it. Not all agencies might be entitled to equal footing in the realm of deference. A court could establish different gradations of deference depending on, for example, the expertise of the agency, the potential for bias, the extent to which the agency has devoted resources in studying the problem at issue, and whether the science produced by the agency represents the agency's official position on the matter.

485. Pacific Northwest Electric Power Planning and Conservation Act, 16 U.S.C. § 839b(h)(7) (1994) ("[T]he Council, in consultation with appropriate entities, shall resolve such inconsistency in the program, giving due weight to the recommendations, expertise, and legal rights and responsibilities of the federal and the region's state fish and wildlife agencies and appropriate Indian tribes.").

486. Northwest Resource Info. Ctr. v. Northwest Power Planning Council, 35 F.3d 1371 (9th Cir. 1994).

own conclusions.[487] Indeed, this concern appeared to influence Judge Marsh in his ruling overturning the NMFS' no-jeopardy opinion on the 1993 hydrosystem operations.[488] Noting that states and tribes had offered numerous recommendations to save the salmon and that such recommendations had fallen on "deaf ears" in the NMFS consultation process,[489] Judge Marsh alluded to a shifting deference approach:

> Federal defendants (NMFS) are under no legal obligation to listen and respond to salmon plans from every corner of the Northwest, but the ESA does impose substantive obligations with respect to an agency's consideration of significant information and data from well-qualified scientists such as the fisheries biologists from the states and tribes. See 16 U.S.C. section 1536 (a)(2)...(each agency "shall use the best scientific and commercial data available.").[490]

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487. *See* Marsh v. Oregon Natural Resources Council, 490 U.S. 360, 378 (1989); *supra* note 422 and accompanying text. *But see infra* note 490 and accompanying text.

488. Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995).

489. *Id.* at 899–900.

490. *Id.* at 900. No other court has yet directly addressed a shifting deference principle in the context of reviewing section 7 determinations. In 1989, the Supreme Court in *Marsh* addressed the role of other agencies' scientific conclusions in the context of NEPA, but the case in no way closes the door for a shifting deference principle in the context of section 7 ESA determinations.

In *Marsh*, the U.S. Army Corps of Engineers proposed to build three large dams in the Rogue River Basin of Oregon. *Marsh*, 490 U.S. at 363. The action agency, the Corps of Engineers, completed a Final Environmental Impact Statement ("FEIS") to fulfill its obligations under NEPA. Plaintiff citizen groups brought suit to enjoin the construction of the Elk Creek Dam on the basis that the Corps had violated NEPA by failing to supplement its FEIS in light of new information on environmental impacts contained in documents from two agencies: the Oregon Department of Fish and Wildlife (ODFW) and the U.S. Soil Conservation Service. The Court found that the Corps' determination as to whether the new information was "significant" (thereby triggering a NEPA obligation to supplement the FEIS) was a "factual dispute the resolution of which implicates substantial agency expertise," and, accordingly, extended exclusive deference to the Corps' determination. *Id.* at 376–77.

The case does not foreclose a shifting deference principle in the ESA context. First, as noted earlier, NEPA lacks the "best available scientific and commercial data" standard of the ESA—language that implicitly calls for a weighing of alternative scientific approaches. Second, the ODFW document submitted by plaintiffs did not express the official position of the state agency. *Id.* at 383. Unlike the *Idaho Department of Fish & Game* case discussed above, which involved a citizen suit against NMFS brought by a state agency, the plaintiffs in *Marsh* were private citizen groups, and, apart from the Corps, there were no other agencies party to the lawsuit; moreover, the ODFW had not taken an official position on the dam. *Id.* Accordingly, the issue in *Marsh* was strictly one of whether to give the Corps deference in its conclusions regarding the significance of new information. *Id.* at 377. The issue was not whether to give *other* agencies deference in their scientific conclusions, which would be the core issue in applying a shifting deference principle as described above.

In adopting any of these approaches, a central concern should be scrutinizing both the defendant agency's approach and any alternative approaches for inherent bias. The primary justification for modifying the deference doctrine in the first place is to expose to greater judicial scrutiny agency decisions that may be politically biased. It would defeat the purpose of the modified deference principle to simply substitute flawed agency decisions with other technical conclusions that themselves are the product of extreme bias. The Supreme Court and Ninth Circuit in *Daubert* emphasized that a primary factor in the gatekeeping role is to exclude evidence that is tainted by bias. As the Ninth Circuit explained the implementation of this factor:

> One very significant fact to be considered is whether the experts are proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying.
>
> ...[E]xperts whose findings flow from existing research are less likely to have been biased towards a particular conclusion by the promise of remuneration.[491]

Ferreting out bias is not an easy matter, but courts can look to several factors in this task. One court has recognized the potential for bias arising out of the following factors: loyalty to a company with a profit-making objective adverse to the species' interests;[492] prior remuneration for acting as an advocate for private interests opposed to the listing of the species;[493] scientific work funded by private industry;[494] input by attorneys in the drafting of scientific or technical reports;[495] and experience with the species which grew out of primary involvement with the regulated industry.[496]

Thus, just as courts must deal with the potential for bias in performing their *Daubert* role in nonadministrative actions, so should courts confront this fundamental concern in the administrative realm. This alone may do much to restore agency expertise to the exalted position it once enjoyed in the administrative law framework. Failing to do so will perpetuate an illusion of agency neutrality that, at the very least, may seriously undermine congressional mandates and, at worst, may threaten the proper functioning of the tripartite system of government.

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491. Daubert II, 43 F.3d 1311, 1317 (9th Cir. 1995).

492. Marbled Murrelet v. Pacific Lumber Co., 880 F. Supp. 1343, 1361 (N.D. Cal. 1995), *aff'd*, 83 F.3d 1060 (9th Cir. 1996), *cert. denied*, 117 S. Ct. 942 (1997) (examining the results of marbled murrelet locating surveys on private land and noting, "Pacific Lumber's bold pursuit of its intention 'to cut and grow trees' renders the objectivity of its survey results highly suspect.").

493. *Id.* at 1363.

494. *Id. at* 1364.

495. *Id.*

496. *Id.* at 1365.

B. Injunctive Relief: The Court's Role in Restoring the Normative River

If a court vaults the traditional deference doctrine in reviewing the Services' section 7 determinations, it may well conclude that ongoing operations of the river systems in the Colorado or Columbia Basin do not satisfy the strict no-jeopardy standard.[497] Restoring more natural river conditions through ESA enforcement, however, requires more than a judicial determination under section 7. It also requires structuring an appropriate judicial remedy that forces meaningful changes to status quo river operations.

