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# Keeping Power in Charge: Federal Hydropower and the Downstream Environment

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**Keeping Power in Charge: Federal Hydropower and the  
Downstream Environment**

**Reed D. Benson\***

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*What those northern rivers, the Missouri and the Columbia, were still struggling toward, the Colorado had become—a part of nature that had died and been reborn as money.<sup>1</sup>*

## I. INTRODUCTION

Federal water policy for the western United States has been through many changes over the past century, but at least one aspect has remained much the same: hydropower is a top priority. Since the 1920s, the federal government has consistently supported hydropower development and generation, both in building and operating its own water projects for this purpose and in licensing non-federal hydropower facilities. So important was hydropower that the federal government sometimes chose to license or build a project over the determined opposition of a State,<sup>2</sup> despite the usual rhetoric about federal deference to the western States in water management.<sup>3</sup> Large reservoirs built for hydropower and other purposes came to dominate several major river systems in the West, including the Columbia, Snake, Missouri, and Colorado. As they lost their free-flowing character to dams that generated a stream of hydropower revenues, these rivers—in the words of historian Donald Worster—essentially died and were reborn as money.

Later in the 20<sup>th</sup> century, Congress began to show greater concern for fish and wildlife, enacting statutes that seemed to give new weight to the needs of fish and wildlife affected by water development and management activities. These laws, and the public values that led to their enactment, helped bring an end to the era of major dam construction by

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1. DONALD WORSTER, *RIVERS OF EMPIRE: WATER, ARIDITY, AND THE GROWTH OF THE AMERICAN WEST* 276 (1985).

2. *Okla. ex rel. Phillips v. Guy F. Atkinson Co.*, 313 U.S. 508 (1941) (rejecting Oklahoma's arguments against the Corps' Denison Dam, many of which were focused on their hydropower aspect of the project); *Fed. Power Comm'n v. Oregon*, 349 U.S. 435 (1955) (rejecting Oregon's challenge to a federal license for a non-federal hydropower project on an important salmon-bearing river).

3. Reed D. Benson, *Deflating the Deference Myth: National Interests vs. State Authority under Federal Laws Affecting Water Use*, 2006 UTAH L. REV. 241 (contending that deference arguments are partly true, but largely myth).

the federal government.<sup>4</sup> With the notable exception of the Endangered Species Act (ESA),<sup>5</sup> however, these laws protecting fish and wildlife have had little to no effect on the operation of existing federal water projects.

Federal or not, most of the projects that generate hydropower today were built decades ago, before fish and wildlife protection was the priority that it is today. For non-federal projects, the law has an established system—“relicensing” under the Federal Power Act (FPA)<sup>6</sup>—that requires periodic review of project operations so as to re-balance hydropower production against fish and wildlife protection. For water projects constructed and operated by the federal government, however, no such standard requirement or program exists.<sup>7</sup>

The West has hundreds of federal water projects operated by the Bureau of Reclamation (the Bureau) or the Army Corps of Engineers (the Corps). The Bureau and the Corps have reviewed and revised the operation of some of their projects to address fish and wildlife concerns, primarily to meet the requirements of the ESA, which applies generally to federal dams and reservoirs. Some laws protecting fish and wildlife only apply to certain facilities or river basins, however, and some of these laws have led to reviews at specific federal projects. A notable example is the Bureau’s Glen Canyon Dam on the Colorado River, where a thorough

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4. Donald J. Pisani, *Federal Reclamation Law in the Twentieth Century: A Centennial Retrospective*, in THE BUREAU OF RECLAMATION: HISTORY ESSAYS FROM THE CENTENNIAL SYMPOSIUM VOLUMES I AND II 611 (2008). Pisani, a leading scholar on the history of water development in the West, identifies some of the reasons for environmental opposition to dams, and notes that these objections were among several factors contributing to the end of the era of major new federal water projects. *Id.* at 622, 625.

5. Pub. L. No. 93-205, 87 Stat. 884 (codified at 16 U.S.C. §§ 1531–1544. (2012)).

6. Paul Stanton Kibel, *Passage and Flow Considered Anew: Wild Salmon Restoration via Hydro Relicensing*, 37 PUB. LAND & RESOURCES L. REV. 65 (2016) (summarizing relicensing requirements and their potential to benefit fish populations affected by hydropower projects).

7. This article provides a sort of complement to one written by Paul Kibel in connection with the 36th Public Land Law Conference, in 2015. *Id.* That article discussed Federal Power Act relicensing of non-federal hydropower projects, and focused on environmental issues associated with salmon and other anadromous fishes. This one summarizes the legal framework governing federal hydropower projects, and examines a recent decision on operations of Glen Canyon Dam, where the affected fish populations are the native humpback chub and resident trout species.

review and extensive public process led to a new long-term plan for operating one of the nation's most important dams.

This article examines legal issues regarding hydropower, fish and wildlife at federal water projects in the West. It begins by briefly explaining the legal and institutional framework for federal water projects that generate hydropower. The following section summarizes relevant laws and policies for fish and wildlife protection in relation to federal hydropower operations, focusing primarily on the application of the ESA in this context. The article then considers the case of Glen Canyon Dam, where the Bureau and the National Park Service recently adopted a new operating plan after an extensive review that addressed hydropower, the needs of two very different fish populations, and other concerns. It concludes with an observation about the relative importance of hydropower and environmental values at federal water projects.

## II. HYDROPOWER PRODUCTION AND WILDLIFE PROTECTION: LEGAL AND INSTITUTIONAL CONTEXT

### *A. Hydropower at federal water projects*

Federal water projects generate about half of all hydropower produced in the U.S.<sup>8</sup> The legal, institutional, and contractual arrangements for federally-generated hydropower are complex, and they vary by region and by project. With no hope of capturing this complexity and variety in a few pages, this section instead provides a brief introduction to the two agencies that operate the big federal projects in the West, the statutes that authorized these projects, and the power marketing administrations (PMAs) that market the power generated at these projects.<sup>9</sup>

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8. Although there are far more non-federal hydropower projects than federal ones, the average generating capacity of a federal project is more than ten times larger than the non-federal average. U.S. DEPARTMENT OF ENERGY, EFFECTS OF CLIMATE CHANGE ON FEDERAL HYDROPOWER 7 (Jan. 2017).

9. This paper focuses on federal water projects in the West, so it does not address the other major federal dam operating agency, the Tennessee Valley Authority. The TVA operates reservoirs in the southeastern U.S. for hydropower and other purposes, and its electricity is not marketed through PMAs. *Id.*

The Corps is responsible for flood control, which has been the agency's primary purpose in building dams.<sup>10</sup> The Corps today controls nearly 700 dams, many of which are multi-purpose facilities that also serve purposes such as supporting navigation or providing "flatwater" recreation.<sup>11</sup> About 75 Corps dams also generate hydropower, and the total generating capacity of these power plants is 21.7 gigawatts, making the Corps the largest single source of hydropower generation in the United States.<sup>12</sup>

The Bureau is primarily responsible for water supply, and it has been building projects for this purpose for over a century, since Congress in 1902 authorized the Interior Department to build and operate irrigation works.<sup>13</sup> The Bureau would eventually build around 600 dams, and like those of the Corps, many serve two or more purposes.<sup>14</sup> Here again, most of these dams do not generate power, but the 76 that do have a total generating capacity exceeding 15 gigawatts, making the Bureau the second-largest U.S. hydropower producer.<sup>15</sup>

Both Corps and Bureau projects are governed by authorizing statutes, whereby Congress provided for construction of the project.<sup>16</sup>

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10. A. Dan Tarlock, *A First Look at a Modern Legal Regime for a "Post-Modern" United States Army Corps of Engineers*, 52 KAN. L. REV. 1285, 1299-1307 (2004) (summarizing the Corps' historical evolution as a water resources development and management agency).

11. U.S. Army Corps of Engineers, *Dam Safety Program*, <http://www.usace.army.mil/Missions/CivilWorks/DamSafetyProgram.aspx> (last visited Aug. 7, 2014).

12. U.S. DEPARTMENT OF ENERGY, *supra* note 8, at 7.

13. Act of June 17, 1902, Pub. L. No. 161, 32 Stat. 388 (codified in scattered sections of 43 U.S.C. from § 371 to § 498 (2000)).

14. U.S. Bureau of Reclamation, *About Us*, <http://www.usbr.gov/main/about/> (last visited June 20, 2015).

15. U.S. DEPARTMENT OF ENERGY, *supra* note 8, at 7.

16. For Bureau projects, while there are general statutes that apply broadly to the reclamation program, "each project operates within its own legal framework, including project authorizing statutes and water supply contracts. The authorizing statutes specify (among other things) the purposes for which the projects are constructed and operated ...." Reed D. Benson, *Environmental Review of Western Water Project Operations: Where NEPA Has Not Applied, Will It Now Protect Farmers from Fish?* 29 UCLA J. ENVTL. L. & POL'Y 269, 275 (2011). As for the Corps, "each project is authorized by Congress with a specific set of purposes, usually

Each project is authorized for one or more purposes: water supply, flood control, hydropower, fish and wildlife, etc.<sup>17</sup> These authorized purposes determine a project's basic operating priorities; that is, a dam authorized for water supply, hydropower, and recreation is constructed and operated to serve those specific functions. Congress may authorize a project for multiple purposes with differing priorities; some projects were authorized with secondary purposes or "incidental" benefits.<sup>18</sup> Multi-purpose projects became the norm during the boom period for federal dam construction, in the middle part of the 20<sup>th</sup> century, when most of the big projects were authorized and built.

For any given project, the authorizing statute is typically the most important source of law, but more general statutes also may affect decisions about project operations. One notable example is Section 301 of the Water Supply Act of 1958,<sup>19</sup> which provides that Congress must approve any "modification" of a federal reservoir project if the proposed

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as part of a larger annual bill that encompasses multiple Corps' and other agency public works requests." Robert Haskell Abrams, *Water Federalism and the Army Corps of Engineers' Role in Eastern States Water Allocation*, 31 U. ARK. LITTLE ROCK L. REV. 395, 407 (2009).

