

Federal Actors in Dam Removal Policy: Legal and Bureaucratic Influences in the Decommissioning of Powered and Non-Powered Dams in the United States

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Abstract -- Multiple avenues exist by which the Federal Government can influence dam removal for environmental, safety, economic, and socio-cultural purposes. For non-federal powered dams, FERC's regulatory procedures accommodate for non-developmental values and the participation of resource agencies in project licensing, which can compel the decommissioning of certain projects. In addition, as aging dams increasingly pose risks to downstream populations, FEMA has supported the removal of certain non-federal non-powered dams to prevent dam failure-related emergencies. For federal dams, which are largely owned and operated by the USBR and USACE, removal is less-frequently considered, as a formal relicensing process does not exist for this dam class.

Though federal forums for dam removal do exist, the Federal Government does not have a dominant role in compelling dam removal. Dam removal is primarily negotiated through settlements, in which public participation has an increasingly important role. In public settings, it is especially important to discuss dam removal by the partitioning of dam class, to direct public sentiment appropriately and encourage the longevity of America's hydropower industry.

I. INTRODUCTION TO AMERICAN DAM INFRASTRUCTURE

Since the 1700s, the US Federal Government has had an evolving relationship with hydropower. Prior to the Industrial Revolution, freshwater was largely seen as a common good rather than an economic commodity, and the natural flow of rivers was favored as a means for watercraft travel. Only when the US's energy needs increased did the Federal Government begin to favor mill owners and the construction of dams. But early dam construction did not go unchallenged, as the courts were forced to grapple with novel issues related to foundational legal concepts, like common-law principles and the regulatory takings doctrine in relation to water infrastructures' effects on fish passage.¹

The US Army Corps of Engineers (USACE), US Bureau of Reclamation (USBR), and Tennessee Valley Authority (TVA) were the first establishments of our "water bureaucracy" and originally assisted with the facilitation of primarily state-led water projects. In November of 1997, the Federal Government's influence over hydropower expanded to include dam removal. The removal of Edwards Dam on Maine's Kennebec River for the purpose of river health restoration, as ordered by the Federal Energy Regulatory Commission (FERC), was the first and currently only time that the Federal Government has directly ordered a dam to be removed.² FERC's authority to order the decommissioning of Edwards Dam has been contested and the range of potential conditions that fall under the term "decommission" continue to add complexity to dam removal policy today. Currently, the issue of dam removal is primarily negotiated through settlements and is an intricate combination of local, state, and national interests.

II. DAM PRODUCTIVITY, INVENTORY, AND OWNERSHIP

US hydropower provides about 6.3%³ of our Nation's energy needs and accounts for approximately 50% of all renewable energy generated domestically.⁴ This hydroelectric energy is derived from only 3% of the Nation's dams, while the others provide services related to flood control, water storage (including recreation and irrigation), and navigation.⁵

¹ John Hart, "Fish, Dams, and James Madison: Eighteenth-Century Species Protection and the Original Understanding of the Takings Clause," *Maryland Law Review* 63, no. 2 (2004): 287-95.

² "A Brief History of Edwards Dam," Natural Resources Council of Maine, accessed February 18, 2021, <https://www.nrcm.org/programs/waters/kennebec-restoration/history-edwards-dam/>.

³ "Hydropower explained," US Energy Information Administration, accessed February 20, 2021, <https://www.eia.gov/energyexplained/hydropower/>.

⁴ "Hydropower and FERC, Introduction," Federal Energy Regulatory Commission, accessed February 10, 2021, <https://ferc-oep.maps.arcgis.com/apps/MapSeries/index.html?appid=447e5523f6bc4a759c5667791d5af074>.

⁵ US Army Corps of Engineers, *National Inventory of Dams* (Washington, DC, 2020) <https://nid.sec.usace.army.mil/ords/f?p=105:113:33558033177501::NO::>.

The USACE has a primary role in accounting for our Nation's dams. In 1972, Congress authorized the Secretary of the Army to maintain a National Inventory of Dams (NID) with the passing of the National Dam Inspection Act (Pub. L. 92-367).⁶ NID data reports that the total number of dams in the US is 92,017 and the average age of those dams is 61 years old. Data in the NID reflects that 75% of high hazard dams have an Emergency Action Plan (EAP).⁷ "High hazard" is defined as those which "will probably cause loss of human life" in case of failure or mis-operation.⁸ It should also be noted that thousands of dams in the Nation (many of which are concentrated in the Northeast US) do not meet NID criteria and thus are not accounted for in the NID.⁹ The majority of the Nation's dams are privately owned. Private operators include private power companies, individual property owners, irrigation districts, universities, and even homeowners associations and country clubs.¹⁰ Local governments account for the second largest ownership group, followed by state governments.