In *TVA*, the Supreme Court emphasized that section 7 *commanded* appropriate injunctive relief to protect species in the face of jeopardy.[498] In that case, the Tellico Dam was "virtually completed,"[499] but its operation would have significantly reduced or extirpated the known population of a species of snail darter.[500] The Court carefully reviewed the legislative history of the ESA, finding a clear intent on the part of Congress to protect endangered species from extinction "whatever the cost." Citing a House committee report that noted "[t]he value of this genetic heritage is, quite literally, incalculable," the Court observed that "Congress was concerned...about the unforseeable place such creatures may have in the chain of life on this planet."[501] The Court found that the legislation "indicates beyond doubt that Congress intended endangered species to be afforded the highest of priorities."[502] Holding that the words of section 7 "admit of no exception," the Court nevertheless recognized the consequences of the decision:

> It may seem curious to some that the survival of a relatively small number of three-inch fish among all the countless millions of species extant would require the permanent halting of a virtually completed dam for which Congress has expended more than $100 million. The paradox is not minimized by the fact that Congress continued to appropriate large sums of public money for the project, even after congressional Appropriations Committees were apprised of its apparent impact upon the survival of the snail darter. *We conclude, however, that the explicit provisions of the Endangered Species Act require precisely that result.*[503]

The *TVA* holding quite clearly requires meaningful injunctive relief upon a showing of a violation of section 7. The Court recognized that in most circumstances "a federal judge sitting as a chancellor is not mechanically obligated to grant an injunction for every violation of law," but in the context of the ESA, the

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497. 16 U.S.C. § 1536(a)(2) (1994).

498. Tennessee Valley Auth. v. Hill, 437 U.S. 153, 173 (1978).

499. *Id.* at 156.

500. *Id.* at 159 n.7, 168. The impoundment behind the dam would have also resulted in the adverse modification or destruction of the snail darter's critical habitat. *Id.* at 165.

501. *Id.* at 178.

502. *Id.* at 174.

503. *Id.* at 172–73 (emphasis added).

statutory mandate was so clear on its face that the failure to issue an injunction would repudiate congressional intent and breach the separation of powers between the branches of government.[504] The Court later distinguished the ESA context from other statutory contexts that do not mandate injunctive relief for violations. In *Weinberger v. Romero-Barcelo,* the Court held that the federal Clean Water Act, which has a permit system offering alternative enforcement remedies (such as fines and criminal penalties) for violations, allows a court to exercise traditional discretion in balancing equities to determine whether an injunction should issue.[505] By contrast, the Court noted that the ESA contains a "flat ban," and a statutory structure that "foreclose[s] the exercise of the usual discretion possessed by a court of equity" to not issue an injunction.[506]

The words of the Court in *TVA* leave no doubt as to the necessity of meaningful injunctive relief in face of a section 7 violation.[507] The additional challenge in today's river basin context is tailoring relief to the restorative needs of the rivers.[508] The experience in the Columbia River Basin vividly demonstrates that a judicial order invalidating a biological opinion but merely remanding a case to the Service to reinitiate consultation[509] achieves little in the way of in-river protection for the fish.[510] As recognized by the court in *Idaho Department of Fish & Game,* relief for the endangered fish may require a combination of changes to

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504. *Id.* at 193–94.

505. Weinberger v. Romero-Barcelo, 456 U.S. 305 (1982). The decision has been criticized for its application of traditional discretionary equitable power in the context of public law enforcement. *See* Zygmunt J.B. Plater, *Statutory Violations and Equitable Discretion,* 70 CAL. L. REV. 524, 592–93. (1982). For a full discussion of equitable relief in the environmental law context, see Michael D. Axline, *Constitutional Implications of Injunctive Relief Against Federal Agencies in Environmental Cases,* 12 HARV. ENVTL. L. REV. 1 (1988).

506. *Weinberger,* 456 U.S. at 313.

507. *See also* Pacific Rivers Council v. Thomas, 30 F.3d 1050 (9th Cir. 1994) (holding district court erred in not enjoining salmon habitat-damaging activity upon finding section 7 consultation violation); Silver v. Babbitt, 924 F. Supp. 976, 988 (D. Ariz. 1995) (The court issued a sweeping injunction prohibiting timber harvest activities across Southwest forests, noting, "[I]n cases involving the Endangered Species Act, Congress has removed from the courts their traditional equitable discretion of balancing the parties' competing interests.").

508. *See supra* Part II.A.5 (describing the Normative River).

509. That was the result in *Idaho Department of Fish & Game v. National Marine Fisheries Service,* 850 F. Supp. 886 (D. Or. 1994), *vacated and remanded,* 56 F.3d 1071 (9th Cir. 1995). During oral argument the Idaho Department of Fish and Game surrendered any request that the court direct river operations in the interim period while renewed consultation was taking place. *Id.* at 901. Accordingly, the court directed NMFS to reinitiate consultation. *Id.* The agency did so, and NMFS issued a new biological opinion in March 1995.

510. *See supra* Part IV.E.

the river system falling in two categories: structural changes and operational changes.[511]

Structural changes are physical changes to the facilities themselves. The most drastic may be removal or bypassing of dams or other projects that offer only modest human benefits but pose lethal conditions for fish. Some public quarters are calling for selected dam removal or decommissioning in both the Columbia and Colorado River Basins.[512] Structural modifications that, short of removal,

511. *See Idaho Dep't of Fish & Game*, 850 F. Supp. at 894 ("Thus, operational changes as well as systemic or facility changes to the dams' existence may well be available."). The federal river managers adhere to this dichotomy as well in studying various river options. The U.S. Army Corps of Engineers recently completed phase two of a system configuration study designed to examine structural changes to the system. U.S. ARMY CORPS OF ENGINEERS, SYSTEM CONFIGURATION STUDY—PHASE II: LOWER SNAKE RIVER JUVENILE SALMON MIGRATION FEASIBILITY STUDY: INTERIM STATUS REPORT (1996) [hereinafter CORPS CONFIGURATION STUDY]. The Corps, along with the Bureau of Reclamation and the BPA, also completed a system operation review, which examined purely operational changes to the system to benefit salmon. *See* Blumm et al., *supra* note 26, at 73–74 & n.340; *see also* MacDonnell, *supra* note 8 (discussing structural and operational changes to Bureau of Reclamation facilities).

512. For the Columbia River Basin, see, for example, IDAHO RIVERS UNITED, *supra* note 83 (report commissioned by environmental group suggesting elimination or reconfiguration of some dams in the Columbia River Basin); Brinckman, *supra* note 119, at A1 (reporting strong support for Snake River dam removal); Brinckman, *supra* note 83, at A1 (same); Loretta Callahan, *Report Says Restoring Salmon Is Worth Costs*, COLUMBIAN, Oct. 23, 1996, at B5 (report commissioned by environmental group suggesting elimination or reconfiguration of some dams in the Columbia River Basin); Bill Crampton, *Put Dam Removal Back on the Table*, OREGONIAN (Portland, Or.), Sept. 29, 1997, at E11 (advocating serious consideration of Snake River dam removal); *Dollars, Sense & Salmon*, *supra* note 67 (regional Idaho newspaper calling for removal of the four Snake River dams); Steve Fick, *Oregon's Commercial Fishermen Lose Livelihoods While Dams Kill Salmon*, OREGONIAN (Portland, Or.), Aug. 14, 1997, at B7 (advocating Snake River dam removal); Michael Grunwald, *Some Seek to Number the Days of the Dam*, BOSTON GLOBE, Feb. 9, 1998, at A1 (reporting strong support for Snake River dam removal); Catherine Koehn, *Save the Salmon, Now!*, OREGONIAN (Portland, Or.), Aug. 13, 1997, at B9 (advocating Snake River dam removal); Murr & Begley, *supra* note 81, at E3 (reporting strong support for Snake River dam removal); *New Plan for Rescuing the Salmon*, *supra* note 161, at B8 (reporting strong support for Snake River dam removal); Vaughn Peterson, *Natural River Option Can Restore Idaho's Endangered Salmon*, IDAHO STATESMAN (Boise, Idaho), Oct. 3, 1997, at 11A (advocating Snake River dam removal); Simon, *supra* note 115, at A1 (same); *Take Out Snake Dams, Fish Advocate Says*, OREGONIAN (Portland, Or.), Feb. 20, 1997, at E9 (advocating Snake River dam removal); *When Will Idaho Leaders Acknowledge Breaching Lower Snake Dams Best for Region?*, IDAHO STATESMAN (Boise, Idaho), Nov. 2, 1997, at A18 (regional Idaho newspaper calling for removal of the four Snake River dams). *But see Interim BPA Chief Opposes Dam Removal*, IDAHO STATESMAN (Boise, Idaho), Dec. 18, 1997, at A3 (opposing Snake River dam removal); *Residents Oppose Breaching Dams*, OREGONIAN (Portland, Or.), Sept. 25, 1997, at B7 (residents of eastern Washington farm communities opposed to Snake River dam removal).