17. *e.g.*, Flood Control Act of 1950, 81 Pub. L. No. 516, § 204, 64 Stat. 163, 177 (approving "[t]he plan for flood control, water conservation, and related purposes, in the Russian River Basin, California, ... substantially in accordance with the recommendations of the Board of Engineers ..."); Act of July 3, 1952, 82 Pub. L. No. 445, 66 Stat. 325 (authorizing the Interior Department to construct the Collbran Project in Colorado for purposes of "supplying water for the irrigation of approximately twenty-one thousand acres of land and for municipal, domestic, industrial, and stockwater uses and of producing and disposing of hydroelectric power and, as incidental to said purposes, for the further purpose of providing for the preservation and propagation of fish and wildlife ...").

18. For example, Congress authorized the Washita Basin Project in Oklahoma for the principal purposes of storing, regulating, and furnishing water for municipal, domestic, and industrial use, and, for the irrigation of approximately twenty-six thousand acres of land and of controlling floods and, as incidents to the foregoing for the additional purposes of regulating the flow of the Washita River, providing for the preservation and propagation of fish and wildlife, and of enhancing recreational opportunities. Act of February 25, 1956, 84 Pub. L. No. 419, ch. 71, § 1, 70 Stat. 28.

19. Pub. L. No. 85-500, § 301, 72 Stat. 297, 319 (codified at 43 U.S.C. § 390b (2012)).

modification “would seriously affect the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve major structural or operational changes . . .”<sup>20</sup> One statute requires the Corps “to prescribe regulations for the use of storage allocated for flood control or navigation at all reservoirs constructed wholly or in part with Federal funds provided on the basis of such purposes, and the operation of any such project shall be in accordance with such purposes.”<sup>21</sup> Another requires the Bureau, in carrying out the reclamation program of constructing and operating water projects, to comply with state laws “relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder.”<sup>22</sup>

While the Corps and the Bureau make operating decisions for most project purposes, hydropower operations are largely determined by the relevant federal Power Marketing Administration (PMA). In the Columbia River Basin, the Bonneville Power Administration (Bonneville) is the relevant PMA; in the rest of the West,<sup>23</sup> it is the Western Area Power Administration (Western). The primary function of the PMAs is marketing hydropower produced at Corps and Bureau dams, and they sell it at low cost-based rates, giving preference to certain entities such as public utility districts and electric cooperatives.<sup>24</sup> As between the two,

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20. *Id.*, 72 Stat. 297, 320 (codified at 43 U.S.C. § 390b(e).) (2012)).

21. This is § 7 of the Flood Control Act of 1944, codified at 33 U.S.C. § 709 (2012).

22. This is § 8 of the 1902 Reclamation Act, codified at 43 U.S.C. § 383 (2012).

23. The only portion of the West that lies outside the Bonneville and Western territories is the southern Plains—Kansas, Oklahoma, and most of Texas—which is within the territory of the Southwestern Power Administration. That PMA and Western both supply power to part of Kansas. U.S. DEPARTMENT OF ENERGY, *supra* note 8, at 3.

24. As explained in a Department of Energy (DOE) report, “PMAs market power from federal projects at the lowest possible rates to preference customers, consistent with sound business principles, so as to encourage the most widespread use of federal assets. If excess power is available beyond the needs of preference customers, the PMAs may sell surpluses to non-preference entities.” Differences in the way that the PMAs operate are due to several things, including their statutory authorities, their role in electricity transmission, and the number and size of their dams. Each PMA “is a distinct and self-contained entity within DOE, much like



Bonneville's average power generation and revenue are more than double Western's, but Western has nearly twice as many hydropower plants (55 to Bonneville's 31) and more than double the number of wholesale power customers.<sup>25</sup>

The foregoing applies generally to hydropower produced by the Bureau or the Corps, but there is an additional wrinkle: about 150 of their dams have powerplants that these agencies do not operate. These *non-federal* powerplants produce power that is marketed by a utility or cooperative, and their operations are governed by a very different legal and institutional regime than the one just described. Non-federal hydropower projects have been subject to federal regulatory control since 1920, when Congress adopted a licensing scheme that is now implemented by the Federal Energy Regulatory Commission (FERC).<sup>26</sup> The FPA limits these licenses to a maximum 50-year term, at the end of which a project must undergo "relicensing" by FERC. Each license contains a variety of conditions, including operating requirements and constraints, and relicensing may result in a new license with significantly changed operating conditions.<sup>27</sup>

*B. A measure of protection for fish and wildlife: potentially relevant federal laws*

While Congress emphasized new dams and reservoirs during the mid-20<sup>th</sup> century, in the 1960s it began to show greater concern for environmental protection, at least in relation to new water projects. Most remarkably, the 1968 Wild and Scenic Rivers Act<sup>28</sup> provided that

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a wholly owned subsidiary of a corporation." U.S. DEPARTMENT OF ENERGY, EFFECTS OF CLIMATE CHANGE ON FEDERAL HYDROPOWER 7 (Aug. 2013).

25. *Id.* at 7, tbl.2. Bonneville also supplies 35 percent of all the electricity sold within its service area, whereas Western accounts for only four percent of sales in its territory, which is much larger than Bonneville's. *Id.*

26. Sam Kalen, *Essay: Historical Flow of Hydroelectric Regulation: A Brief History*, 53 IDAHO L. REV. 1 (2017) (tracing the development of federal law and policy on hydropower development, including the Federal Water Power Act of 1920).

27. Adell L. Amos, *Dam Removal and Hydropower Production in the United States – Ushering in a New Era*, 29 J. ENVTL. L. & LITIG. 1, 15-16 (2014).

28. 16 U.S.C. §§ 1271-1286 (2012).

designated rivers with “outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition . . .”<sup>29</sup> At existing reclamation projects, a 1965 statute authorized the Bureau to build and operate “public outdoor recreation and fish and wildlife enhancement facilities,” but not to revise operations for the benefit of recreation, fish, or wildlife; to the contrary, it required that public use of these facilities or project waters must be “coordinated with the other project purposes.”<sup>30</sup>

Congress went further in the National Environmental Policy Act (NEPA),<sup>31</sup> sometimes called the “Magna Carta” of environmental laws.<sup>32</sup> One major motivation for NEPA was reining in the Corps and the Bureau, “mission agencies” that were famous for the environmental harm caused by their dam construction.<sup>33</sup> Although courts have held that NEPA’s lofty statements of policy are basically unenforceable,<sup>34</sup> the statute does require federal agencies to produce a detailed statement of environmental impacts and potential alternatives before taking any “major federal action[.]significantly affecting the quality of the human environment.”<sup>35</sup>

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29. *Id.* § 1271. Following this policy statement, the statute provides for designation of wild, scenic, or recreational river segments by Congress or by a State *Id.* § 1273. The statute prohibits FERC from licensing construction of new hydropower works on a designated segment, and requires any federal agency to issue a special report before seeking authorization or appropriations for a new federal project on a designated segment. *Id.* § 1278.

30. *Id.* § 4601-18.

31. Pub. L. No. 91-190, 83 Stat. 852 (codified at 42 U.S.C. §§ 4321-4347 (2012)).

32. COUNCIL ON ENVIRONMENTAL QUALITY, A CITIZEN’S GUIDE TO THE NEPA 2 (2007) (hereinafter Guide to NEPA).

33. A. Dan Tarlock, *The Story of Calvert Cliffs: A Court Construes the National Environmental Policy Act to Create a Powerful Cause of Action*, in ENVIRONMENTAL LAW STORIES 77, 85 (Richard J. Lazarus & Oliver A. Houck eds., 2005).

34. Calvert Cliffs’ Coordinating Comm., Inc. v. U.S. Atomic Energy Com., 449 F.2d 1109 (D.C. Cir. 1971); Strycker’s Bay Neighborhood Council, Inc. v. Karlen, 444 U.S. 223 (1980) (per curiam).

35. 42 U.S.C. §4332(2)(C) (2012). NEPA § 102(2) applies to all agencies of the federal government, and states several requirements in addition to the “detailed statement” mandate of subsection (C), one of which is to “study, develop, and describe appropriate alternatives to recommended courses of action in any

The Environmental Impact Statement (EIS) has become a standard prerequisite for many kinds of action by federal agencies, requiring them to develop and consider information on the environmental impacts of their proposed actions, and to provide opportunities for public participation in their decision-making.<sup>36</sup>

In protecting wildlife, Congress' boldest stroke was the ESA, enacted in 1973 to conserve imperiled species and the ecosystems on which they depend.<sup>37</sup> The ESA protects animal and plant species listed as threatened or endangered under that law.<sup>38</sup> The key ESA provision for federal water projects is Section 7,<sup>39</sup> which imposes special procedural and substantive obligations on federal agencies. Section 7(a)(2) requires the process of "consultation" with the U.S. Fish & Wildlife Service (or National Marine Fisheries Service) before a federal agency can take, authorize or fund an action that may harm a listed species. Substantively, it commands that every federal agency "shall . . . insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence" of any threatened species, or adversely modify its designated critical habitat.<sup>40</sup> The ESA's prohibition on agency actions causing jeopardy to listed species has been a source of litigation and political controversy since 1979, when the Supreme Court ruled that the federal Tellico Dam could not be completed since it would jeopardize the newly discovered snail darter.<sup>41</sup>

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proposal which involves unresolved conflicts concerning alternative uses of available resources." *Id.* § 4332(2)(E).

36. *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 355-56 (1989).

37. 16 U.S.C. § 1531(b) (2012).

38. Section 4 of the ESA establishes detailed standards, procedures, and deadlines for the federal government's decisions on whether to list a particular species as threatened or endangered under the Act. *Id.* § 1533.

39. *Id.* § 1536.

40. *Id.* § 1536(a)(2).

41. The Supreme Court's landmark decision in *Tennessee Valley Auth. v. Hill*, 437 U.S. 153 (1978) helped make the ESA one of the most potent environmental laws. Congress later directed that the dam be completed, but largely preserved the law itself. See Holly Doremus, *The Story of TVA v. Hill: A Narrow Escape for a Broad New Law*, in ENVIRONMENTAL LAW STORIES 109, 132 (Richard J. Lazarus & Oliver A. Houck eds., 2005).