III. NON-FEDERAL POWERED DAMS

FERC, an independent regulatory agency within the Department of Energy (DOE), is the primary federal agency that regulates, licenses, and inspects non-federal hydropower projects. FERC currently has jurisdiction over 1,700 dams¹¹ and about 51% of the Nation's hydropower capacity.¹² In 1977, this agency was given authority and responsibility over Parts I and II of the Federal Power Act (FPA) (16 U.S.C. §§ 791-824w) after the passing of the Department of Energy Organization Act.

Most relevant to this work is Part I of the FPA, under which FERC licenses the construction and operation of privately owned and some publicly owned (non-federal) projects.¹³ Issuance of licenses requires FERC's compliance with a multitude of federal statutes. For example, Clean Water Act, Sec. 401(a)(1); Endangered Species Act, Sec. 7(a)(2); National Historic Preservation Act, Sec. 106; and the National Environmental Policy Act.¹⁴ Pursuant to these statutes and the FPA, FERC can prevent the construction of a dam during the original licensing process and require the decommissioning of a dam during the relicensing (new license) processes.

A. Non-Developmental Values in the FPA

The FPA was amended with the passing of the Electric Consumers Protection Act (ECPA) in 1986, and now allows for the consideration of a broader range of non-developmental values during FERC's regulation of hydropower projects.¹⁵ As specified by Congress, with the passing of the ECPA, FERC should demonstrate a "high level of concern for all environmental aspects of hydropower development"¹⁶ during its proceedings. For example, amendments to Sec. 4(e) and Sec. 18 grant prescription authority to resource agencies other than FERC in hydropower development. Specifically, Sec. 4(e) now requires that equal consideration is granted to hydropower development, energy conservation, fish and wildlife (including spawning grounds and habitat), recreational opportunities, and environmental quality. This section also now allows for conditions to be provided in licenses by resource agencies, of which FERC can neither alter nor reject.¹⁷ Similarly, Sec. 18 amendments require that the

⁶ *An Act to authorize the Secretary of the Army to undertake a national program of inspection of dams*, Pub. L. No. 92-367 (1972).

⁷ US Army Corps of Engineers, *National Inventory of Dams*.

⁸ US Army Corps of Engineers, *List of Field Definitions – 2018 National Inventory of Dams*, sec. 36 (2018).

⁹ US Library of Congress, Congressional Research Service, *Dam Safety Overview and the Federal Role*, by Anna Normand, R45981 (2019).

¹⁰ Margaret Walls and Vincent Gonzales, "Dismantling Dams Can Help Address US Infrastructure Problems," Resources, October 22, 2020, <https://www.resourcesmag.org/archives/dismantling-dams-can-help-address-us-infrastructure-problems/>.

¹¹ "Commission's Responsibilities," Federal Energy Regulatory Commission, last updated January 25, 2021, <https://www.ferc.gov/industries-data/hydropower>.

¹² US Department of Energy, *Hydropower Vision Report: A New Chapter for America's 1st Renewable Energy Source* (2016): 80.

¹³ US Library of Congress, Congressional Research Service, *The Legal Framework of the Federal Power Act*, by Adam Vann, IF11411 (2020).

¹⁴ "Hydroelectric Licensing Regulations Under the America's Water Infrastructure Act of 2018," Federal Register, accessed February 20, 2021, <https://www.federalregister.gov/documents/2019/02/07/2019-01256/hydroelectric-licensing-regulations-under-the-americas-water-infrastructure-act-of-2018>.

¹⁵ US General Accounting Office Division, *Electric Consumers Protection Act's Effects on Licensing Hydroelectric Dams*, B-249467 (1992).

¹⁶ H.R. Conf. Rep. No. 934, 99th Cong., 2d. Sess. at 21-25, reprinted in 1986 U.S. Code Cong. & Admin. News 2496, p. 2537-2542.

¹⁷ Electric Consumers Protection Act of 1986, 16 U.S.C. § 791a (1986): 2.

