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Note

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INTRODUCTION

On March 24, 2014, the City of River Falls, Wisconsin, held a public meeting to discuss the relicensing of the River Falls Hydroelectric Project (the Project) by the Federal Energy Regulatory Commission (FERC).[1] FERC issued the City of River Falls (the City) a thirty-year license to operate the Project located on the Kinnickinnic River on September 1, 1988.[2] Though the license does not expire until August 31, 2018, the City began the relicensing process in November 2013 when it submitted its Notice of Intent to Relicense and its Pre-Application Document (PAD).[3] Upon submitting its Notice of Intent, the First Stage Consultation began, a process that requires the City to notify foreseeably interested parties and hold a public meeting for stakeholders.[4] This requirement is one of the ways that the FERC licensing process allows stakeholders to become involved in the process and express

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1. *Hydroelectric Facilities Licensing*, RIVER FALLS WIS., http://www.rfmu.org/index.aspx?NID=582 (last visited Apr. 4, 2015).
2. *Id.*
3. *Id.*
4. *Id.*

their thoughts about the economic, environmental, and social effects of the hydropower project.[5]

Following the public meeting, stakeholders had sixty days to submit comments on the PAD as well as comment on "the scope and breadth of the necessary studies for relicensing to FERC and the City."[6] The City received numerous submissions for proposed studies that would evaluate the environmental and socioeconomic effects of the Project.[7] The City conducted a preliminary financial analysis of the Project and hired a consulting "firm that specializes in hydroelectric relicensing, to provide an analysis of the licensing options available to the city and their financial [and environmental] implications"[8] before it determined which studies to perform. Based on the FERC relicensing timeline, the City has until the fall of 2015 to complete all agreed upon studies, which are to be determined as of publication.[9] Upon the completion of the studies, the City must submit a Draft License Application (DLA) by January 2016.[10] This gives interested parties and stakeholders another opportunity to comment on the Project and DLA before the Final License Application is due.[11]

While this is a lengthy and often costly process, it is there to ensure that the governmental permitting authority considers and addresses the economic, environmental, and social effects of the project.[12] In many cases, stakeholder oversight catches adverse effects that would otherwise fall through the regulatory cracks.[13] The River Falls Hydroelectric Project is one of many hydroelectric facilities going through, or about to

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5. FRIENDS OF THE KINNI, http://www.friendsofthekinni.org (last visited Nov. 20, 2014).

6. *Hydroelectric Facilities Licensing*, *supra* note 1.

7. *Id.*

8. *Id.*

9. *Id.*

10. *Id.*

11. *Id.*

12. *See American Energy Initiative: Hearing on the "Resolving Environmental and Grid Reliability Conflicts Act of 2012" and the "Hydropower Regulatory Efficiency Act of 2010" Before the Subcomm. on Power and Energy and the H. Comm. on Energy & Commerce*, 112th Cong. (2012) [hereinafter *American Rivers Written Testimony*] (written testimony of Matthew Rice, Director, Colorado Conservation, American Rivers).

13. *See infra* Part II.D.

experience, FERC's relicensing process.[14] Over the next five years, 6000 megawatts of nonfederal hydropower will be up for relicensing, with numbers expected to more than double the following ten years.[15] While those numbers are substantial, they only represent a fraction of the dams in the United States with the potential to generate hydropower that do not already do so.[16]

In an effort to streamline FERC's regulatory process and promote the development of small-scale hydropower projects, Congress passed the Hydropower Regulatory Efficiency Act of 2013 (the Act),[17] also known as the 1040-EZ of hydropower.[18] This Note contends that in an effort to promote the development of small-scale hydropower projects and streamline FERC's regulatory process, it appears that Congress favored efficiency over oversight, and failed to recognize the negative externalities of the dams the Act seeks to utilize.

Part I of this Note introduces the relevant background information and the regulatory process for hydropower development. Within Part I, nonpowered dams and their potential for hydropower development is introduced. Part I concludes with a look at the current regulation of hydropower dams and how the Act seeks to streamline the relicensing process by reducing regulatory burdens. Part II considers whether the aggregate increase in hydropower outweighs the environmental, economic, and social externalities of maintaining dams and installing hydropower infrastructure. This Part also considers whether the Act values efficiency and hydropower gained from streamlined regulations over community and stakeholder oversight. Part III proposes that FERC and Congress consider a more concentrated and efficient approach to increased hydropower generation and energy policy.

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14. AM. COUNCIL ON RENEWABLE ENERGY, THE OUTLOOK FOR RENEWABLE ENERGY IN AMERICA 32 (2014), *available at* http://www.acore.org/files/pdfs/ACORE_Outlook_for_RE_2014.pdf.

15. *Id.*

16. *See infra* Part I.A.

17. Hydropower Regulatory Efficiency Act of 2013, H.R. 267, 113th Cong. (1st Sess. 2013), *available at* http://www.ferc.gov/legal/fed-sta/bills-113hr267enr.pdf.

18. 113 CONG. REC. H439–40 (daily ed. Feb. 12, 2013).