In the 1980s and '90s, Congress began taking actions that were more specific to addressing fish and wildlife concerns at existing water projects. For the Corps, Congress conferred various environmental authorities, including one allowing the Corps to modify “structures and operations” of its projects, provided the modifications “(1) are feasible and consistent with the authorized project purposes, and (2) will improve the quality of the environment in the public interest.”<sup>42</sup> For the Bureau, Congress authorized a variety of project- or basin-specific efforts intended to address the environmental damage caused by reclamation projects, typically related to impacts on fish populations;<sup>43</sup> most famously and dramatically, it enacted the Central Valley Project Improvement Act, which emphasized restoration of fish and wildlife populations harmed by the giant Central Valley Project in California and reallocated a large block of project water for that purpose.<sup>44</sup> In the same vein, Congress amended the FPA to give greater weight to fish and wildlife concerns in FERC licensing (and relicensing) decisions on non-federal hydropower projects.<sup>45</sup>

Thus, after authorizing the Corps and the Bureau to build hundreds of water projects (and the PMAs to market the power generated by these projects), Congress would later enact laws reflecting a greater interest in protecting and restoring fish and wildlife populations. These more recent enactments, however, have had limited effect in “greening” federal hydropower operations for the benefit of fish and wildlife. The next

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42. 33 U.S.C. § 2309a(b) (2000). This is often called the Corps’ “1135” authority, since it originated in § 1135 of the Water Resources Development Act of 1986. Pub. L. No. 99-662, § 1135, 100 Stat. 4082, 4251 (1986).

43. Reed D. Benson, *New Adventures of the Old Bureau: Modern-Day Reclamation Statutes and Congress’s Unfinished Environmental Business*, 48 HARV. J. ON LEGIS. 137, 167-68 (2011) (describing such statutes relating to Bureau projects in the Trinity, Carson-Truckee, and Yakima river basins).

44. *Id.* (citing Central Valley Project Improvement Act, Pub. L. No. 102-575, § 3406 (b)(2), 106 Stat. 4600, 4706 (1992) (see provision reallocating 800,000 acre-feet of Central Valley Project water for fish and wildlife)).

45. Michael C. Blumm & Viki A. Nadol, *The Decline of the Hydropower Czar and the Rise of Agency Pluralism in Hydroelectric Licensing*, 26 COLUM. J. ENVTL. L. 81, 87-88 (2001) (summarizing 1986 amendments to the Federal Power Act giving greater weight to fish and wildlife values in hydropower licensing decisions).

section briefly examines why efforts to balance federal hydropower and wildlife interests are narrowly focused on ESA compliance.

### III. BALANCING HYDROPOWER AND FISH AT FEDERAL PROJECTS: IS THE ONLY TOOL A HAMMER?

Given the existing legal regime applicable to federal water projects, the fundamental challenge for balancing hydropower with fish and wildlife needs is the age of the projects. Most Corps dams are over 50 years old,<sup>46</sup> and the Bureau's are even older, as about half of them were built before 1950.<sup>47</sup> Thus, most projects were authorized at a time when Congress showed relatively little concern for fish and wildlife interests, and most were constructed before the dawn of modern environmental law.<sup>48</sup> This problem could be solved, or at least mitigated, if the Corps and the Bureau regularly revisited their long-term reservoir operating plans. For federal water projects, however, there is no general system or program for reviewing and revising reservoir operations.

#### *A. No periodic review of federal hydropower operations*

Perhaps the most important gap in the legal framework for federal water projects is the lack of any requirement for periodic review of long-term operating plans. Congress has not heeded expert advice, going back

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46. Army Corps of Eng'rs, *Dam Safety Facts and Figures*, <http://www.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/590578/dam-safety-facts-and-figures> (last visited Aug. 11, 2017) (also noting that 95 percent of Corps dams are over 30 years old, and the average age of the Corps' "dam safety portfolio" is 56 years).

47. U.S. Bureau of Reclamation, *Infrastructure*, <http://www.usbr.gov/newsroom/presskit/factsheet/detail.cfm?recordid=2> (last visited Aug. 11, 2017). As stated in the Bureau's brief autobiography, "Reclamation's last really big construction authorization occurred in 1968" with the authorization of the Central Arizona Project and others in the Colorado River Basin. U.S. BUREAU OF RECLAMATION, BRIEF HISTORY 5 (2011), available at <http://www.usbr.gov/history/2011NEWBRIEFHISTORY.pdf>.

48. COUNCIL ON ENVIRONMENTAL QUALITY *supra* note 32, at 2 (Noting that NEPA, signed into law on New Year's Day of 1970, is generally considered the first modern environmental statute).

at least as far as the National Water Commission's 1973 report, about the value of revising federal reservoir operations to meet changing needs.<sup>49</sup> Thus, federal law is less demanding on Corps and Bureau projects than it is on non-federal hydropower installations,<sup>50</sup> which are reviewed through FERC relicensing every 30 to 50 years,<sup>51</sup> and which may face greatly altered operating requirements as a result.<sup>52</sup>

While the law does not require reviews of federal water project operations, neither does it prohibit them. In fact, the Corps' rules regarding its project "water control plans"<sup>53</sup> call for these plans to be reviewed and updated every ten years.<sup>54</sup> The rules further provide that water control plans, "shall be revised as necessary to conform with changing requirements resulting from developments in the project area and downstream, improvements in technology, improved understanding of ecological response and sustainability, new legislation and other relevant factors, provided such revisions comply with existing federal regulations and established Corps policy."<sup>55</sup> In adopting or revising a

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49. See Reed D. Benson, *Reviewing Reservoir Operations: Can Federal Water Projects Adapt to Change?* 42 COLUM. J. ENVTL. L. 353, 358-59 (2017) (discussing National Water Commission statements on federal reservoirs, as well as those of the Western Water Policy Review Advisory Commission and others).

50. *Id.* at 401-05 (discussing requirements applicable to various agencies and explaining that Federal law is also tougher on federal land management agencies, which are required periodically to review and revise their land management plans).

51. See Kibel, *supra* note 6, at 73 (noting that FERC relicensed about 350 hydropower projects nationally from 1993 – 2005).

52. See Dave Owen & Colin Apse, *Trading Dams*, 48 UNIV. CAL. DAVIS L. REV. 1043, 1064 (2015); see also, *City of Tacoma v. Federal Energy Regulatory Comm'n*, 460 F.3d 53 (D.C. Cir. 2006) (upholding new license conditions, including greatly increased flows to protect fisheries affected by the project, even though these new conditions could make the project uneconomical to operate).

53. DEPARTMENT OF THE ARMY, U.S. ARMY CORPS OF ENGINEERS, ENGINEERING AND DESIGN – WATER CONTROL MANAGEMENT, ENGINEER REGULATION NO. 1110-2-240 (May 30, 2016) (hereinafter Water Control Management Rule).

54. *Id.* ¶ 3-2(j).

55. *Id.* ¶ 3-1(e).

water control plan,<sup>56</sup> the Corps must provide for public involvement,<sup>57</sup> and must work with all stakeholders who may be affected by project operations.<sup>58</sup>

The Bureau has no directly-parallel rule or policy on this subject, although it does have an internal “directive and standard”<sup>59</sup> calling for regular operations and maintenance reviews of Bureau projects for various purposes, including to ensure effective operations, improve water management, and “protect public interests, safety, and the environment.”<sup>60</sup> Such reviews are to be conducted at least every six years,<sup>61</sup> and are to consider environmental and public interest issues relating to the project.<sup>62</sup> A separate directive and standard governs operations and maintenance reviews of powerplants at Bureau projects,<sup>63</sup> which are also supposed to be completed every six years.<sup>64</sup> The powerplant guidance, however, seems

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56. Once adopted, a water control plan becomes the centerpiece of a water control manual, which “defines rules or provides guidance for direction, and operation, and management of water storage at an individual project or system of projects ....” *Id.* ¶ 3-1(a).

57. *Id.* ¶¶ 1-1, 5-2.

58. The rule mandates that water control plans “will be developed in concert with all basin interests that are impacted or could be impacted by or have an influence on project regulation. Close coordination shall be maintained with all appropriate international, federal, state, regional and local agencies” in developing and implementing water control plans. *Id.* ¶ 3-2(d).

59. U.S. Bureau of Reclamation, *Reclamation Manual, Directives and Standards* FAC 01-04, Review of Operation and Maintenance (RO&M) Program Examination of Associated Facilities, *available* at <http://www.usbr.gov/recman/fac/fac01-04.pdf>. A parenthetical at the end of the title clarifies that this Directive and Standard applies only to facilities other than high- and significant-hazard dams.

60. These are three of the nine stated purposes for these examinations. *Id.* at 7.

61. *Id.* at 10.

62. Under the heading “Content,” the document lists 19 items that an examination might cover, including “water operations; water management and conservation; ... endangered species; habitat/wetlands; environmental impacts; and compliance with mitigation.” *Id.* at 7-8.

63. U.S. Bureau of Reclamation, *Reclamation Manual, Directives and Standards* FAC 04-01, Power Review of Operation and Maintenance (PRO&M) Program, <http://www.usbr.gov/recman/fac/fac04-01.pdf>.

64. The policy requires two types of six-year review, one of which is done by personnel within the project region, and the other is done by personnel from

entirely geared toward maintaining facilities and operational efficiency, and makes no mention of environmental or public interest factors.<sup>65</sup>

Given that both the Corps' rules and the Bureau's guidance call for periodic reviews of project operating plans, it may seem surprising that neither agency makes a practice of doing them. A recent study on the Corps' approach to this issue suggests cost is a major factor, as the agency has been reluctant to commit funds for this purpose.<sup>66</sup> A second disincentive is potential controversy, as the agencies may be reluctant to stir up opposition from stakeholder groups that benefit from current operations, when maintaining the status quo would let sleeping dogs lie.<sup>67</sup> A third factor is litigation risk, as the Bureau or the Corps can minimize their exposure by continuing their established operating regimes and practices.<sup>68</sup> This latter factor raises the role of NEPA in federal water project operating decisions, as examined in the next part.

#### *B. No NEPA review of "routine" project operations*

NEPA applies to a wide range of federal agency actions, and its environmental reviews have become a familiar requirement. It is seemingly inescapable in the realm of federal land management,<sup>69</sup> for

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outside the region. *Id.* ¶ 3. The policy calls for these reviews to alternate, so that one of them is done every three years for a particular powerplant. *Id.* ¶ 5.