US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NOAA Fisheries) prescribe mandatory fishway passage requirements to relevant projects.¹⁸

Other amendments to the FPA incorporate non-mandatory resource agency participation in FERC's proceedings. Sec. 10(a) was amended to expand FERC's consideration of State and Federal comprehensive plans to include fish and wildlife values, instructing FERC to consider recommendations regarding these values from resource agencies (and Indian Tribes when applicable). FERC does not have an obligation to neither incorporate these recommendations in the license nor provide an explanation for their rejection. Likewise, Sec. 10(j) was amended to emphasize the importance of the balancing of developmental and non-developmental values in the licensing process. This act calls for the protection, mitigation, and enhancement of natural resources based on recommendations given to FERC by NOAA Fisheries, the USFWS, and applicable state agencies. FERC can reject these recommendations in some cases if inconsistent and/or unsubstantial evidence is provided.¹⁹

The participation of outside agencies in the licensing and relicensing processes (especially when mandatory) is essential to avoid agency capture- the notion in which an agency works to benefit the interests that it regulates rather than the public good.²⁰ The variety of interests that are vested with influence in FERC's regulatory processes is a means by which equal consideration in hydropower regulation can be fulfilled. The consideration of non-developmental goods, in addition to expanded opportunities for outside participation in FERC's regulatory processes, has resulted in the dismissal or rejection of some original and new license applications.

B. Original License Applications

FERC issues original licenses for terms of 50 years. The evolution of the FPA has provided a means by which original license applications are reviewed with increased scrutiny for previously disregarded implications of dam construction. This was emphasized in a 1986 Congressional Conference Report in which amendments to the FPA were being discussed. The Joint Explanatory Statement of the Committee of Conference stated:

"We agree that there are instances in which careful and thoughtful consideration of the impact of a proposed project would and should lead to the conclusion that an original license ought not to be issued...Such consideration is important because it is intended that FERC give these nondevelopmental values the same level of reflection as it does to power."²¹

Though originally the House and Senate had developed opposing amendments to the FPA, this agreement was reached through the chambers' mutual understanding of the preservation of our national "heritage"²² as being inclusive of natural, recreational, mitigation, and enhancement values. FERC has rejected original applications with this commonly understood definition.

Example: Bear River Narrows hydroelectric project. In 2016, FERC denied an original license application for Twin Lakes Canal Company's 10-megawatt (MW) hydroelectric project proposal on southeast Idaho's Bear River. FERC's reasoning was based on environmental grounds and was influenced by multiple groups, including Idaho Rivers and American Whitewater (AW).²³ Local citizens were also involved in the process through FERC's distribution of two scoping documents and a draft environmental impact statement (EIS) to the local community, which solicited the public's recommendations and comments regarding the project.²⁴ The proposed project boundary included 121 acres of wetlands and other sensitive habitat, largely composed of Utah juniper that would be inundated by the proposed reservoir. Construction would also result in the loss of 425 acres of "nearly pristine"²⁵ habitat, which included 55 acres of land termed by the Bureau of Land Management (BLM) as an "Area of Critical Environmental Concern."²⁶ It was eventually determined that the project would violate FPA Sec. 4(e) by eliminating critical plant and animal habitat and FPA Sec. 10(a)(2)(A), by not adhering to Idaho's Northwest Power and

¹⁸ US Fish and Wildlife Service, *Overview of the Federal Power Act and the Hydropower Relicensing Process*, (accessed March 3, 2021): 2-4.

¹⁹ USFWS, *Overview of the Federal Power Act and the Hydropower Relicensing Process*, 2-5.

²⁰ Adell Amos, "Dam Removal and Hydropower Production in the United States – Ushering In a New Era" (lecture, University of Oregon School of Law, Eugene, OR, October 5, 2013).

²¹ US Congressional Serial Set, Report 99-900, 99th Cong., 2nd Sess. (1986): 21-22.

²² US Congressional Serial Set, Report 99-900, 21.

²³ Thomas O'Keefe, "License Denied for New Dam on Bear River (ID)," American Whitewater, June 18, 2016, https://www.americanwhitewater.org/content/Article/view/article_id/32589/.

²⁴ Federal Energy Regulatory Commission, Division of Hydropower Licensing, *Environmental Impact Statement for Hydropower License: Bear River Narrows Project*. FERC Project no. 12486-008 – Idaho (2016): xxvi.

²⁵ Federal Energy Regulatory Commission, *Environmental Impact Statement for Hydropower License*, 235.

²⁶ Federal Energy Regulatory Commission, *Environmental Impact Statement for Hydropower License*, xxxix.