effectively mothball the project and allow resumption of natural flows, may also be feasible.[513] In some cases, lesser measures, such as improvement of fish ladders, more effective bypass systems, or dissolved gas abatement devices,[514] may greatly improve fish survival.[515]

Operational changes are of a different breed. These are changes to the day-to-day operations of the system and do not require structural modifications. Examples of operational changes include releasing more water from upstream storage reservoirs when fish are migrating (to mimic the high natural springtime flows juvenile fish depend on), spilling some water over dam spillways (which allows juvenile fish to pass the dams via the spillways rather than through the turbines), and lowering or "drawing down" the water level in reservoirs (which increases the speed of the current through the reservoirs and improves juvenile fish migration).[516]

For the Colorado Basin, see David R. Brower, *Let the River Run Through It,* SIERRA, Mar./Apr. 1997, at 42 (advocating decommissioning of Glen Canyon Dam on Colorado River and noting support by unanimous decision of the Board of Directors of the Sierra Club); Brown, *supra* note 65 (Sierra Club calling for removal of Glen Canyon Dam); Greg Hanscomb, *Reclaiming a Lost Canyon,* HIGH COUNTRY NEWS, Nov. 10, 1997, at 9 (describing efforts to dismantle Glen Canyon Dam and noting supportive newspaper editorials); H. Josef Hebert, *Sierra Club Floats the Idea of Draining Lake Powell,* OREGONIAN (Portland, Or.), Sept. 24, 1997, at A24 (Sierra Club calling for removal of Glen Canyon Dam); Ed Marston, *Drain Lake Powell? Democracy and Science Finally Come West,* HIGH COUNTRY NEWS, Nov. 10, 1997, at 1 (calling for serious consideration of merits and drawbacks of removing Glen Canyon Dam). *But see* George Sibley, *A Tale of Two Rivers: The Desert Empire and the Mountain,* HIGH COUNTRY NEWS, Nov. 10, 1997, at 8 (considering drawbacks of removing Glen Canyon Dam). For a discussion calling for dam removal generally, see Pyle, *supra* note 82 and *supra* Part II.A.5, discussing efforts to restore a natural river regime.

513. For example, the concrete portions of the four lower Snake River dams do not extend from canyon wall to canyon wall. A significant portion of each dam is comprised of earth and rock fill. Decommissioning or mothballing could be accomplished by removing these earth and rock fill portions of each dam, thus restoring a river channel that bypasses or detours around the concrete portion of the dam. The remaining concrete portion, containing the nonfunctioning turbines and navigation locks, could simply be made secure and "mothballed." The river would resume its natural elevation, flowing around the remaining portions of the dams. Power production and navigation would not occur, and the dams would pose no further impediment to migrating salmon. *See* CORPS CONFIGURATION STUDY, *supra* note 511, at ES–4 to ES–5, ES–11 to ES–12, ES–14.

514. Also known as "flip lips," these devices help reduce the amount of dissolved nitrogen gas that is entrained in water as it plunges over a dam's spillways. High levels of dissolved nitrogen gas can cause a condition known as "gas bubble disease," which is harmful or lethal to fish. Jonathan Brinkman, *Churning Up Trouble for Fish Below Dams,* OREGONIAN (Portland, Or.), Mar. 7, 1997, at B2.

515. *See* MacDonnell, *supra* note 8, at 217–19 (discussing structural changes of facilities operated by the Bureau of Reclamation).

516. *See generally* Blumm et al., *supra* note 26, at 30–34 (describing measures).

If a court finds that continued operation of water projects or dams violates section 7, the court may be presented with one of two scenarios in fashioning relief. The first is one in which the agency changes operation of the dam, or ceases operation altogether, in order to comply with section 7. In the second scenerio, merely ceasing operation of the project is not sufficient. In many cases, the mammoth projects pose such an impediment to flows and fish migration that jeopardy to the species may only be avoided by structural change to the projects themselves. Both types of remedial action raise issues with respect to the court's role in fashioning appropriate injunctive relief.

1. Structural Changes to the Projects

Assuming a court is convinced that section 7's mandate is violated by the mere existence of some of the projects in the river,[517] and that structural modifications are necessary to "insure" no jeopardy to the species, a court likely has the authority to order such relief. Indeed, there is nothing in the ESA that, on its face, precludes a court from ordering structural modifications to dams or other projects. When Congress passed the ESA, it was aware of the grave consequences water projects posed to imperiled species.[518] Its only exception to the section 7 consultation provision extended to construction activities on projects underway on November 10, 1978.[519] The U.S. District Court in *Idaho Department of Fish & Game* did not order any substantive measures, but it clearly presumed the availability of structural relief under the ESA:

> While the ESA exempts any construction projects predating November 10, 1978 from consultation requirements under § 7(a)(2), the ESA places no temporal limits on the types of actions (i.e. past or present) which may be considered by an agency in proposing "reasonable and prudent alternatives," or measures. Thus, operational changes *as well as systemic or facility changes to the dams' existence* may be available.

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517. The evidence of a section 7 violation must be clear to afford injunctive relief. In *TVA*, for example, the Supreme Court noted: "We begin with the premise that operation of the Tellico Dam will either eradicate the known population of snail darters or destroy their critical habitat." Tennessee Valley Auth. v. Hill, 437 U.S. 151, 171 (1978). There the parties did not "seriously dispute" that fact. *Id.* Now, a full 20 years after that landmark case, the Services are influenced by nonbiological concerns and may be less likely to make such clear indication of jeopardy on the record. *See supra* Part IV.D–E (discussing formulation of reasonable and prudent alternatives to avoid jeopardy).

518. *See* 16 U.S.C. § 1531(c)(2) (1994) ("Federal agencies shall cooperate with state and local agencies to resolve water issues in concert with conservation of endangered species.").

519. *Id.* § 1536(c)(1) (1994). This narrow grandfather provision covered only the construction aspects of the projects and was likely intended to protect third parties who had ongoing construction contracts with federal agencies at the time the Act was passed.