65. A separate Reclamation Manual Policy on hydropower addresses these issues only in the most general terms, stating a policy "to seek an appropriate balance among multiple purposes," and to "comply with all Federal and state environmental laws, as appropriate, in developing, implementing [sic]our power program." U.S. Bureau of Reclamation, *Reclamation Manual*, Policy FAC P04, Hydroelectric Power, available at <http://www.usbr.gov/recman/fac/fac-p04.pdf>.

66. U.S. GOV'T ACCOUNTABILITY OFFICE, ARMY CORPS OF ENGINEERS: EFFORTS TO ASSESS THE IMPACT OF EXTREME WEATHER EVENTS, GAO-15-660 (2015).

67. Benson, *supra* note 49, at 390-92.

68. *Id.* at 392-93.

69. See, e.g., CHRISTINE A. KLEIN, FEDERICO CHEEVER & BRET C. BIRDSONG, *NATURAL RESOURCES LAW* 122–23 (2nd ed. 2014) (describing NEPA as "a pervasive presence in federal public lands and natural resources decision-making" and "an integral part of the decision-making process" for federal managers of these resources).



example, and those familiar with that field might expect NEPA to apply similarly in the context of federal dam operations. In fact, however, NEPA plays a very limited role in the Corps' and the Bureau's decisions regarding operation of their existing projects.

The leading case on NEPA and reservoir operations, *Upper Snake River Chapter of Trout Unlimited v. Hodel*, arose from a multi-year drought in eastern Idaho. Environmental and angling groups sued to force the Bureau to produce an EIS before cutting releases from Palisades Dam below 1,000 cfs, arguing that the Bureau's proposed release of 750 cfs would harm the blue-ribbon fishery in the South Fork of the Snake River.<sup>70</sup> The district court denied the requested injunction, holding that NEPA did not apply to ongoing project operations which represented no change from established practices.<sup>71</sup> The Ninth Circuit Court of Appeals affirmed,<sup>72</sup> in part because the Bureau had cut Palisades Dam releases below 1,000 cfs during previous droughts.<sup>73</sup> The Ninth Circuit acknowledged that such low releases would harm the downstream fishery,<sup>74</sup> but concluded that these impacts—and the operational decisions leading to them—were just a continuation of the status quo.<sup>75</sup>

*Upper Snake* involved reservoir operations for water supply, but courts have followed it in cases involving federal hydropower operations. In a case involving the Bureau's Glen Canyon Dam on the Colorado River,

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70. 706 F.Supp. 737, 738-39 (D. Idaho 1989).

71. *Id.* at 740-41. The court also found that the plaintiffs would suffer no irreparable injury, and that the balance of hardships did not favor them. *Id.* at 741.

72. *Upper Snake River Chapter of Trout Unlimited v. Hodel*, 921 F.2d 232 (9th Cir. 1990).

73. Palisades Dam had been in operation for about thirty years at the time the case was brought, and the court indicated that releases had fallen below 1,000 cfs in ten of those years, for a total of 555 days—a little under five percent of all days the dam had operated. *Id.* at 233-34.

74. *Id.* at 234. The court, however, did not reach the issue of whether the impact was significant for purposes of the EIS requirement, because it determined that the Bureau's project operations were not "major federal action." *Id.*

75. After noting that the Bureau had been operating the dam since before NEPA was enacted, and had increased and decreased releases in response to changing conditions throughout that history, the court concluded, "In short, they are doing nothing new, nor more extensive, nor other than that contemplated when the project was first operational. Its operation is and has been carried on and the consequences have been no different than those in years past." *Id.* at 235.

the Ninth Circuit held that no EIS or Environmental Assessment (EA) was needed for preparation of annual operating plans by the Bureau<sup>76</sup> where those plans merely implemented a long-term operating regime adopted after a full EIS.<sup>77</sup> Most recently, the Ninth Circuit held that no EIS was needed for a change in winter hydropower operations at a federal reservoir on the Pend Oreille River, even though the Corps had halted such operations fifteen years earlier because of their environmental impacts.<sup>78</sup>

The latter case, *Idaho Conservation League v. Bonneville Power Administration*, shows how far the courts are willing to go in keeping NEPA out of dam operating decisions. The case involved Albeni Falls Dam, a multi-purpose project that forms Lake Pend Oreille and generates hydropower marketed by Bonneville.<sup>79</sup> From the late 1950s through the mid-1990s, the Corps had operated the dam for power production during the winter, causing reservoir levels to rise and fall. These fluctuations were problematic for the reservoir's kokanee salmon population, leading to a decision to hold levels steady during the winter, a practice that continued from 1997 through about 2011.<sup>80</sup> At Bonneville's request, however, the Corps decided in 2011 to implement "flexible winter power operations" allowing reservoir levels to rise and fall by up to five feet. The

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76. *Grand Canyon Trust v. U.S. Bureau of Reclamation*, 691 F.3d 1008, 1021-22 (9th Cir. 2012).

77. *See infra* part III.A.

78. *Idaho Cons. League v. Bonneville Power Admin.*, 826 F.3d 1173, 1176-77 (9th Cir. 2016). "According to the court, 'In 1995, the Corps determined that allowing the lake's elevation to drop during the winter months had adverse effects on the kokanee salmon population and so beginning in 1997 began holding the lake's elevation constant.'" *Id.* at 1175.

79. *Id.* at 1174.

80. *Id.* at 1175. The case refers to a 1995 NEPA review of Albeni Falls Dam operations, although the opinion is not clear on what the agencies did at that time, referring to both a 1995 EIS and a 1995 EA. *Id.* at 1176-77.

agencies did produce a substantial EA<sup>81</sup> on this proposal,<sup>82</sup> and concluded that it would not have significant environmental impacts. Relying on *Upper Snake*, the Ninth Circuit held that returning to the agency's prior operating practices was not a change to the status quo, despite the previous 15 years of steady winter levels; in the court's view, those bygone operating practices still counted as "existing operations" for NEPA purposes, meaning that no EIS was required regardless of the likely impacts.<sup>83</sup>

The Albeni Falls case effectively extends *Upper Snake* because it holds that even a proposed change in operations<sup>84</sup> does not trigger the EIS requirement so long as the change represents a return to the status quo ante. In other words, if the agency proposes to operate one of its dams in a way that the dam has *ever operated in the past*, no EIS is needed.<sup>85</sup> The court reiterated that "a significant shift of direction in operating policy" would trigger an EIS,<sup>86</sup> but the opinion suggests that the courts will rarely find such a shift if the agency can make a plausible case that its proposal is

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81. An EA is an environmental review that is generally shorter and less detailed than an EIS, and is typically produced when an agency can conclude that a proposed action will not have significant environmental impacts. See 40 C.F.R. § 1508.9; (2014); Center for Env'tl. Law & Policy v. Bureau of Reclamation, 655 F.3d 1000 (9th Cir. 2012) (reviewing Bureau's EA on proposed allocation of water in Lake Roosevelt for water supply).

82. U.S. ARMY CORPS OF ENG'RS & BONNEVILLE POWER ADMIN., ALBENI FALLS DAM FLEXIBLE WINTER POWER OPERATIONS, BONNER COUNTY, IDAHO, FINAL ENVTL. ASSESSMENT (2011). The EA exceeds 100 pages, and the "summary" preceding the table of contents states that the agencies took comment on a draft EA for about 45 days.

83. *Idaho Cons. League*, 826 F.3d at 1176-77.

84. In their EA on winter operations, the agencies acknowledged, "The proposal is a change to the way [Albeni Falls Dam] has been operated in the winter time in recent years ...." U.S. ARMY CORPS OF ENG'RS & BONNEVILLE POWER ADMIN., *supra* note 82, summary page.

85. *Idaho Cons. League*, 826 F.3d at 1176 (interpreting *Upper Snake* to mean that "even if an agency had only engaged in a proposed action sporadically in the past, ... repeating that action did not change the status quo"), 1177 (noting that "existing operations" for NEPA purposes includes operating practices that were more than 15 years old, and that were halted by an earlier agency decision).

86. *Id.* at 1176 (citing *Grand Canyon Trust v. Bureau of Reclamation*, 691 F.3d 1008, 1022 (9th Cir. 2012)).

nothing it has not done before. Thus, under this line of Ninth Circuit cases, an EIS may never be needed if the agency itself does not characterize its proposed operating regime as a major shift. An EIS may be required if the Bureau or the Corps is making changes to comply with the ESA, however,<sup>87</sup> which brings up the role of ESA Section 7 in federal dam operations.

### *C. Endangered Species Act consultation on project operations*

Unlike NEPA, the ESA has affected the operations of numerous federal water projects—even “routine” operations of projects that predate its enactment. As noted above, ESA Section 7 requires federal agencies to avoid taking any action that would jeopardize the survival of a threatened or endangered species.<sup>88</sup> Before taking an action that could affect a listed species, the agency must consult with the Fish & Wildlife Service (or National Marine Fisheries Service) to ensure that its proposed action would not cause jeopardy.<sup>89</sup> Courts have held that the ESA requires

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87. See *San Luis & Delta-Mendota Water Auth. v. Jewell*, 747 F.3d 581 (9th Cir. 2014) (requiring Bureau to prepare an EIS before selecting and implementing an ESA “reasonable and prudent alternative” regarding its Central Valley Project operations); *Nat’l Wildlife Fed’n v. Nat’l Marine Fisheries, Serv.*, 184 F.Supp.3d 861 (D. Or. 2016) (same requirement, regarding operations of the Federal Columbia River Power System).

88. See *supra* text accompanying notes 37 – 41.

89. The Ninth Circuit, which has seen a great deal of ESA litigation, has summarized the consultation process as follows:

In order to ensure compliance with the Act, the ESA and its implementing regulations require federal agencies (“action agencies”) to consult with the appropriate federal fish and wildlife agency . . . whenever their actions “may affect an endangered or threatened species.” See 50 C.F.R. § 402.14(a). Thus, if the agency determines that a particular action will have no effect on an endangered or threatened species, the consultation requirements are not triggered. If the action agency subsequently determines that its action is “likely to adversely affect” a protected species, it must engage in formal consultation. *Id.* Formal consultation requires that the consulting agency . . . issue a biological opinion determining whether the action is likely to jeopardize the listed species and

consultation if the operation of a federal water project may affect a protected species,<sup>90</sup> which has made Section 7 a crucial factor in forcing reviews of water project operations.