Conservation Council's regulations.²⁷ In the words of FERC Commissioners, "The project's unmitigable adverse impacts outweigh its benefits."²⁸ Without the addition of non-developmental values in the FPA, approval would have more likely been granted to this license application.

C. New License Applications (Relicense)

The notion that dam decommissioning is a viable alternative to the renewal of a license has progressed recently. As written in a 1994 policy statement by FERC, "In nearly every instance, existing licensees have applied for, and received, new power licenses when their old ones expired."²⁹ While this statement exemplifies the pro-development priorities that were dominant in the 1990s, today the relicensing process, albeit infrequent, provides an increasingly important setting for adaptive governance to take place. During this time, an aging dam's current purpose, condition, perception by its surrounding community, and compliance with regulations certified during the original licensing phase must be re-assessed.³⁰ Relicenses for existing non-federal powered dams are issued by FERC for terms of 30-50 years. Between 1970-1979, 13,406 dams were completed and issued original licenses.³¹ This is the second-largest decade for dam completion after the 1960s. This topic is highly salient because these original licenses will be subject to the relicensing process during the years 2020-2029.³²

Example: Potter Valley hydroelectric project. In 2019, Pacific Gas and Electric Company (PG&E) withdrew a relicense application for their hydroelectric project located on the Eel River and East Branch Russian River of California. The Potter Valley Project (PVP) included two dams, Cape Horn and Scott Dams in Mendocino County and Lake County, respectively. While Cape Horn dam was equipped with fish passage facilities, Scott Dam was not.³³ During the relicensing process, FERC's study plan determination included multiple natural concerns regarding the PVP (in which NOAA Fisheries had a large contributing role), in addition to tribal and cultural concerns.³⁴ With the costly anticipated new license conditions, PG&E withdrew the license application after determining that the continuation of the project would be contrary to the interests of electric ratepayers. NOAA Fisheries requested that PG&E conduct studies related to the effect of dam removal on fish passage. Though detailed decommissioning-related studies were not being conducted at that time, PG&E staff stated that "Dam removal may be an end result of this proceeding."³⁵ As predicted, in May of 2020, a coalition of water and energy agencies, local government groups, a Native American group, and an environmental group adopted the orphan project with plans that included the removal of Scott Dam.³⁶

IV. NON-FEDERAL NON-POWERED DAMS

State and local governments are responsible for the management of privately owned, non-powered dams. Approximately 80% of dams listed in the NID are regulated by state governments.³⁷ Federal influence over removal of this infrastructure is typically limited, unless an egregious error has occurred. Though current dam infrastructure and foundation materials were built with the best technology available at the time of their construction, infrastructure is now aging and subject to increasing regulations. In addition to the natural weakening of infrastructure with time, the increasing frequency and severity of climate-induced weather events further strains the stability of

²⁷ "FERC Denies New Project License Application on Environmental Grounds," *The National Law Review*, July 1, 2016, <https://www.natlawreview.com/article/hydro-newsletter-ferc-denies-new-project-license-application-environmental-grounds>.

²⁸ Federal Energy Regulatory Commission, *Order Denying Application for License*, Project no. 12486-008 (2016): 6.

²⁹ Federal Energy Regulatory Commission, *Project Decommissioning at Relicensing; Policy Statement*, 18 CFR Part 2 (1994): 341.

³⁰ Brian Chaffin and Hannah Gosnell, *Beyond Mandatory Fishways: Federal Hydropower Relicensing as a Window of Opportunity for Dam Removal and Adaptive Governance of Riverine Landscapes in the United States*, *Water Alternatives* 10, no. 3 (2017).

³¹ *National Inventory of Dams*, US Army Corps of Engineers.

³² *National Inventory of Dams*, US Army Corps of Engineers, "Dams by Completion Date" [here](#).

³³ "Potter Valley Hydroelectric Project," California Water Boards, State of CA, last updated February 26, 2019, https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/potter_valley_ferc77.html.

³⁴ Federal Energy Regulatory Commission, Office of Energy Projects, *Study Plan Determinant for Potter Valley Project*, Project no. 77-285 – California (2018).

³⁵ FERC, *Study Plan Determinant for Potter Valley Project*, Appendix B, 1.

³⁶ Felicity Barringer, "As Relicensing Looms, Aging Dams Face a Reckoning," *The Bill Lane Center for the American West*, Stanford University, updated May 14, 2020, <https://west.stanford.edu/news/blogs/and-the-west-blog/2019/green-power-source-or-fish-killer-relicensing-looms-aging-dams-face-reckoning>.