> Idaho avoids specifying...long term remedial measures...but Oregon has noted that no one in this case is seeking removal of *all dams.*[520]

Similarly, the Ninth Circuit has addressed the question of structural relief, though peripherally, in *Oregon Natural Resources Council v. Harrell*, a case arising out of the litigation surrounding the Elk Creek Dam on the Rogue River in Oregon.[521] In that case, citizen plaintiffs sought demolition of the partially completed dam or removal of the dam's spillway section in order to preserve anadromous fish runs, pending continued study by the U.S. Army Corps of Engineers to meet its obligations under NEPA.[522] Critical to the case was the fact that the Corps' underlying legal obligation pursuant to NEPA was purely procedural and short-term: to supplement earlier environmental analysis.[523] The plaintiffs' proposed remedy, on the other hand, amounted to permanent structural changes (dam demolition or removal of spillway).[524] The district court denied the plaintiffs' requested relief, and the Ninth Circuit affirmed.[525] But in so holding, the court carefully tied its decision to the short-term, procedural nature of the Corps' duties, and in no way precluded structural relief as a proper remedy in the future course of the litigation:

> [T]he remedy ONRC seeks is essentially temporary in nature: an injunction against leaving the partially-completed dam in place until completion of the decision-making process....
>
> ...[S]ince the remedy sought is removal of the dam or spillway until the decision-making process is completed, evidence that the dam will destroy habitat and possibly extirpate the fish eventually *does not compel demolition of the structure now....*
>
> ...[T]he district court was within its discretion to allow [the] Corps to address those concerns on remand *before ordering the relief requested.*[526]

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520. Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886, 893 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995) (emphasis added).

521. Oregon Natural Resources Council v. Harrell, 52 F.3d 1499 (9th Cir. 1995).

522. *Id.* at 1500. The protracted litigation history of the case is summarized in *Harrell*, 52 F.3d at 1501 n.1. It includes a decision by the Supreme Court, *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 378 (1989), discussed *supra* note 490.

523. *Harrell*, 52 F.3d at 1507–08.

524. *Id.*

525. *Id.* at 1508–09.

526. *Id.* (emphasis added). The court did, however, refer elsewhere to the proposed relief as an "extraordinary remedy." *Id.* at 1509. Subsequent to the court's ruling in *Harrell*, the U.S. Army Corps of Engineers voluntarily recommended breaching the existing dam structure to eliminate adverse environmental effects from the project. *See* Hearing on Proposal to Provide Fish Passage Through the Elk Creek Dam in Jackson County, Or., Before the House Comm. on Agric., Medford, Or. (Nov. 13, 1997) (on file

An ESA section 7 violation contrasts considerably with the NEPA statutory setting in *Oregon Natural Resources Council v. Harrell*.[527] NEPA is primarily a procedural statute, and the agency fulfills its statutory obligations by complying with its mandate to study environmental consequences of proposed actions.[528] As emphasized in *Harrell*, the agency presumably would fulfill its statutory obligations in the short-term by completing the required analysis. NEPA does not require that the action agency reach a decision that is environmentally benign.[529] By contrast, section 7 establishes a clear mandate, forcefully interpreted by the Supreme Court, that action agencies "insure" that their actions not jeopardize listed species.[530] When a project is found to violate that mandate, there is no short-term procedural action an agency can take to achieve compliance (short of the exemption procedure discussed below).[531] Therefore, in contrast to relief under NEPA, which is by its very nature interim relief, the relief in the ESA context is necessarily permanent. Accordingly, those considerations that caused the court to stay its equitable hand in *Harrell* would not be present in the ESA section 7 context.

While dam retirement or structural modifications may seem far-reaching to those accustomed to such projects as part of the status quo, in fact, dams have limited life spans, as acknowledged in a report issued by the National Research Council on the Columbia River system.[532] The report states, "Although dams are seemingly permanent (albeit recent) features of the Northwest riverine environment, like all artificial structures, they have a finite engineering and economic life expectancy."[533] One significant limiting factor is sedimentation, which accumulates behind the structure and decreases the reservoir capacity over time.[534] This is particularly true with dams on the Colorado River, which, in its natural travail, deposits huge amounts of sediment.[535]

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with author) (statement of Wendell Wood, Southern Or. Field Representative, Oregon Natural Resources Council, in support of breaching the dam); *see also A Dead Dam*, REGISTER-GUARD (Eugene, Or.), Nov. 8, 1995, at A14.

527. 52 F.3d 1499 (9th Cir. 1995).

528. 42. U.S.C. § 4332(2)(C) (1994 & Supp. 1 1995).

529. Marsh v. Oregon Natural Resources Council, 490 U.S. 360, 371 (1989).

530. Tennessee Valley Auth. v. Hill, 437 U.S. 153, 173 (1978).

531. *See infra* notes 565–73 and accompanying text (discussing exemption procedure).

532. Committee on Protection and Management of Pacific Northwest Anadromous Salmonids, National Research Council, Upstream: Salmon and Society in the Pacific Northwest (1995) (prepublication copy on file with author).

533. *Id.* at 211–12.

534. The report notes:

> [D]ams trap sediment, which significantly reduces their active storage capacity and economic value. Although sedimentation in most Columbia River reservoirs is minor compared to dams on rivers elsewhere, which carry higher sediment loads under natural conditions, the economic life of all reservoirs is ultimately affected by sedimentation. A number of

Dam removal or dismantlement has become a "feasible strategy for river restoration."[536] Secretary of Interior Bruce Babbitt announced early in his term a desire to restore river ecosystems by dismantling dams that cause severe environmental damage and for which alternatives are available to meet human consumptive and economic needs.[537] In the Pacific Northwest, the U.S. Army Corps of Engineers has studied selective dam removal as one option in river management to comply with its obligations under the ESA and other statutes.[538] During the summer of 1997, dam removal along the Snake River gained widespread press attention and support on editorial pages in regional newspapers.[539] Elsewhere, smaller dams are being dismantled to restore fisheries.[540]

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older, low dams elsewhere in the U.S. (notably in the East and Midwest) have been removed because of sedimentation.

Id. at 212; *see also* Pyle, *supra* note 82, at 100 n.14 (citing another National Research Council Report, which concludes that concrete dams have a finite life span "because concrete inevitably erodes in fifty to one hundred years and because sediment eventually fills up the reservoir"). Other rationales for dam removal include obsolescence, increased maintenance costs, and threat of collapse. *See id.* at 100–01.

535. *See* Brower, *supra* note 512, at 43 (arguing for removal of Glen Canyon dam, noting that "[a]s [Lake] Powell rises, fills with sediment, and spreads out across the landscape (it peaked at 88 percent of capacity last year) the [water] losses will be even larger").

536. Pyle, *supra* note 82, at 98 (discussing ongoing dam removal efforts).

537. James Gerstenzang, *Babbitt Hammers into History, Slamming North Carolina Dam,* IDAHO STATESMAN (Boise, Idaho), Dec. 18, 1997, at 14A; Melissa Healy, *Babbitt's Dam Dream is Damned by Critics,* REGISTER–GUARD (Eugene, Or.), Apr. 3, 1994, at A1 (Secretary Babbitt calling for removal of two dams on the Elwha River in Washington).