If the relevant Service determines that the agency's proposed operations would jeopardize a listed species, it must identify a "reasonable and prudent alternative" (RPA) that would avoid the likelihood of jeopardy.<sup>91</sup> Under the ESA implementing rules, a RPA must be "consistent with the intended purposes of the action," within the action agency's authority and jurisdiction, and "economically and technologically feasible."<sup>92</sup> Although a RPA must avoid jeopardy, it need not be the best alternative for the listed species, and might actually represent a modest alteration of the agency's proposed action or mitigation of its impacts.<sup>93</sup> Before it adopts and implements a RPA that would require a change in a project's operations, however, the agency must first produce an EIS on the potential impacts of the change.<sup>94</sup>

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describing, if necessary, reasonable and prudent alternatives that will avoid a likelihood of jeopardy.

See 16 U.S.C. § 1535(b)(3)(A); *Pacific Rivers Council v. Thomas*, 30 F.3d 1050, 1054 n.8 (9th Cir. 1994) (emphasis added).

90. See Reed D. Benson, *Avoiding Jeopardy, Without the Questions: Recovery Implementation Programs for Endangered Species in Western River Basins*, 2 MICH. J. ENVTL. & ADMIN. L. 473, 491-500 (describing application of ESA to Bureau projects in the Lower Colorado, Klamath, and Rio Grande basins), 528-29 (noting chronic litigation over the Corps' and Bonneville's ESA compliance in operating the Federal Columbia River Power System) (2013).

91. If the Service's Biological Opinion finds jeopardy, it must include a RPA unless none can be identified. 50 C.F.R. § 402.14(h)(3) (2014).

92. 50 C.F.R. § 402.02. (2014).

93. *Sw. Ctr. for Biological Diversity v. Bureau of Reclamation*, 143 F.3d 515, 523 (9th Cir. 1998) (upholding RPA for Bureau's operation of Hoover Dam/Lake Mead that was much weaker than draft RPA, allowing destruction of existing, occupied Southwestern willow flycatcher habitat so long as the Bureau acquired substitute habitat).

94. See *San Luis & Delta-Mendota Water Authority v. Jewell*, 747 F.3d 581, 646 (9th Cir. 2014) (holding that the Bureau needed to comply with NEPA before adopting and implementing a RPA for operation of the Central Valley Project for purposes of complying with the ESA).

The ESA's application to federal water projects has produced some ferocious legal and political battles, most of which have focused on Bureau projects operated primarily for water supply.<sup>95</sup> Some of the most important federal hydropower projects in the West, however, have also been the focus of ESA litigation over their operations. These include the string of Corps reservoirs on the Missouri River,<sup>96</sup> and the Bureau's Glen Canyon Dam on the Colorado River.<sup>97</sup> Undoubtedly, the most intense controversy over federal hydropower and endangered species has involved the Federal Columbia River Power System. Plaintiffs committed to saving Pacific Northwest salmon have had great success in challenging the Corps' and Bonneville's ESA compliance in operating dams on the Columbia and Snake Rivers.<sup>98</sup> But losing in court has not prompted the agencies to make dramatic changes in river operations; nearly 25 years after a federal judge blasted the agencies for an approach that was "too heavily geared towards a status quo that has allowed all forms of river activity to proceed . . . when the situation literally cries out for a major overhaul,"<sup>99</sup> federal operations on the Columbia remained out of compliance with the ESA.<sup>100</sup>

Whatever else may be said about the ESA in the context of federal water projects, one thing remains true: it has been the most effective law

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95. Examples include the Klamath Basin and Middle Rio Grande disputes of the early 2000s. *See* Benson, *supra* note 90, at 494-500 (summarizing those disputes and resulting litigation). Perhaps the most divisive current controversy over the ESA involves its application to the Bureau's Central Valley Project, where farmers and their political allies have complained bitterly about reduced deliveries of irrigation water. *See, e.g.* San Luis & Delta-Mendota Water Authority v. Jewell, 747 F.3d 581.

96. *See* Am. Rivers v. U.S. Army Corps of Eng'rs, 271 F.Supp.2d 230 (D.D.C. 2003); *In re* Operation of the Missouri River System Litigation, 421 F.3d 618 (8th Cir. 2005).

97. *See, e.g.* Grand Canyon Trust v. Bureau of Reclamation, 691 F.3d 1008 (9th Cir. 2012).

98. *See* Michael C. Blumm & Aurora Paulsen, *The Role of the Judge in Endangered Species Act Implementation: District Judge James Redden and the Columbia Basin Salmon Saga*, 32 STAN. ENVTL. L.J. 87, 110-42 (2013) (describing around 20 years of this litigation).

99. Idaho Dep't of Fish & Game v. Nat'l Marine Fisheries, Serv., 850 F.Supp. 886, 900 (D. Or. 1994), *vacated as moot*, 56 F.3d 1071 (9th Cir. 1995).

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

in making the agencies review and revise their operations for the benefit of wildlife.<sup>101</sup> The substantive and procedural requirements of Section 7, the judicial decisions applying these requirements to ongoing project operations, and the willingness of citizen groups to enforce these requirements in the courts, have forced the Bureau and the Corps to develop measures for the protection of listed species.<sup>102</sup> While ESA litigation over federal water projects has been bitterly contested, and remains so in the Columbia and the California Central Valley, in other places it has prompted negotiated solutions that form the basis for collaborative water management and species conservation programs.<sup>103</sup>

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101. In a 2011 report, the Bureau summarized 16 of its river restoration programs, every one of which was driven by the need for ESA compliance. U.S. BUREAU OF RECLAMATION, BUREAU OF RECLAMATION RIVER RESTORATION PROGRAMS: A SUMMARY OF 16 PROGRAMS AND SHARED INSTITUTIONAL CHALLENGES 72 (Sept. 2011), *available at* <http://www.uttoncenter.unm.edu/pdfs/USBR-Riv-Rest-Smry.pdf>.

102. One example involves the Bureau's operations on the Rio Grande in New Mexico, which were the subject of fierce ESA litigation in the early 2000s. In a 2002 opinion that *upheld* a modest RPA for the benefit of the endangered Rio Grande silvery minnow, the court closed with these observations about the value of the lawsuit:

I believe it is appropriate to compliment Plaintiffs' counsel for their work on behalf of the endangered silvery minnow and the entire Middle Rio Grande system. It is my impression that at the time this lawsuit was filed, not much was being done by the federal agencies, or by the other major players with interests in the middle Rio Grande, to confront seriously the hard, difficult issues that had to be addressed in order to protect the minnow, and the river, itself. By filing this lawsuit, the Plaintiffs' attorney got the ball rolling, prompting all interested parties to come up with far-reaching solutions to the problems that once seemed insurmountable.

Rio Grande Silvery Minnow v. Keys, 469 F.Supp.2d 973 (D. N.M. Apr. 19, 2002), *vacated as moot*, Rio Grande Silvery Minnow v. Bureau of Reclamation, 601 F.3d 1096 (10th Cir. Apr. 21, 2010).

103. *See* Benson, *supra* note 90, at 501-504 (summarizing such results in the Klamath, Middle Rio Grande, and Lower Colorado River basins, and noting other places where litigation led to similar outcomes).

While Section 7 remains vitally influential in water project operations, it is not the only factor underlying efforts to balance federal hydropower and wildlife conservation. For one thing, in both the Colorado and Columbia basins, hydropower revenues provide financial support for conservation efforts. This funding is particularly significant in the Columbia Basin, where Bonneville claims to have spent over \$250 million in direct and program expenditures for fish and wildlife in 2015 alone;<sup>104</sup> in the Colorado River Basin, a portion of Western's hydropower dollars support the Upper Colorado and San Juan Recovery Implementation Programs for endangered fish.<sup>105</sup> In addition, some efforts to balance federal hydropower and wildlife values are based on statutes other than the ESA. The Northwest Power Act of 1980<sup>106</sup> set up a regional governance institution charged with planning for both electric power and fish and wildlife conservation in the Columbia Basin,<sup>107</sup> and the Northwest Power and Conservation Council remains influential in guiding the basin's fish and wildlife efforts.<sup>108</sup> On the Colorado, Congress enacted the Grand Canyon Protection Act (GCPA) in 1992,<sup>109</sup> directing the Interior Secretary to develop a new operations plan for Glen Canyon Dam that would better balance hydropower production with ecosystem and recreational values.

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104. "BPA funds hundreds of fish and wildlife projects in the Columbia Basin, including habitat restoration, hatcheries, land acquisitions, predator control and research and evaluation." Fact Sheet, BONNEVILLE POWER ADMINISTRATION, BPA Invests in Fish and Wildlife (Jan. 2016), *available at* <http://www.bpa.gov/news/pubs/FactSheets/fs-201601-BPA-invests-in-fish-and-wildlife.pdf> (last visited Sept. 15, 2017) Counting other categories of costs associated with fish and wildlife, BPA claims to have spent over \$750 million for this purpose in 2015, without which its power rates would be about a third lower. *Id.*

105. *See id.* Benson, *supra* note 90 at 521-25 (summarizing legislation authorizing federal hydropower revenues to support these programs).

106. Pacific Northwest Electric Power Planning and Conservation Act, Pub. L. No. 96-501, 94 Stat. 2697, codified at 16 U.S.C. §§ 839-839h (1980).

107. *See* 16 U.S.C. § 839b (establishing the Pacific Northwest Electric Power and Conservation Planning Council).

108. 2014 *Columbia River Basin Fish and Wildlife Program*, NORTHWEST POWER & CONSERVATION COUNCIL, <http://www.nwcouncil.org/fw/program/2014-12/Program> (last visited Nov. 16, 2017).

109. Pub. L. 102-575, tit. XVIII, 106 Stat. 4600, 4669 (Oct. 30, 1992).



Interior recently completed its second plan to comply with the GCPA, as explained in the next section.

#### IV. GLEN CANYON DAM OPERATIONS: HYDROPOWER, FISH, AND THE GRAND CANYON

Glen Canyon Dam is one of the nation's most significant dams, and over the years it has been the focus of more than one controversy.<sup>110</sup> Much of the focus has been on the impacts of hydropower operations on downstream Grand Canyon National Park, which have been the subject of both litigation in the federal courts and legislation in Congress. The Interior Department has also tackled these issues, engaging in a multi-year review effort that in 2016 resulted in a new long-term operating plan for Glen Canyon Dam.