³⁷ "National Dam Safety Program Resources for States," Federal Emergency Management Agency, last updated August 19, 2020, <https://www.fema.gov/emergency-managers/risk-management/dam-safety/resources-states>.

infrastructure.³⁸ For this reason, a prominent incentive for non-federal non-powered dam removal is safety-related concerns.

The safety risks that decrepit dams pose to downstream populations has prompted the Federal Emergency Management Agency (FEMA) to provide funding for select dam removal projects. In addition, it is important to note that dam safety initiatives often address dam rehabilitation and emergency response rather than dam removal. The implications of this tendency will be discussed in relation to the work of both FEMA and the Association of State Dam Safety Officials (ASDSO).

A. FEMA Hazard Mitigation Assistance Grants

While FEMA was originally established to provide disaster response and recovery services, the scope of this agency's efforts has been expanded to include disaster prevention. As exemplified in a recent statement, FEMA declared it "aims to categorically shift the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience."³⁹ These proactive efforts have included dam failure prevention.

FEMA's dam failure prevention efforts have been accomplished through the provision of the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation Grant (PDM). The PDM is currently being replaced by FEMA's Building Resilient Infrastructure and Communities initiative, though this initiative will not be discussed in this work as it has not yet undergone its first round of project selection.⁴⁰ Both the PDM and HMGP were established in 1988 through the Disaster Relief Act (Pub. L. 100-707). These programs provide decision support systems and funding for dam removal to dam safety professionals. The HMGP is only eligible to specific subsets of non-powered dams in the US, including those that are located in states with a state dam safety program (thus it excludes Alabama, which is the only US state that does not have a state-wide dam safety program⁴¹). The HMGP is available to those that have a high hazard potential and are failing to meet state/territory state dam safety requirements. Federally owned dams and those regulated by FERC are not eligible.⁴² Though both established over three decades ago, the HMGP and PDM have funded the removal of only two dams in total;⁴³ these programs have much opportunity for expansion.⁴⁴

Example: Rattlesnake Creek Dam removal. Built in 1924 and owned by Mountain Water Company, Rattlesnake Creek Dam provided the city of Missoula, Montana with drinking water until the giardia outbreak of 1983. Since then, the idle dam and accompanying 3 million gallon settling pond were requiring \$15,000 per year from Missoula Water in ongoing maintenance costs. The dam structure was "highly deteriorated"⁴⁵ and posed a "very real flooding risk"⁴⁶ in case of failure, in which potential damages were estimated at \$6,000.⁴⁷ Recognizing this risk, the City formed a partnership with Trout Unlimited (TU), the Watershed Network, and Montana Department of Fish, Wildlife and Parks. Working together, these entities established a project vision for dam removal that would result in the decrease of liability and elimination of a public risk.

The dam removal project was funded by over 20 groups, including local businesses and individual donors.⁴⁸ But the majority of money was derived from a sizeable fund secured from FEMA, which granted over \$700,000 to

³⁸ Peter Sinclair, "Michigan dam break shows how climate change strains infrastructure," Yale University, Yale Climate Connections, June 17, 2020, <https://yaleclimateconnections.org/2020/06/michigan-dam-break-shows-how-climate-change-strains-infrastructure/>.

³⁹ Margaret Walls and Leonard Shabman, *Federal Funding for Dam Removal in the United States*, Resources for the Future, Issue Brief 20-12 (2020): 5.

⁴⁰ "Building Resistant Infrastructure and Communities (BRIC)," Federal Emergency Management Agency, last updated March 26, 2021, <https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities>.

⁴¹ "Dams in Alabama," Alabama Section of the American Society of Civil Engineers, accessed March 2, 2021, <https://www.alabama-asce.org/report-card/dams-in-alabama/>.

⁴² "Hazard Mitigation Assistance Grants," Federal Emergency Management Agency, last updated March 23, 2021, <https://www.fema.gov/grants/mitigation>.

⁴³ Margaret Walls and Leonard Shabman, *Federal Funding for Dam Removal in the United States*.

⁴⁴ FEMA report on dam removal and PDM, Ninemile Creek Mitigation Project (provision of \$1.2M) [here](#).

⁴⁵ "Rattlesnake Dam," Morrison-Maierle, (presented at Rattlesnake Dam Open House, Missoula, MT) accessed February 2, 2021, 3.