538. CORPS CONFIGURATION STUDY, *supra* note 511. In its feasibility study, the Corps has examined three drawdown alternatives for the lower four Snake River dams: (1) seasonal, near spillway crest drawdown; (2) seasonal, near natural river drawdown; and (3) permanent, near natural river drawdown. *Id.* at ES–4. The latter would, essentially, amount to dam removal or decommissioning. Each alternative was judged against five criteria: (1) technical feasibility; (2) biological effectiveness; (3) other environmental effects; (4) cost effectiveness; and (5) regional acceptability. *Id.* at ES–5 to ES–6. Concluding that the natural drawdown alternatives (alternatives 2 and 3 above) provided the maximum benefit for juvenile salmon passage, the Corps eliminated the first alternative (seasonal spillway crest drawdown) from further consideration. *Id.* at ES–12. Of the remaining two, the Corps eliminated the seasonal natural river option (alternative 2) from further consideration because of its long implementation time (15 years), adverse environmental impacts expected during that time, and high costs of implementation ($3.588 billion). *Id.* The Corps selected the permanent natural river option (decommissioning, alternative 3) for further study, citing its relatively low construction costs ($533 million, which is one-sixth the cost of the seasonal natural river option), and its short implementation time (five years). *Id.* at ES–12, ES–14. However, the Corps also recommended continued study of artificial transportation options. *Id.* at ES–15.

539. *See supra* note 512.

540. Congress has authorized removal of two dams on the Elwha River in Washington State, which historically provided ideal habitat for salmon. Elwha River

Dismissed as radical just a few years ago,[541] the notion of dam removal has now "entered the political mainstream" as a viable alternative to status quo river management.[542]

Nevertheless, at least four concerns arise with respect to fashioning the structural relief associated with dam removal or decommissioning. The first is primarily technical. Unlike an injunction halting final construction of a dam (as in *TVA*),[543] an injunction ordering structural relief must be predicated on complex technical analysis that courts lack the expertise to develop. A court will not be inclined to order structural changes until technical feasibility and environmental analyses have been completed by the appropriate agencies. Indeed, the Ninth Circuit in *Harrell* noted its concern that the dam removal requested by the plaintiffs would likely have environmental consequences that had not yet been studied.[544] To overcome this problem, a court could embark on structural relief by ordering the appropriate agencies to accomplish predicate steps, such as preparing studies, technical plans, and seeking funding from Congress—all within strict time frames. Where an agency has already developed the necessary plans and the court finds that such relief is essential for the protection of the species, a court could order the implementation of such plans.[545]

Ecosystem and Fisheries Restoration Act, Pub. L. No. 102–495, 106 Stat. 3173 (1992); *see* Pyle, *supra* note 82, at 121–22. For other dam removal efforts, see *A Dead Dam, supra* note 526, at A14 (U.S. Army Corps of Engineers abandons completion plans for Elk Creek Dam on Rogue River, Oregon); Richard Cockle, *Dam Removal Will Enhance Fish Runs,* OREGONIAN (Portland, Or.), Apr. 4, 1997, at B6 (Marie Dorion Dam in eastern Oregon removed); Gerstenzang, *supra* note 537, at 14A (Quaker Neck Dam in North Carolina dismantled); Carey Goldberg, *Fish Are Victorious over Dam as U.S. Agency Orders Shutdown,* N.Y. TIMES, Nov. 26, 1997, at A16 (FERC denies relicensing and orders removal of Edwards Dam on Kennebec River in Maine); Cheryl Martinis, *State Tells District to Step Up Plans to Remove Rogue Dam,* OREGONIAN (Portland, Or.), Oct. 3, 1997, at D8 (plans to remove Savage Rapids Dam on Rogue River, Oregon); Murr & Begley, *supra* note 81, at E3 (predicting demolition of dozens of small aging dams in Oregon and Washington); Reisner, supra note 88, at 1 (three dams on Butte Creek, California dismantled); *Utility Considers Removing Dam as Cost to Protect Fisheries Escalates,* IDAHO STATESMAN (Boise, Idaho), Feb. 16, 1998, at A7 (owner considers removing Condit Dam on White Salmon River, Washington).

541. *See* Brinckman, *supra* note 83, at A1; Reisner, *supra* note 88, at 1 (noting past attitudes towards dam removal).

542. Pyle, *supra* note 82, at 98; *see also* Reisner, *supra* note 88, at 1 (noting "dam deconstruction has acquired serious momentum in California"); *supra* note 512.

543. *See supra* notes 498–503 and accompanying text.

544. Oregon Natural Resources Council v. Harrell, 52 F.3d 1499, 1509 (9th Cir. 1995).

545. For example, the U.S. Army Corps of Engineers is in the process of studying the feasibility of removing four dams on the Snake River in the Columbia River Basin. *See supra* note 538; *see also* Pyle, *supra* note 82, at 107–11 (discussing engineering aspects of dam removal generally).

The second concern, one likely to be raised by the river operators, is that the projects were authorized by Congress and that a court's injunction ordering removal would violate congressional intent.[546] The Court in *TVA* faced similar arguments raised by the Tennessee Valley Authority.[547] There, Congress had continued to appropriate millions of dollars for the completion of the dam despite repeated status reports that the dam, if operated, would jeopardize the species.[548] Yet the Court held in no uncertain terms that the duty of the action agency was first and foremost to comply with the clear mandates of section 7 of the ESA:

> [T]he legislative history undergirding section 7 reveals an explicit congressional decision to require agencies to afford first priority to the declared national policy of saving endangered species. The [legislative history] reveals a conscious decision by Congress to give endangered species priority over the "primary missions" of federal agencies.[549]

A third concern is that the river operators may lack immediate congressional appropriations to implement a court order requiring structural changes. Removal costs are likely to soar into the millions of dollars. For example, initial capital costs for removing the two Elwha dams in Washington are estimated to exceed sixty-four million dollars.[550] But while the lack of available funds is a persistent problem in administering federal statutes, it is not a categorical defense for failure to comply with a nondiscretionary statutory duty. Courts have rejected such excuses in the context of other nondiscretionary duties under the ESA. Illustrative is the case of *Marbled Murrelet v. Babbitt.*

In that case, the USFWS was under a court order to designate critical habitat for the threatened marbled murrelet.[551] Subsequent to the court's order,

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546. This argument is likely to be raised with respect to a judicial order calling for operational changes as well. *See infra* Part V.B.2.

547. Tennessee Valley Auth. v. Hill, 47 U.S. 153 (1978).

548. *Id.* at 162–71.

549. *Id.* at 185. For discussion of the *TVA* opinion in the context of Columbia River Basin operations, see Noonan, *supra* note 80, at 789. While appropriations for dams do not pose a barrier to a court's award of structural relief, in the private dam context, another law has force and effect. The Federal Energy Regulatory Commission is restricted by a provision in the Federal Power Act that limits options for ordering dam removal during the license term. *See* Pyle, *supra* note 82, at 125. Nevertheless, the agency may have condemnation power available to it during the license term. *Id.* at 126. The agency claims authority to order dam removal upon expiration of the FERC license, which typically lasts for a period of 50 years. *Id.* at 128, 130–31.

550. *See* Pyle, *supra* note 82, at 111. Congress appropriated money for initial planning for removal of the Elwha dams. *Id.* at 121. The Corps estimates that decommissioning of the lower four Snake River dams would cost $533 million. CORPS CONFIGURATION STUDY, *supra* note 511, at ES–12. This option is, however, far cheaper than the alternative of seasonal natural river drawdown, which would cost $3.588 billion. *See supra* note 538.