##### *A. Background on Glen Canyon Dam Operations*

Congress authorized Glen Canyon Dam (Glen Canyon) in 1956 through the Colorado River Storage Project Act,<sup>111</sup> providing for construction and operation of four major storage dams<sup>112</sup> in the Upper Basin of the Colorado River.<sup>113</sup> The Act authorized these reservoirs for multiple purposes, including “regulating the flow of the Colorado River, storing water for beneficial consumptive use, [and] making it possible for the States of the Upper Basin to utilize” the water allocated to them by the

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110. Most recently, Dan Beard—who served as Commissioner of Reclamation at the beginning of the Clinton Administration—called for removing Glen Canyon Dam, even putting the idea in the title of his provocative book. DANIEL P. BEARD, *DEADBEAT DAMS: WHY WE SHOULD ABOLISH THE BUREAU OF RECLAMATION AND TEAR DOWN GLEN CANYON DAM* (2015).

111. Act of April 11, 1956, § 1, 70 Stat. 105.

112. In addition to Glen Canyon Dam on the Colorado River, the 1956 statute authorized Curecanti Dam on the Gunnison River, Flaming Gorge Dam on the Green River, and Navajo Dam on the San Juan River. *Id.*, § 1(1). It also authorized a set of smaller “participating projects” in various locations. *Id.*, § 1(2).

113. In the Colorado River Storage Project Act, Congress used the Colorado River Compact’s definition of “Upper Basin,” and defined the “Upper Basin States” to include Colorado, New Mexico, Utah, and Wyoming. *Id.*, § 16, 70 Stat. 111.

Colorado and Upper Colorado Compacts.<sup>114</sup> The statute also authorized the dams to generate hydropower, and while it called for them to be operated for the greatest “practicable” power production, it also prohibited hydropower operations that would interfere with water supply.<sup>115</sup>

Glen Canyon delivered benefits in the form of storage, hydropower, and recreation on Lake Powell, but dramatically altered the downstream ecosystem. First, and most fundamentally, the dam deprived the downstream ecosystem of nearly all sediment, which the Colorado River had carried in abundance through this reach;<sup>116</sup> the loss of sediment has resulted in shrinkage or loss of river beaches which are important to Grand Canyon rafters. The dam also eliminated fluctuations in water temperature, which once varied by nearly 50 degrees Fahrenheit from winter to summer, but now remains a steady 46° through the year.<sup>117</sup> These releases of cool, clear water support a popular rainbow trout fishery in the Glen Canyon reach just below the dam, but have adversely affected native fishes—such as the endangered humpback chub and razorback sucker—that are now found farther downstream in the warmer waters within the

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114. The Colorado River Compact divided the U.S. portion of the Colorado River Basin into the Lower Basin (Arizona, California, Nevada) and the Upper Basin. The Compact then apportioned the waters of the Colorado between the two basins, allocating 7.5 million acre-feet of consumptive use to each. Later, the Upper Colorado River Basin Compact would apportion the Upper Basin share among the four states, giving each state a specified percentage of the available water. U.S. BUREAU OF RECLAMATION, THE COLORADO RIVER DOCUMENTS 2008 xxxix – xl (2010).

115. Act of Apr. 11, 1956, § 7, 70 Stat. 105, 109. The statute did not similarly limit hydropower generation to protect ecosystems or recreational uses downstream of the dam, however. Thus, flow releases from Glen Canyon Dam were allowed to rise or fall each day by up to about 30,000 cfs. U.S. BUREAU OF RECLAMATION, RECORD OF DECISION, OPERATION OF GLEN CANYON DAM, 6 (Oct. 1996), [https://www.usbr.gov/uc/rm/amp/pdfs/sp\\_appndxG\\_ROD.pdf](https://www.usbr.gov/uc/rm/amp/pdfs/sp_appndxG_ROD.pdf) (allowable daily flow fluctuations of no action alternative).

116. U.S. DEPARTMENT OF THE INTERIOR, GLEN CANYON DAM LONG-TERM EXPERIMENTAL AND MANAGEMENT PLAN FINAL ENVIRONMENTAL IMPACT STATEMENT, ES-43 (Oct. 2016), [http://ltempeis.anl.gov/documents/final-eis/Executive\\_Summary.pdf](http://ltempeis.anl.gov/documents/final-eis/Executive_Summary.pdf) (hereinafter LTEMP FEIS).

117. *Id.* (noting that during the warmer months, water temperatures rise downstream by about 1.8° F for every 30 miles).

Grand Canyon.<sup>118</sup> “Post-dam water releases fluctuate on a daily and hourly basis to maximize the value of generated power during high-demand periods . . . result[ing] in a downstream “fluctuation zone” between low and high river stages (water level associated with a given flow) that is inundated and exposed on a daily basis.”<sup>119</sup> While these fluctuations could be eliminated by changing hydropower operations, the temperature and sediment problems cannot be resolved without changes to the dam infrastructure.<sup>120</sup>

The GCPA specifies that Glen Canyon operations to benefit the Grand Canyon must be “fully consistent with and subject to” the existing legal framework on the Colorado River.<sup>121</sup> Within the constraints of existing law, however, Congress directed the Bureau to develop new Glen Canyon Dam operating criteria and plans and take additional measures “to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including, but not limited to natural and cultural resources and visitor use.”<sup>122</sup> The GCPA also imposed several procedural mandates, including a requirement that the Bureau consult with the Colorado River Basin States, with the public, and with certain kinds of stakeholders in developing the new operating regime.<sup>123</sup>

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118. *Id.* at ES-44.

119. *Id.* at ES-43.

120. *Id.* at ES-62.

121. Key features of the existing “Law of the River” applicable to Glen Canyon include the Colorado River Compact; the Upper Colorado River Basin Compact; the 1944 treaty with Mexico; the Colorado River Storage Project Act; the Colorado River Basin Project Act; and the Supreme Court’s 1963 Decree in *Arizona v. California*. See GCPA, Pub. L. 102-575, § 1802(b), 106 Stat 4669 (1992). A more recent addition to the relevant legal framework is the 2007 Colorado River Interim Guidelines, under which annual releases from Glen Canyon Dam may be higher or lower than the traditional standard release of 8.23 million acre-feet. U.S. DEPARTMENT OF THE INTERIOR, COLORADO RIVER INTERIM GUIDELINES FOR LOWER BASIN SHORTAGES AND THE COORDINATED OPERATIONS FOR LAKE POWELL AND LAKE MEAD. (Dec. 13, 2007), <https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf>.

122. GCPA § 1802(a), 106 Stat 4669.

123. The identified stakeholder groups included “representatives of academic and scientific communities; environmental organizations; the recreation

The GCPA required the Bureau to complete a Glen Canyon Dam Environmental Impact Statement within two years of enactment.<sup>124</sup> The resulting EIS, issued in 1995,<sup>125</sup> evaluated nine alternative operating regimes, each with its own approach to daily fluctuations, minimum and maximum releases, and “ramping rates” for boosting or cutting releases.<sup>126</sup> The Bureau selected the Modified Low Fluctuating Flow alternative “because it will reduce daily flow fluctuations well below the no action levels (historic pattern of releases) and will provide steady high releases of short duration which will protect or enhance downstream resources while allowing limited flexibility for power operations.”<sup>127</sup> Historic operations had featured large daily fluctuations in dam releases that usually exceeded 12,000 cfs,<sup>128</sup> and the new plan limited these fluctuations to 8,000 cfs per day.<sup>129</sup>

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industry; and contractors for the purchase of Federal power produced at Glen Canyon Dam.” *Id.*, § 1804(c)(3), 106 Stat 4671.

124. *Id.*, § 1803(a), 106 Stat 4670.

125. U.S. DEPARTMENT OF THE INTERIOR, OPERATION OF GLEN CANYON DAM, FINAL ENVIRONMENTAL IMPACT STATEMENT, 15 (March 1995), [http://www.fwspubs.org/doi/suppl/10.3996/082012-JFWM-071/suppl\\_file/10.3996082012-jfwm-071.s10.pdf?code=ufws-site](http://www.fwspubs.org/doi/suppl/10.3996/082012-JFWM-071/suppl_file/10.3996082012-jfwm-071.s10.pdf?code=ufws-site).

126. *Id.* at 17. A spreadsheet compares these elements across the nine alternatives. The alternatives ranged from allowing even greater daily fluctuations in flows (up to the maximum capacity of the dam’s powerplant), to imposing a steady flow regime that would basically keep releases at the same level all year long. *Id.*, tbl.II-1, p. 18.

127. U.S. BUREAU OF RECLAMATION, RECORD OF DECISION, OPERATION OF GLEN CANYON DAM, Appendix G-3 (Oct. 9, 1996), [https://www.usbr.gov/uc/rm/amp/pdfs/sp\\_appndxG\\_ROD.pdf](https://www.usbr.gov/uc/rm/amp/pdfs/sp_appndxG_ROD.pdf). A key feature of the chosen alternative was “beach/habitat-building flows which are scheduled high releases of short duration designed to rebuild high elevation sandbars, deposit nutrients, restore backwater channels, and provide some of the dynamics of a natural system.” *Id.*

128. Daily fluctuations exceeded 12,000 cfs on nearly 60% of the days from 1965-1989, and exceeded 20,000 cfs on over 15% of days. Hourly fluctuations exceeded 4,000 cfs over two-thirds of that time, with up-ramp rates exceeding 6,000 cfs about one-third of the time and down-ramp rates exceeding 6,000 cfs about one-fourth of the time. U.S. BUREAU OF RECLAMATION, OPERATION OF GLEN CANYON DAM, DRAFT ENVIRONMENTAL IMPACT STATEMENT 22-23 (1993).