⁴⁶ Dennis Bragg, "After a century, Rattlesnake Dam comes down in hours," Missoula Current, August 11, 2020, <https://missoulacurrent.com/outdoors/2020/08/rattlesnake-dam-down/>, para 2.

⁴⁷ "FEMA Helps Fund Dam Removal as Part of Innovative Public-Private Partnership," Federal Emergency Management Agency, R9-20-NR-009, April 14, 2020, <https://www.fema.gov/press-release/20210318/fema-helps-fund-dam-removal-part-innovative-public-private-partnership>.

⁴⁸ Brett Prettyman, "Rattlesnake Dam removal is almost complete," Trout Unlimited, accessed February 10, 2021, <https://www.tu.org/magazine/rattlesnake-dam-demolition-nearly-complete/>.

the project through its HMGP, accounting for 75% of the project costs. The securement of this funding allowed for the project to begin in March of 2020. The removal of Rattlesnake Creek Dam has allowed for not only the elimination of a public safety hazard, but also the passage of multiple native fish species and the improvement of public recreation opportunities.

B. Other Dam Safety Initiatives and Their Implications

FEMA National Dam Safety Program. While developing their individual dam safety programs, most states account for suggestions administered by FEMA. FEMA's National Dam Safety Program (NDSP) was authorized by Congress in 1996 under Sec. 467(f) of U.S.C. Title 33 and has an essential role in encouraging the establishment and implementation of "effective dam safety programs in each State based on State standards."⁴⁹ The NDSP largely focuses on enhancing public emergency-related risk communication and emergency response and evacuation planning for dam-related infrastructure failure. FEMA accomplishes this by educating public authorities regarding dam safety, emergency preparedness, and human consequence modules. The program is comprised of federal and state agencies, in addition to private sector partners.⁵⁰

Association of State Dam Safety Officials. Though not a federal agency, the ASDSO claims the USACE as a member and has succeeded in fostering a unified dam safety community across the Nation. This organization has an essential role in raising awareness for dam safety among the states and federal government. The ASDSO's work relies on the acknowledgement that "dams are innately hazardous structures"⁵¹ and that all states' dam safety programs are not equally effective. Some programs are under-funded, while others lack the legislative authority to implement comprehensive dam safety programs. For example, while Georgia state law does not require that EAPs are updated after initial submission, the state of Connecticut requires that Emergency Operations Plans for high and significant hazard dams are updated at least once per year.⁵² Recognizing these disparities, the ASDSO helps local governments improve their dam safety laws and EAPs, in addition to collecting information on dam failures nationwide and assisting states in the financing of dam rehabilitation projects. The USACE has a prominent role in the ASDSO's education efforts and frequently helps to lead ASDSO events.

As previously discussed, federal involvement over removal of non-federal non-powered dams typically occurs only in the case of an egregious error. While the federal government oftentimes has an advisory role in dam removal studies (e.g., USACE and NOAA Fisheries), the need for federal funding in removal projects is apparent. While it is important that groups like FEMA, the ASDSO, and the USACE aid states in emergency response preparedness and dam rehabilitation efforts, dam removal should also be accepted as a method by which public safety can be upheld. FEMA's HMGP and PDM have collectively provided funding for the removal of only two dams. While not futile, this progress could be occurring at a faster rate. For many other dams in the Nation outside of these two projects, proactive removal projects could benefit public safety values.

V. FEDERAL POWERED AND NON-POWERED DAMS

Some of the largest dams in the Nation are federally owned and operated, many of which are located on major river systems. These structures were especially important to the economic development of the arid West, being vital to industries such as mining and agriculture.⁵³ While small dams are the most commonly removed river impoundments in the Nation, the sheer size of large, federal dams is an obstacle to removal. The USBR and USACE collectively own and operate a large portion, 42%, of federal dams. Others are owned and operated by the US Forest Service, Department of Defense, Bureau of Indian Affairs, International Boundary and Water Commission, BLM, USFWS, TVA, and DOE.⁵⁴ Federal water project authorization occurs through the Water Resources Development Acts (WRDAs). Congress utilizes the WRDAs to grant the USACE and USBR permission to study a

⁴⁹ "National Dam Safety Program (NDSP)," Grants Intelligence, accessed March 2, 2021, <https://www.homelandsecuritygrants.info/GrantDetails.aspx?gid=33832>.

⁵⁰ Federal Emergency Management Agency, *Year-In-Review; National Dam Safety Program Fiscal Years 2018 and 2019* (2021).