551. Marbled Murrelet v. Babbitt, 918 F. Supp. 318, 319–20 (W.D. Wash. 1996).

Congress passed an appropriations rider that rescinded 1.5 million dollars of agency funds and prohibited the use of remaining funds for making final listing or critical habitat decisions; the rider, however, allowed expenditures to comply with pending court orders as long as the massive funding recission did not make the listing or critical habitat determination "impracticable."[552] The USFWS moved to vacate the court's earlier order, arguing that the agency's decreased funding made it "impracticable" to designate critical habitat.[553] The court rejected the agency's arguments and found "extremely troubling" a decision by the agency to spend available funds on unspecified other projects. The court stated: "[The acting director] has apparently made a discretionary choice to spend available funds on other agency projects, deliberately ignoring the pending order in this case. This is not an acceptable way of setting priorities, nor does it establish anything but unwillingness to comply with this court's order."[554] The court also "carefully examined" the agency's proffer of expenses required to complete the critical habitat designation and found that the primary expenditures were for staff time and overhead, noting, "[p]resumably these costs would be incurred even if the court were to vacate its order; they would simply be shifted to another agency activity."[555] Finally, in response to the agency's argument that more costly studies would be necessary before designating critical habitat, the court simply stated: "Federal defendants are not at liberty to continue indefinitely studying all of the myriad factors and weighing all of the complex ramifications of designating critical habitat."[556]

The opinion illustrates well an aggressive judicial approach towards this line of argument.[557] Indeed, such a strict judicial approach is necessary, because in

552. Emergency Supplemental Appropriations and Rescissions for the Department of Defense to Preserve and Enhance Military Readiness Act, Pub. L. No. 104–6, 109 Stat. 73, 86 (1995); *see Marbled Murrelet*, 918 F. Supp. at 320.

553. *Marbled Murrelet*, 918 F. Supp. at 321.

554. *Id.*; *see also* Friends of the Wild Swan, Inc. v. United States Fish & Wildlife Serv., 945 F. Supp. 1388, 1401 (D. Or. 1996) (requiring USFWS to make listing determination for bull trout, and rejecting agency's argument that such a listing decision did not fit into the agency's "current funding priorities").

555. *Marbled Murrelet*, 918 F. Supp. at 322.

556. *Id.*

557. Where the agency, however, is expressly precluded from spending funds on specified activities, courts have made some allowance for delay. For example, the congressional rider at issue in *Marbled Murrelet* prohibited spending remaining funds on listing or critical habitat decisions that were not subject to an ongoing court order. Pub. L. No. 104–6, 109 Stat. at 86; *see also Marbled Murrelet*, 918 F. Supp. at 320 (quoting legislation). In *Environmental Defense Center v. Babbitt*, 73 F.3d 867 (9th Cir. 1995), the court found that, while the rider did not remove the statutory duty to comply with the listing and critical habitat provisions of the ESA, it "necessarily restrict[ed] the Secretary's ability to comply with [these duties] by denying him funding," and thus compliance with the ESA was justifiably delayed "until a reasonable time after appropriated funds are made available." *Id.* at 871–72; *see also* Oregon Natural Resources Council v. Brown, No. 95–3117 (N.D. Cal. March 18, 1996) (order granting partial summary judgment) (following

nearly every conceivable circumstance an agency could raise the appropriations argument to defend its noncompliance with a mandatory duty. The blanket acceptance of such defenses will create, in effect, immunity from statutory obligations and blur the line between the separate powers of government.[558]

The fourth, and perhaps overriding, concern with ordering structural changes in water projects and dams is the claimed drastic economic and social consequences associated with such relief. Dams and water projects provide a range of public services, and their retirement or modification will inevitably result in a reallocation of economic burdens and benefits.[559] Traditionally, courts have had discretion to balance equities and hardships in deciding whether to issue an injunction,[560] though less so in the arena of public law enforcement.[561] In *TVA*, the district court took into account the cost of the dam and the extent to which it was completed in determining that an injunction should not issue.[562] Similarly, in any section 7 enforcement action in the river basin context, federal river operators and private river interests are likely to claim economic hardship and public losses in resisting injunctive relief that would force structural changes to the projects.[563]

The Supreme Court's opinion in *TVA*, however, shuts the door on any such weighing of interests by the court. The Court specifically held that the judiciary lacks the discretion to balance public harms against the loss of species in determining whether an injunction should issue:

> One might [say] that in this case the burden on the public through the loss of millions of unrecoverable dollars would greatly outweigh the loss of the snail darter. But neither the Endangered Species Act nor Art. III. of the Constitution provides federal courts with authority to make such fine utilitarian calculations. On the contrary, the plain language of the Act, buttressed by its legislative history, shows clearly that Congress viewed the value of endangered species as "incalculable." Quite obviously, it would be difficult for a court

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Environmental Defense Center and requiring USFWS to submit timetable to court within 30 days after agency funds are appropriated for issuing proposed rule to list steelhead trout).

558. *See* Tennessee Valley Auth. v. Hill, 437 U.S. 153, 194 (1978) (stating a court's failure to provide injunctive remedies for clear statutory violations threatens the separation of powers between the three branches). Nevertheless, a court must tailor its relief to the actual financial circumstances an agency faces. Necessary appropriations for dam removal might reach such an order of magnitude that the court must order preliminary steps that the agency can take, such as seeking requisite funds from Congress.

559. *See* Brinckman, *supra* note 83, at A1 (examining costs and benefits of dam removal in Columbia River Basin).

560. *Tennessee Valley Auth.*, 437 U.S. at 194.

561. Axline, *supra* note 505, at 1.

562. *Tennessee Valley Auth.*, 437 U.S. at 166 (summarizing district court opinion).

563. This is particularly true since the *Bennett* ruling, which gives plaintiffs with purely economic interests standing to challenge section 7 determinations in the endangered rivers context. Bennett v. Spear, 117 S. Ct. 1154 (1997).

> to balance the loss of a sum certain—even $100 million—against a congressionally declared 'incalculable' value, even assuming we had the power to engage in such a weighing process, which we emphatically do not.[564]

Later congressional amendments to the Act strongly reinforce the Court's conclusion that balancing economic interests against the value of the species is not the province of the judiciary. In 1978, Congress created a special committee authorized to grant exemptions from section 7's requirements.[565] The "Endangered Species Committee," otherwise known as the "God Squad," is comprised of high-ranking officials in the executive branch.[566] The Committee reviews the merits of the exemption application based on a detailed report submitted by the Secretary of Interior after hearings conducted in accordance with the procedures of the Administrative Procedures Act ("APA").[567] The Committee "shall" grant an exemption from section 7's provisions if it determines that (1) there are no reasonable and prudent alternatives to the agency's proposed action; (2) the benefits of such action clearly outweigh the benefits of alternative courses of action consistent with conserving the species or its critical habitat, and such action is in the public interest; (3) the action is of regional or national significance; and (4) the agency did not make any "irreversible or irretrievable commitments of resources" during consultation.[568] The decision of the Committee is a final agency action under the APA and is subject to judicial review in the court of appeals.[569]

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564. *Tennessee Valley Auth.*, 437 U.S. at 187–88. Later the Court reiterated the point:

> Here we are urged to view the Endangered Species Act "reasonably," and hence shape a remedy "that accords with some modicum of common sense and the public weal." But is that our function? We have no expert knowledge on the subject of endangered species, much less do we have a mandate from the people to strike a balance of equities on the side of the Tellico Dam. Congress has spoken in the plainest of words, making it abundantly clear that the balance has been struck in favor of affording endangered species the highest of priorities...."