129. U.S. BUREAU OF RECLAMATION, RECORD OF DECISION, OPERATION OF GLEN CANYON DAM, (Oct. 9, 1996). The new decision also cut back on hourly

In its 1996 final decision on Glen Canyon operations, the Interior Department also emphasized the use of adaptive management in shaping operational practices,<sup>130</sup> and launched the Glen Canyon Dam Adaptive Management Program (GCDAMP).<sup>131</sup> The GCDAMP provides “an organization and process for cooperative integration of dam operations, downstream resource protection and management, and monitoring and research information for the purposes of protecting and improving” the values reflected in the GCPA.<sup>132</sup> Within this framework, the Interior Department conducted a series of experimental releases from Glen Canyon, testing how downstream resources would respond under various conditions.<sup>133</sup>

*B. A second review and a 2016 plan for Glen Canyon operations*

The Interior Department first announced in 2009 that it would produce a new Glen Canyon Operating Plan.<sup>134</sup> The Bureau and the National Park Service would jointly lead the development of the new LTEMP,<sup>135</sup> and from the outset, the agencies emphasized the need for

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fluctuations, limiting the “up-ramp” rate to 4,000 cfs and the “down-ramp” rate to 1,500 cfs. *Id.*

130. *Id.* at Appendix G-10 (establishment of Adaptive Management Workgroup, and “development of a long-term monitoring, research, and experimental program which could result in some additional operational changes”).

131. U.S. DEPARTMENT OF THE INTERIOR, RECORD OF DECISION FOR THE GLEN CANYON DAM LONG-TERM EXPERIMENTAL AND MANAGEMENT PLAN FINAL ENVIRONMENTAL IMPACT STATEMENT 12 (Dec. 2016) [hereinafter LTEMP ROD].

132. *Id.*

133. Lara M. Schmit, Steven P. Gloss, and Christopher N. Updike, *Overview*, in THE STATE OF THE COLORADO RIVER IN GRAND CANYON: A REPORT OF THE GRAND CANYON MONITORING AND RESEARCH CENTER 1991–2004 1-13 (U.S. GEOLOGICAL SURVEY CIRCULAR 1282) (2005).

134. Another 19 months would pass, however, before the agency published its Notice of Intent to prepare an EIS on the issue. Notice of Intent to Prepare a Draft Environmental Impact Statement and Conduct Public Scoping on the Adoption of a Long-Term Experimental and Management Plan for the Operation of Glen Canyon Dam, 76 Fed. Reg. 39435, 39435 (July 6, 2011) (noting that Secretary Salazar had announced the need for a new plan on December 10, 2009).

135. This arrangement reflected the Bureau’s role in operating Glen Canyon and the Park Service’s role in managing Grand Canyon National Park, as well

stakeholder involvement.<sup>136</sup> A remarkable total of 15 cooperating agencies participated, including three other federal agencies, six tribal governments, three state agencies, the Upper Colorado River Commission (primarily composed of representatives from the four Upper Basin states), and two utilities.<sup>137</sup> The agencies also engaged the broader public, holding a series of public meetings at the scoping stage, hosting a two-day public meeting regarding preliminary alternatives, and sending e-mail notice of the Draft EIS to about 600 people; the Draft EIS drew over 3,000 comments.<sup>138</sup> The EIS addressed a wide range of topics, including effects on both hydropower production and riparian ecology,<sup>139</sup> and evaluated seven alternatives,<sup>140</sup> ranging from boosting hydropower generation<sup>141</sup> to establishing steady year-around flows with no daily fluctuations.<sup>142</sup>

In December 2016, the Interior Department officially completed the LTEMP process by choosing Alternative D as the new plan for Glen Canyon Dam.<sup>143</sup> Alternative D was essentially a hybrid of Alternatives C and E, the latter of which was developed and submitted by seven Colorado River Basin states.<sup>144</sup> Interior deemed Alternative D the “environmentally

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as Glen Canyon and Lake Mead National Recreation Areas. LTEMP ROD, *supra* note 131, at 1.

136. This point appears in the second sentence of the Department’s initial Notice of Intent to prepare an EIS on the LTEMP. Notice of Intent to Prepare a Draft Environmental Impact Statement and Conduct Public Scoping on the Adoption of a Long-Term Experimental and Management Plan for the Operation of Glen Canyon Dam, 76 Fed. Reg. at 39435.

137. LTEMP ROD, *supra* note 131, at 1.

138. LTEMP FEIS, *supra* note 116, at ES–17 to ES–18.

139. It also addressed various other values and interests, including water and sediment resources, air quality, tribal and cultural resources, and river-based recreation. *Id.* at ES–8.

140. Under the “no action” Alternative A, operations would continue as before (under the 1996 ROD). *Id.* at ES–18.

141. This was Alternative B, developed by the Colorado River Energy Distributors Association. *Id.*

142. The latter was Alternative G. The seven alternatives are summarized, and their impacts presented in tabular form, *id.* at ES–19 to ES–36.

143. LTEMP ROD, *supra* note 131, at 2.

144. Alternative C, by contrast, came from the federal agencies. LTEMP FEIS, *supra* note 116, at ES–19.

preferred alternative” among the seven considered,<sup>145</sup> concluding that it “provides the best balance among downstream resources to comply with the GCPA to protect, mitigate adverse impacts to, and improve the natural and cultural resources and visitor use” in the national park units, while also complying with other legal requirements regarding Glen Canyon operations.<sup>146</sup> A key feature of the new plan is continued reliance on the GCDAMP, which will prioritize “management and experimental actions; mitigation and environmental commitments; and research and monitoring” under the new plan.<sup>147</sup>

The new plan makes very modest revisions to regular operations at Glen Canyon.<sup>148</sup> It tweaks monthly release volumes to benefit sediment conservation,<sup>149</sup> but also increases monthly releases in August and

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145. *Id.* at ES-33.

146. LTEMP ROD, *supra* note 131, at 2. The decision noted that no alternative performed best across the full range of objectives and goals, but Alternative D did the best overall, including a more favorable regime for hydropower:

Specific performance benefits of Alternative D include expected improvements to conditions for humpback chub, trout, and the aquatic food base; the least impact on vegetation, wetlands, and terrestrial wildlife; improvements to sandbar building potential and sediment conservation; maintaining or improving conditions for reservoir and river recreation; improving preservation of cultural resources; respecting and enhancing tribal resources and values; and limiting impacts on hydropower resources. Specific to hydropower, it was determined (after the initial results analysis was complete) that combining elements of Alternatives C and E into a new alternative, Alternative D, would allow for increased hydropower and sediment conservation performance without sacrificing performance for other resources such as fish, vegetation, cultural resources, and others.

*Id.* at 10. Significantly, Alternative D was supported by key interests including WAPA, the Navajo Nation, and perhaps most significantly the seven states of the Colorado River Basin.

147. *Id.* at 11-15 (explaining the nature, role, and priorities of the GCDAMP).

148. “Alternative D has a base hydrological pattern that incorporates a few improvements over the No-Action Alternative.” *Id.* at 7.

149. *Id.*

September—when electricity demands are high—rather than from April to June, when flows would naturally be high on the Colorado.<sup>150</sup> Daily fluctuations would not change much (remaining capped at 8,000 cfs), and flows could still rise no faster than 4,000 cfs per hour, but could drop more rapidly—up to 2,500 cfs per hour, a 67% increase—to improve the efficiency and flexibility of hydropower operations.<sup>151</sup> Thus, to the limited extent that the new LTEMP changes normal Glen Canyon operations, those changes largely benefit hydropower.<sup>152</sup>

For purposes of improving downstream resources, the LTEMP emphasizes a set of experimental measures in the form of mostly short-duration releases targeted to achieve a certain objective.<sup>153</sup> These measures include a variety of high-flow experiments to benefit beaches and sandbars;<sup>154</sup> one set of flows intended to manage trout populations below the dam;<sup>155</sup> another to support aquatic insects that are part of the

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150. LTEMP FEIS, *supra* note 116, at ES–24. Indeed, Alternative D was adjusted during the LTEMP process to boost flows in August at the expense of May and June, *id.* at ES–33, even though May and June were often the months of peak flow on the river before the dam, *id.* at ES–35.

151. *Id.* at ES–24 to ES–25; LTEMP ROD, *supra* note 131, at 7.

152. Late changes to the chosen Alternative D show the importance of hydropower in the LTEMP decision. The Final EIS explains that four changes were made to Alternative D following completion of modeling, and two further changes were made after publication of the Draft EIS, all in response to input from cooperating agencies and stakeholders. All six of these changes would benefit hydropower, and could negatively impact sediment resources. LTEMP FEIS, *supra* note 116, at ES–33.

153. The sediment-related high flows may last up to 250 hours. LTEMP ROD, *supra* note 131, *id.* at B–18. All the other experimental flows would last less than 10 days each, except for low summer flows (as explained below), which are precluded during the first 10 years of the LTEMP. *Id.* at B–12 to B–14.

154. There are four different types of sediment-related flows, triggered primarily by sediment inputs from the Paria River below the dam, allowing for releases of up to 45,000 cfs for periods ranging from 1 hour to 250 hours. *Id.* at B–17 to B–22.

155. These flows are intended to reduce trout numbers, and are designed literally to strand juvenile trout along the shore, where they will die from dewatering, high water temperatures in isolated pools, or predation. *Id.* at B–23. The EIS noted that “several Tribes have expressed concerns” about this experiment “as a taking of life within the canyon without a beneficial use.” It stated that the federal agencies



food base for fish in the river;<sup>156</sup> and low summer flows that could benefit the humpback chub,<sup>157</sup> but that may be implemented only during the second half of the LTEMP period.<sup>158</sup> Although the plan is very prescriptive regarding the experimental measures that may be taken and the circumstances that will trigger them,<sup>159</sup> the Record of Decision states that “an adaptive management-based approach that is responsive and flexible will be used to adapt to changing environmental and resource conditions and new information.”<sup>160</sup>

For purposes of ESA compliance, the Bureau engaged in formal consultation with the Fish & Wildlife Service (FWS)<sup>161</sup> regarding the effects of the proposed LTEMP on listed species. The primary species of concern was the humpback chub, an endangered fish which has its largest population in the area below Glen Canyon Dam.<sup>162</sup> FWS produced a

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would continue working with the Tribes “to determine the most appropriate means of mitigated impacts on Tribal values” if these flows are implemented. *Id.* at B–24.

156. These “macroinvertebrate production flows” would involve steady low flows on summer weekends, intended to stabilize habitat for the larval stages of mayflies, stoneflies, and caddisflies, all of which provide important food sources for both native fish and trout. *Id.* at B–31 to B–32.

157. These low flows would be intended to raise water temperatures in the reach of the Little Colorado River and downstream, providing better habitat for growth and recruitment of endangered humpback chubs. Unlike the other experimental flows in the LTEMP, which are limited to 10 days or less, these flows would last all summer long (up to three months). *Id.* at B–28.