⁵¹ "The Increasing Hazard: Summary of US Dam Data," Association of State Dam Safety Officials, accessed February 6, 2021, <https://www.damsafety.org/Roadmap#Lack%20of%20Transparency>, para 1.

⁵² "State Dams Program FAQ (EAP)," Environmental Protection Division, State of Georgia, accessed March 3, 2021, <https://epd.georgia.gov/safe-dams-program-faq-eap>.

⁵³ David Billington, Donald Jackson, and Martin Melosi, *The History of Large Federal Dams: Planning, Design, and Construction*, US Department of the Interior, Bureau of Land Management (2005).

⁵⁴ US Library of Congress, CRS, *Dam Safety Overview and the Federal Role*, by Anna Normand.

potential project's feasibility, benefits, and costs. If the project meets required criteria, congressional approval can be granted to begin subsequent planning and construction efforts.⁵⁵

Because some of the WRDAs were developed in an era during which new water infrastructure construction was occurring at a higher rate, the WRDAs are not designed to prioritize investments for the removal of existing infrastructure. In addition, many federal water infrastructure projects were built during the first half of the twentieth century and are now in need of repairs. Yet, federal funding for these projects has been "consistently...inadequate to maintain all of this infrastructure at acceptable levels of performance and efficiency."⁵⁶ While Congress and the Office of Management and Budget (OMB) within the executive branch focus on planning responsibilities for new projects, a lack of resources is partitioned to address the needs of existing projects. Without clear, centralized priorities by the OMB and Congress, federal agencies are left without clear guiding principles in managing existing dam infrastructure, while associated fiscal challenges continue to strain infrastructure management.⁵⁷

While the FPA requires that non-federal powered dams are re-evaluated periodically and similar requirements exist in state laws for non-powered dams, a centralized re-examination process does not exist for federally owned dams. Incentives to engage in reevaluation are generally infrequent and no automatic reevaluation is required.⁵⁸ Without decommissioning incentives, agencies like the USACE have less resources available for higher priority projects. As stated in a National Resource Council study in 2013, "Financial stresses placed on the Corps to provide safe and efficient operation of *all* infrastructure leads to *partial* investments across many facilities [emphasis added]."⁵⁹ If decommissioning was considered a feasible method to re-distribute federal funding, larger investments could be made to more critical facilities and higher OMB priorities. Because the attainment of bureaucratic, congressional, and/or executive approval obstructs these decisions, the decommissioning of federal dams is not a frequent practice.

VI. THE EFFECT OF DAM CLASS ON PUBLIC SENTIMENT REGARDING DAM REMOVAL

As observed in previously referenced case studies, public participation is an increasingly influential factor in compelling the decommissioning of dams. This participation includes certain interest groups that boast large memberships and serve as a venue for public participation in policy decisions. For example, the previously discussed AW and TU have 6,000⁶⁰ and 300,000⁶¹ members across the Nation, respectively. Because dams are innately "social-ecological systems,"⁶² efforts to manage dam infrastructure in isolation from society would be less productive. Recent surveys in New Hampshire revealed important findings regarding public views of dam removal. This state is an appropriate venue to conduct this study, because though it includes many dams that have received low letter grades in the past (an average of C- on the American Society of Civil Engineers' 2017 infrastructure report card), many of these dams are still considered active.⁶³

In 2018, the Carsey School of Public Policy at the University of New Hampshire surveyed over 1,500 randomly sampled local adults. Participants were asked a series of four questions that featured trade-offs between dam removal for fish/wildlife versus other values. Three of these questions asked participants if they preferred dam removal over the preservation of waterfront property values, industrial history, and recreational opportunities. For these three questions, most participants favored dam removal for the purpose of river restoration. Though dam removal preferences prevailed for these three questions, the last question asked participants if they favored dam removal over the generation of hydropower. For this, more individuals, 46%, opposed dam removal and favored electricity generation. A minority, 33%, of participants favored dam removal over hydropower generation and 21% of participants had no response.⁶⁴

⁵⁵ Committee on US Army Corps of Engineers Water Resources Science, Engineering, and Planning, *Corps of Engineers Water Resources Infrastructure: Deterioration, Investment, or Divestment?* (Washington, DC: The National Academies Press, 2013).

⁵⁶ Committee on USACE Water Resources Science, *Corps of Engineers Water Resources Infrastructure*, 2.

⁵⁷ Committee on USACE Water Resources Science, *Corps of Engineers Water Resources Infrastructure*.

⁵⁸ Adell Amos, "Dam Removal and Hydropower Production in the United States – Ushering In a New Era."