Id. at 194 (citation omitted).

565. 16 U.S.C. § 1536(e)–(k) (1994). For discussion, see Note, *The Exemption Process Under the Endangered Species Act: How the "God Squad" Works and Why*, 66 NOTRE DAME L. REV. 825, 843–44 (1991) [hereinafter *Exemption Process*]. The exemption provisions establish a detailed scheme that has been little used. *See* Houck, *supra* note 320, at 339–44.

566. 16 U.S.C. § 1536(e)(3) (Committee members include Secretary of Agriculture, Secretary of Army, Chairman of the Council of Economic Advisors, Administrator of the Environmental Protection Agency, Secretary of Interior, Administrator of the National Oceanic and Atmospheric Administration, and an appointed individual from the affected state).

567. *Id.* § 1536(g).

568. *Id.* § 1536(h)(1)(A)(i–iv).

569. *Id.* § 1536(n) (1994).

The exemption provision was intended to serve as a statutory release valve to avoid unreasonable consequences resulting from the strict section 7 provision (in view of the Supreme Court's grant of injunctive relief to halt construction of the Tellico dam).[570] It is a process of last resort for federal agencies faced with severe consequences from ESA enforcement.[571] The enactment of this provision makes clear that Congress was aware of the potential for far-reaching judicial relief, but rather than dilute the firm mandate of section 7 or restrict the judiciary's equitable powers, Congress provided a process for assessing the merits of offending projects at the highest policy level.[572] The appeal of such a process is that it relieves the courts of the duty to weigh the costs and benefits of proposed federal actions against the interest of conserving species and instead vests that function in a committee of department heads of many of the agencies involved in natural resource management in this country.[573]

In sum, there is nothing on the face of the ESA that precludes structural remedies to projects that do not meet the section 7 standard. Indeed, the Supreme Court in *TVA v. Hill* faced such a situation and affirmed the power and duty of the judiciary to enforce section 7's plain requirements through injunctive relief. The presence of an elaborate exemption provision in the ESA reflects Congress' understanding that enforcement of section 7 may be severe. Thus, the appropriate

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570. *See Exemption Process*, *supra* note 565, at 843–44 ("Congress chose not to gut the ESA [but] instead it introduced flexibility into the Act by way of an exemption process.").

571. The exemption provision is described as follows:

> The 1978 Amendments, by adding the exemption process, lessened the strict mandate of the 1973 Act, but they did not diminish Congress' strong desire to protect endangered and threatened species. Instead of weakening the language of the ESA, which was the backbone of the Supreme Court's interpretation in *TVA v. Hill*, Congress added a limited exemption process to be used only after the normal consultation process failed.... By requiring an exemption applicant to follow all of the consultation procedures and to avoid any conflicts between species preservation and the proposed agency project, *Congress showed that it only wanted the exemption process used as a last ditch solution in the most difficult cases.*

Id. at 845 (emphasis added) (footnote omitted).

572. *See id.* at 848–49 ("The exemption process, as drafted in 1978, showed Congress remained serious about the preservation issue.... The limited nature of the exemption process only allows 'balancing' to settle very difficult cases that cannot be resolved using all of the regular means of the ESA.").

573. The danger in such a process is, of course, undue political influence by powerful political appointees. Indeed, the spotted owl exemption proceedings were tainted by politically driven behavior on the part of Secretary of Interior Lujan. *See* Houck, *supra* note 320, at 339–44. Congress had attempted to immunize the process from such undue political influence by mandating that the exemption proceedings be conducted as a formal adjudicatory hearing under the ESA. *See id.* The success of that process in the context of the spotted owl hearings is questionable. *See id.*

remedy is not to impose an implicit restriction on the judicial ability to fashion injunctive relief, but to invoke the process Congress established in the Act itself.

2. Operational Changes in the River System

The second type of relief a court might order is in the nature of operational changes to the river system. In the Columbia River Basin, for example, the tribes and environmental groups have formulated immediate measures, short of dam removal, that would benefit fish migration in the short-term.[574] These immediate operational changes, coupled with interim predicate steps to long-term structural changes, may effectively set the groundwork for necessary reconfiguration of the system. While operational changes are well within the court's authority to order and typically do not require the massive appropriations needed for structural changes, operational changes pose a different difficulty for the court. Operational changes necessarily involve the day-to-day workings of an enormously complex system. A court has neither the expertise nor the resources to engage in the detailed management of huge river systems. Accordingly, courts have expressed reluctance at awarding injunctive relief of this sort. In *Idaho Department of Fish & Game*, for example, Judge Marsh explained the court's decision not to award preliminary injunctive relief in an earlier case brought by plaintiff citizen groups and tribes to halt the early spring juvenile salmon barging program: "[A]ny injunction against transportation would immediately necessitate some form of replacement system management—such as an improved spill program—and [I] found that this was a particularly inappropriate task for the federal judiciary."[575] In a later stage of that case, he again rejected the plaintiff's request for an injunction against barging "in order to avoid judicial micromanagement of the Columbia River power system."[576] Other judges have lamented the role of "fish master" or "prison master" that some in the judiciary have assumed in order to implement injunctive relief that provides specific operational remedies in complex systems.[577] The remedy generally preferred by the judiciary is to remand a section 7 ESA case back to the agencies for reinitiation of consultation as was done in *Idaho Department of Fish & Game*.[578]

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574. *See* IDAHO RIVERS UNITED ET AL., 1997 SALMON AND STEELHEAD MIGRATION OPERATING PLAN FOR THE SNAKE AND COLUMBIA RIVERS AND FEDERAL DAMS (on file with author) (setting forth measures pertaining to flow targets, flow augmentation, spill, juvenile transportation, turbine operations, temperature, and reservoir levels); *see also* TRIBES' RECOVERY PLAN, *supra* note 52, at 5B–28 to 5B–30 (setting forth interim operating measures).

575. Idaho Dep't of Fish & Game v. National Marine Fisheries Serv., 850 F. Supp. 886, 889 (D. Or. 1994), *vacated and remanded*, 56 F.3d 1071 (9th Cir. 1995).

576. *Id.* at 889.

577. Natural Resources Defense Council v. Hodel, 624 F. Supp. 1045, 1062 (D. Nev. 1985).

578. *See Idaho Dep't of Fish & Game*, 850 F. Supp. at 901. While the Idaho Department of Fish and Game sought an order enjoining the U.S. Army Corps of Engineers and Bureau of Reclamation "from continuing to operate the [hydrosystem] in a manner that

But while a procedural remand may be the preferred approach from a judicial standpoint, such a remedy consumes time precious to the existence of the species at issue. Only the swift relief afforded by an injunction may prevent irrevocable losses. The imminence of extinction presents a challenge for courts to devise meaningful injunctive relief that incorporates immediate operational changes.