158. LTEMP ROD, *supra* note 131, at 7; LTEMP FEIS, *supra* note 116, at ES–26 to ES–29. Alternative C would have allowed for experimental low summer flows at any time, but Alternative E allowed for them only after the first ten years under the new plan, and Alternative D incorporated that ten-year restriction. *Id.* at ES–28.

159. In describing the chosen Alternative D, the LTEMP ROD takes just over five pages to describe its basic operational elements, LTEMP ROD, *supra* note 131, at B–2 to B–7, and about 25 pages to describe the experimental features, *id.* at B–8 to B–32 (explaining the rationale for this “condition-dependent” approach).

160. *Id.* at B–9.

161. FWS was one of the federal cooperating agencies on the LTEMP EIS, at ES–1.

162. U.S. FISH AND WILDLIFE SERVICE, BIOLOGICAL OPINION FOR THE GLEN CANYON LONG-TERM EXPERIMENTAL AND MANAGEMENT PLAN, COCONINO COUNTY, ARIZONA 24 (Nov. 2016) (attachment E of the LTEMP ROD, *supra* note 131, at 24) [hereinafter LTEMP BO]. This population occupies the Colorado River

biological opinion concluding that the proposed LTEMP would not jeopardize the survival or recovery of these species or adversely modify their critical habitat,<sup>163</sup> although it would have some adverse effects.<sup>164</sup> This biological opinion provides ESA coverage for the life of the LTEMP, including authorization for incidental take of listed species resulting from Glen Canyon operations.<sup>165</sup>

The adoption of the final LTEMP ended a review and planning process that stretched from the first December of the Obama Administration to the last. The next section considers some of the lessons of this ambitious seven-year review as they relate to other federal hydropower projects.

### *C. Contemplating the LTEMP*

Whatever its significance for the Grand Canyon and the Colorado River, the LTEMP is important within the broader context of federal reservoir operations. The Interior Department exercised its discretion to

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mainstem within the Grand Canyon, but the highest numbers of chubs are in the tributary Little Colorado River, which is largely unaffected by dam operations. *Id.* at 26. Other listed species of concern included the razorback sucker and Kanab ambersnail.

163. *Id.* at 69.

164. The BO concluded that Glen Canyon Dam “base operations” would continue to harm humpback chub, because continued hydropeaking flows with increased downramp rates would increase the risk of stranding juvenile humpback chub, degrade nearshore rearing habitats, and limit the establishment of aquatic invertebrates. In addition, implementation of the LTEMP proposal would continue to result in river temperatures that are more suitable for coldwater nonnative species than for warmwater native and nonnative fish, particularly closer to the dam. *Id.* at 38. According to the Record of Decision, however, FWS stated that the LTEMP’s conservation measures for humpback chub were “at least as strong, and likely stronger, than any reasonable and prudent measures FWS would require.” LTEMP ROD, *supra* note 131, at 17.

165. LTEMP BO, *supra* note 162, at 71–76 (incidental take statement). The BO requires that ESA consultation be reinitiated if LTEMP implementation results in incidental take that exceeds the limits in the incidental take statement; if new information shows unanticipated effects on listed species or their habitat; if operations are modified in a way that changes their impacts; or if a new species is listed under the ESA. *Id.*

review the long-term operating plan of a very important reservoir. The process not only included environmental review under NEPA, but also engagement with states, tribes, and a wide range of stakeholders. The review drew on an impressive body of recent science regarding the effects of dam operations, and addressed how those operations would affect a wide array of important values. It analyzed seven alternatives, two of which would have significantly changed the standard practices for daily and monthly releases from the reservoir. And the process resulted in a new 20-year plan for both standard and experimental operations at Glen Canyon, based on what the agencies deemed to be the environmentally preferred alternative. The merits of the outcome are debatable, but the Interior Department's *approach* to the LTEMP review is commendable for its scope and inclusiveness.

That said, the results of the LTEMP are unimpressive from an environmental standpoint. The most significant change in the regular operating regime, allowing for more dramatic "ramp-down" flow declines, benefits hydropower.<sup>166</sup> All of the late revisions to the chosen Alternative D favor hydropower interests alone.<sup>167</sup> Flow regimes to benefit other resources are conditional, experimental, and limited to short durations; the most significant potential change, involving low summer flows to improve temperature conditions for humpback chub, was disallowed during the first ten years of the LTEMP implementation period.<sup>168</sup> Thus, while the final LTEMP includes four different experimental flow regimes to benefit environmental and recreational values, its basic operating regime is geared toward hydropower generation and revenue.

This ongoing emphasis on hydropower at Glen Canyon Dam reflects the continuing influence of institutions that prioritize power generation over fish, wildlife, and other environmental values. Prior critiques of the adaptive management regime for Glen Canyon and the Colorado River have examined the ways in which hydropower interests

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166. See *supra* note 152 and accompanying text.

167. See *supra* note 153. "These adjustments improved the performance of Alternative D for hydropower value and capacity while *largely preserving* the benefits to downstream resources for sediment, endangered fish, vegetation, and many other resources." LTEMP ROD, *supra* note 131, at 7 (emphasis added).

168. See *supra* notes 154–161 and accompanying text.

and their allies have largely controlled outcomes in the GCDAMP, to the detriment of the downstream environment.<sup>169</sup> Those interests include the seven Colorado River Basin states, which together hold great sway in major water management decisions affecting the Colorado River,<sup>170</sup> and showed greater support for hydropower than environmental flows in their comments on the LTEMP EIS.<sup>171</sup> One can easily view the LTEMP result as confirmation that hydropower still drives Glen Canyon operations most

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169. See, e.g., Lawrence Susskind, Alejandro E. Camacho, and Todd Schenk, *Collaborative Planning and Adaptive Management at Glen Canyon: A Cautionary Tale*, 35 COLUM. J. ENVTL. L. 1 (2010). The authors found that in the Glen Canyon Adaptive Management Work Group (AMWG), “The strongest opposition to flow regime change has come from power generation interests.” *Id.* at 25. They also determined that the seven Colorado River Basin states often aligned with hydropower interests in that process: “Our review of motions voted on since the AMWG was created confirms that factions are entrenched: environmental organizations, the Fish and Wildlife Service, and the National Park Service regularly find themselves on one side, while the states and power generators are often on the other side.” *Id.* at 26. See also Joseph M. Feller, *Collaborative Management of Glen Canyon Dam: The Elevation of Social Engineering over Law*, 8 NEV. L.J. 896, 896 (noting that the GDAMP “has effectively given hydropower production and non-native fisheries higher priorities than they are legally entitled to” at Glen Canyon) (2008).

170. One of the best examples of this influence was the seven basin states’ success in developing an alternative that formed the core of the Interior Department’s 2007 “Interim Guidelines” decision regarding shortages and reservoir operations on the Colorado. See U.S. DEPARTMENT OF THE INTERIOR, RECORD OF DECISION, COLORADO RIVER INTERIM GUIDELINES FOR LOWER BASIN SHORTAGES AND THE COORDINATED OPERATIONS FOR LAKE POWELL AND LAKE MEAD (Dec. 2007); James H. Davenport, *Softening the Divides: The Seven Colorado River Basin States’ Recommendation to the Secretary of the Interior Regarding Lower Basin Shortage Guidelines and the Operation of Lakes Mead and Powell in Low Reservoir Conditions*, 10 U. DENV. WATER L. REV. 287 (2007) (explaining basin states’ proposal on these issues).

171. In addressing comments on the Final EIS, the LTEMP ROD summarized the seven basin states’ comment as including the following points: “(6) experimental low summer flows should be implemented only when they are needed to address immediate concerns with the humpback chub population and only upon careful consideration of all potentially affected resources; and (7) hydropower resources should be maximized consistent with the preferred alternative and in compliance with existing law.” LTEMP ROD, *supra* note 131, at D-1 (also noting that the basin states had stated that high-flow experiments for sediment purposes should still be considered experimental).

of the time, leaving environmental values in the back seat.

While hydropower remains undeniably powerful at Glen Canyon, the longer view shows that it is not entirely dominant. Following the enactment of the GCPA, the Interior Department adopted a new operating regime that considerably reduced the daily and hourly fluctuations that were common through the 1980s. While it certainly can be (and has been) argued that the resulting regime falls short of what is needed for the Colorado River ecosystem, especially native fishes,<sup>172</sup> it is undeniably true that the 1996 decision restricted hydropower operations for the benefit of aquatic and riparian resources. A major reason the LTEMP proved underwhelming was that an earlier review had already struck a better balance between hydropower and environmental values; the irony is that the agency spent seven years on a second review of Glen Canyon operations, while most federal hydropower dams are still awaiting their first one.

## V. CONCLUSION

Since the FPA ironically applies only to *non-federal* projects, FERC relicensing does not apply to hydropower projects operated by the Corps or the Bureau. In the absence of anything like relicensing, there is no effective program for periodic review of federal reservoir operations, and no mechanism for ensuring that the operating plans for these old projects are consistent with today's science, needs, and values. The federal courts have exacerbated the problem by effectively exempting most federal water project operating decisions from NEPA. And while the ESA has played a vital role in prompting reviews at several federal projects, it is an imperfect tool for the job, in part because it focuses narrowly on saving individual species rather than broadly on protecting aquatic and riparian ecosystems.

The Glen Canyon Dam LTEMP represents a conceptually better approach, with a wider scope of review and greater opportunities for public and stakeholder participation. It considered a range of operating alternatives and evaluated their impacts on not only endangered species, but also other values including game fisheries, Grand Canyon beaches, and

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172. See, e.g., Feller, *supra* note 169 (arguing that Interior is violating the ESA by failing to make further changes to Glen Canyon operations to benefit the humpback chub).

tribal resources. It also gave tribes, states, power customers, rafters, anglers, and environmentalists a rare opportunity to weigh in on the next 20 years of reservoir operations.

Under the LTEMP, hydropower will continue to drive most daily operations at Glen Canyon Dam, although not to the extent that it did through the 1980s. Environmental values remain secondary despite the GCPA, which elevated those values but still required the dam to be operated in accordance with existing laws, including the requirement of generating as much hydropower as “practicable.” This kind of have-your-cake-and-eat-it-too approach virtually assures that hydropower will remain a higher priority than environmental values for federal water projects. It is not easy to restore life to a river that has died and been reborn as money.