⁵⁹ Committee on US Army Corps of Engineers Water Resources Science, *Corps of Engineers Water Resources Infrastructure* (2013): 9.

⁶⁰ "About," American Whitewater, accessed March 3, 2021, <https://www.americanwhitewater.org/content/Wiki/aw:about/>.

⁶¹ "About Trout Unlimited," Trout Unlimited, accessed March 3, 2021, <https://www.tu.org/about/#:~:text=Founded%20in%20Michigan%20in%201959,coldwater%20fisheries%20and%20their%20watersheds..>

⁶² Brian Chaffin and Hannah Gosnell, *Beyond Mandatory Fishways*, 819.

⁶³ "2017 New Hampshire Infrastructure Report Card," American Society of Civil Engineers, Report Card for America's Infrastructure, 2017, <https://infrastructurereportcard.org/state-item/new-hampshire/>.

⁶⁴ Natallie Leuchanka, Catherine Ashcraft, Kevin Gardner et al., *What to do With Dams: An Assessment of Public Opinion to Inform the Debate in New Hampshire*, University of New Hampshire, Carsey School of Public Policy (2019).

The results of this study reveal two important findings. Firstly, the majority of the public does hold an opinion regarding dam removal practices. Of individuals surveyed, an average of only 20% responded with “DK/NA” for the four questions posed. Though most individuals did share an opinion, these responses beg the question, *how well is public opinion informed?* Generally, the American public pays most attention to news stories that involve incompetence and disasters. When dam failures such as the infamous Oroville and Edenville Dam crises appear in headlines, the public is likely to take note. The appearance of frequent headlines like these risks the public developing a negative connotation with the term “dam” or even “hydropower.” Additionally, the FPA currently requires that all licenses are issued in the “public interest.”⁶⁵ This is accomplished in part through the involvement of local communities in the licensing process. Existing licensees must make current maps, data, and drawings, which convey “to the greatest extent practicable”⁶⁶ a range of considerations, including fish, wildlife, and recreational implications of the license in question, available to the public for inspection. Because communities have a stake in local dam licensing through this provision in the FPA and other similar state laws, it is essential that dam safety is rigorously upheld in order to preserve the public’s positive outlook on American dam infrastructure.

Secondly, this study demonstrates that the public is less apt to favor dam removal when powered versus non-powered dams are in question. Furthermore, when the question of dam removal is not prefaced with the specification of powered versus non-powered dams, the public is more apt to favor removal. The respondents prioritized the generation of electricity over values that were even strongly community-based, like property values, historical preservation, and recreational opportunities. Individuals who intend to influence dam removal policy should consider focusing their efforts on non-powered dams rather than dam infrastructure in general.

VII. CONCLUSION – RECOMMENDATIONS FOR RESPONSIBLE DAM DECOMMISSIONING INITIATIVES

While the construction of dams in the US peaked over fifty years ago, aging dams that are no longer economical, safe, and sustainable are now facing a reckoning that involves a diverse array of local, state, and national interests. While the Federal Government’s role in influencing dam removal is not as frequently utilized compared to other non-federal actors, federal influence over removal of dams should not be suspended until egregious errors have occurred. The efforts of FEMA to compel dam decommissioning as a preventative measure rather than a reactive measure to dam failure is promising; this ideal should be applied to dams outside of the narrow sector that FEMA’s HMGP and PDM grants are currently applicable to. Additionally, the FPA’s requirement for project relicensing serves as an essential forum for adaptive governance. A centralized relicensing requirement should be established for federal dams, especially as these large structures age and removal might become more feasible than rehabilitation. As dam removal can offer benefits such as the re-allocation of federal funding to projects of higher OMB priority and a decrease in federal and local governmental liability, dam removal should not be viewed as a zero-sum game between community members and public authorities. The removal of dams, when appropriate, is essential to preserve the public’s positive outlook regarding the American hydropower industry. Of all American dam infrastructure, dams that should be considered for removal will most frequently reside in the non-powered category. Individuals who desire to influence dam removal through their personal efforts should consider focusing their efforts toward non-powered dams. It is important that individuals act with regard to the distinction of dam class in their chosen activities, as public participation is an increasingly powerful force in the negotiation of dam removal settlements.

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⁶⁵ Electric Consumers Protection Act of 1986, 16 U.S.C. § 791a, 3488.

⁶⁶ Electric Consumers Protection Act of 1986, 16 U.S.C. § 791a, 3490.

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