One promising approach is for the court to devise a supervised, negotiated remedy process involving the Service and multiple agencies.[579] In the Columbia River Basin, where there are at least two other viable plans for recovering salmon, a court could order the Service to consider these plans in consultation with the tribes and states, as well as the action agencies. As discussed in Part III.B.1, the tribes have developed a detailed recovery plan that addresses day-to-day operations of the hydrosystem.[580] Under a supervised, negotiated remedy scenerio, the court could direct implementation of portions of the plan as an interim measure, unless the Service demonstrated that the plan would not offer more protection for salmon than the current reasonable and prudent alternatives fashioned under the ESA.

A final negotiated remedy arrived at by the various parties could be formulated into a consent decree, subject to the continuing jurisdiction of the court. Experience with Columbia River Basin salmon harvest management offers precedent for this approach. The Columbia River harvest allocation scheme, which derives from the landmark treaty fishing case, *United States v. Oregon*,[581] provides a model comanagement framework in which multiple state and tribal governments implement a judicial mandate in a complex natural setting. The court maintains a continuing role in supervising the scheme,[582] which ensures that the process maintains more integrity than it would if left to the political processes of the basin. The participation of several state, tribal, and federal agencies allows for a pluralistic approach to scientific determinations.

The negotiated remedy approach offers three advantages. First, without involving the court in the detailed work of crafting a remedy, it brings a judicial structure to an ESA process that has likely given way to political pressures in the past. A court can set firm mandates establishing recovery levels and mile posts for projected tasks. Second, it brings into the process other agencies with expertise in natural resource management. This is particularly crucial in the Columbia River Basin, where states and tribes play an important role in fish management and have developed credible plans for fish recovery pursuant to their authority under another federal statute and a court decree.[583] It is, of course, less of an advantage in the

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jeopardize[d] the listed Snake River salmon," it dropped the request during oral argument, agreeing that the court "should not direct river operations in the interim pending completion of consultations." *Id.*

579. A pressing question inherent in such an approach is whether citizen groups would also have standing in the remedy process.

580. *See supra* notes 218–22 and accompanying text (describing Tribal Plan).

581. 699 F. Supp. 1456, 1459 (D. Or. 1988).

582. *Id.*

583. *See supra* Part III.B.1.

Colorado Basin where no other agencies have developed independent plans for endangered fish recovery. Third, the court can maintain continuing jurisdiction over the remedy, which makes it more likely that it will be enforced. In sum, while the operational dimensions of a judicial remedy are complex and cumbersome, a negotiated remedy process offers potential to carry out section 7's strict mandate where the underlying administrative processes have given way to improper concerns.

VI. CONCLUSION

In the final analysis, the ESA is designed to force a necessary, but difficult, transition. The focus on endangered species and their ecosystems necessarily creates renewed attention to the Aboriginal River conditions as they once existed in the basins just three human generations ago. Those conditions, over millennia, shaped and perfected the species' survival behavior that struggles to endure today. In that sense, the ESA inevitably pits the current Endangered River against the Developed River, because restoring a more natural, sustainable river ecosystem will entail undoing some of the "progress" of the past, reallocating economic benefits from river operations, and trimming some of the human excesses encouraged by the water projects.

In an endeavor to explore challenges of ESA application to endangered river ecosystems, this Article has set forth comparative case studies of ESA implementation in two of the most endangered basins of the West—the Colorado and the Columbia. The comparison illuminates an entrenched mindset on the part of the Services and the river operating agencies regarding all of the projects and their complex accouterments as intractable. The implementation of the ESA in both basins has suffered from an unwillingness to force changes to the Developed River, despite section 7's strong mandate calling upon federal agencies to "insure" that their actions are not likely to jeopardize the continued existence of species. In both basins, the political resistance to change has seriously infected the context in which the ESA must be applied. Unfortunately, the ideal of neutral scientific objectivity underlying the considerable discretion granted to the agencies in section 7 may be impossible to attain in the charged political climate surrounding natural resource issues in both the Colorado and Columbia River Basins. The outcome of ESA administration in both basins has been the dramatic decline of the formerly dominant species.

In both basins, there is promise on a scientific and technical level for restoring a Normative River that would reclaim the vital natural conditions of the Aboriginal River without sacrificing the human benefits of the Developed River. Whether the ESA, with its focus on recovery of species and ecosystems, will force a transition to the Normative River remains to be seen. This Article has suggested an enhanced role for courts in applying section 7 to allow such a paradigm shift.

But judicial enforcement of the ESA faces significant hurdles in river basin settings. The doctrine of deference to agencies, if applied in its strict form, would largely insulate the Services' section 7 determinations from effective

judicial review, due in large part to the complexity of the river operations and scientific uncertainty surrounding the survival of species. To surmount this problem, this Article has suggested that courts adopt a modified deference principle in which courts examine agency scientific conclusions for bias and, if appropriate, accord a degree of deference to other agencies with relevant jurisdiction under a "shifting deference" principle. In the Columbia River Basin, application of this principle may allow for a more pluralistic approach to salmon recovery by providing a role in the ESA process for credible salmon recovery plans developed by tribal and state agencies.

At the remedy stage of an ESA enforcement action in the river basin context, the courts face an additional set of problems posed by the nature of required relief. Courts may be called upon to order structural and operational changes in the river system. While the former is often considered a drastic measure, this Article has suggested that it is within the court's authority and, arguably in some circumstances, a requisite application of the court's equitable powers as interpreted by the Supreme Court in *TVA*. The ESA itself, through its exemption provision, provides a safety valve for relief from any unacceptable consequences of judicially enforced statutory mandates. With respect to operational changes in the river system, while the task poses daunting administrative complexities for a court, a negotiated remedy process provides a solution already tested successfully in the Columbia River Basin salmon harvest management context.

Ideally, the ESA would be rigorously applied by the agencies charged with its implementation, but in reality judicial intervention to enforce the statute will likely be as necessary in the river basin context as it has been in the myriad of other contexts in which the ESA applies. A compelling rationale for judicial enforcement of section 7 in the Colorado and Columbia River Basins is the prospect of swift relief to stave off the imminence of pending extinctions of the dominant fish species in both basins.

The finality and sweeping reach of such extinctions forces a sobering reflection on the brief time it has taken the water projects to mortally threaten ages-old species. Native fish species have survived for three million years in the Colorado Basin and for five million years in the Columbia Basin. Both face perhaps their last five to ten years on earth.[584] Most of the water projects are less than half a century old, yet are perceived "so monumental as to seem immovable, so permanent as to make us prisoners of our own logic."[585]

Achieving a transition to Normative River systems in basins across the country will require a vision every bit as bold as the vision that inspired Lewis and Clark and John Wesley Powell on their treacherous journeys down the aboriginal waters of the Columbia and Colorado Rivers. Such a vision must necessarily look back in time to find directions for the future. The rivers themselves inspire a vision that captures the experience of a far distant past: "If the sawing of the Colorado

584. *See supra* notes 92–94 and accompanying text.

585. DIETRICH, *supra* note 29, at 399.

into the depths of the Grand Canyon reminds us of the planet's age, the Columbia's course through a geologically young landscape reminds us how many times the earth has remade itself."[586] Viewed in this light, the transition back to more natural conditions appears within the Rivers' reach.

586. *Id.* at 46.