I. BACKGROUND

A. NONPOWERED DAMS AND THE POTENTIAL FOR HYDROPOWER DEVELOPMENT

While the United States has used hydropower to produce clean, renewable energy for over a century, hydropower facilities "represent only a fraction of the infrastructure development that has taken place on the nation's waterways."[19] The United States has roughly 80,000 dams[20] installed along over 600,000 miles of intermittent streams and rivers;[21] however, only 2,500 of these dams are used to generate electricity.[22] The United States Department of Energy (DOE) issued a report in 2012, which assessed the energy potential of nonpowered dams[23] if hydroelectric facilities were added to existing infrastructure.[24] On the basis that "all water passing a facility would be available for conversion into electrical energy and that hydraulic head at the facility would remain constant," the report concluded that approximately 54,000 nonpowered dams could be utilized for the production of hydropower.[25] Utilizing these dams could result in a fifteen percent increase of hydropower generation in the United States.[26] The report identified 597 nonpowered dams that, if utilized, would account for ninety percent of the hydropower increase, each with the

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19. BOUALEM HADJERIOUA ET AL., OAK RIDGE NAT'L LAB., AN ASSESSMENT OF ENERGY POTENTIAL AT NON-POWERED DAMS IN THE UNITED STATES vii (2012), *available at* http://www1.eere.energy.gov/water/pdfs/npd_report.pdf.

20. *Id.*; *see also* TASK COMM. ON GUIDELINES FOR RET. OF DAMS AND HYDROELECTRIC FACILITIES, GUIDELINES FOR RETIREMENT OF DAMS AND HYDROELECTRIC FACILITIES 3 (1997) [hereinafter GUIDELINES] (noting that over 75,000 dams existed nationwide in 1996). The Army Corps of Engineers maintains the National Inventory of Dams, which includes the roughly 80,000 dams noted in many sources. Various state and regulatory agencies, however, are responsible for compiling and maintaining dam inventories, resulting in an estimated 2,000,000 or more "small" dams in the United States. LeRoy Poff & David Hart, *How Dams Vary and Why It Matters for the Emerging Science of Dam Removal*, 52 BIOSCIENCE 659, 662 (2002).

21. Peter J. Carney, *Dam Removal: Evolving Federal Policy Opens a New Avenue of Fisheries and Ecosystem Management*, 5 OCEAN & COASTAL L.J. 309, 311 (2000).

22. HADJERIOUA ET AL., *supra* note 19, at vii.

23. Nonpowered dams are those "that do not produce electricity." *Id.*

24. *Id.*

25. *Id.* at vii–viii.

26. *Id.*

potential to generate at least one megawatt.[27] The highest generating nonpowered dam sites are located in areas not traditionally known for hydropower production, particularly the Ohio River Basin, Upper Mississippi, and Arkansas.[28]

The report notes that there is little disincentive to develop hydropower facilities at nonpowered dams because many of the costs have already been incurred and the environmental impacts realized.[29] Because of this, "adding power to the existing dam structure can often be achieved at lower cost, with less risk and in a shorter timeframe than development requiring new dam construction."[30] Additionally, many of the sites with the highest potential for hydroelectric generation are "located at navigation locks and dams on relatively big rivers."[31] The report notes, "[t]he abundance, cost, and

27. *Id.* at 22 ("Although a large number of [nonpowered dams] are assessed in this study, most of the energy potential is found in a relatively small subset of dams . . . each with a potential capacity greater than 1 MW [megawatt], contribute nearly 90% of the estimated additional national capacity from [nonpowered dams]."). One megawatt is enough to power approximately 750–1000 average homes in the United States. *Frequently Asked Questions*, NAT'L HYDROPOWER ASS'N, http://www.hydro.org/tech-and-policy/faq/ (last visited Feb. 21, 2015).

28. HADJERIOUA ET AL., *supra* note 19, at viii. Areas typically known for their hydropower production include the Pacific Northwest and Southwest. *See generally* MARC REISNER, CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER 151–68 (1986) (discussing that some of the largest rivers traditionally known for being harnessed by hydroelectric dams are in the Pacific Northwest and Southwest); DAMNATION, http://damnationfilm.com/press (last visited Feb. 21, 2015) (highlighting dams in the Pacific Northwest and Southwest as the most notable hydroelectric facilities); *Hydroelectric Energy*, NAT'L GEOGRAPHIC, http://education.nationalgeographic.com/education/encyclopedia/hydroelectric-energy/?ar_a=1 (last visited Apr. 4, 2015) (discussing that Washington and Oregon are the largest consumers of hydroelectricity in the United States).

29. HADJERIOUA ET AL., *supra* note 19, at 5.

30. *Id.* at vii. "However, as dam construction often encompasses undesirable social, environmental, and political externalities, development of new large dams can be politically untenable. The current upsurge in construction of smaller, geographically distributed hydrodevelopment schemes may be, in part, a result of increasing acknowledgement of and aversion to impacts of large dams." Kelly M. Kibler & Desiree D. Tullos, *Cumulative Biophysical Impact of Small and Large Hydropower Development in Nu River, China*, 49 WATER RESOURCES RES. 3104, 3104 (2013).

31. HADJERIOUA ET AL., *supra* note 19, at 24. See Bob Petz, *Assessing the Untapped Hydroelectric Potential of Existing, Non-Powered Dams*, ECOLOGY TODAY (Apr. 29, 2012), http://www.ecology.com/2012/04/29/untapped-hydroelectric-power-dams/, for a list of the top fifty nonpowered dams and their hydropower potential. The top ten nonpowered dams are locks and dams on

environmental favorability of [nonpowered dams], combined with the reliability . . . of hydropower, make these dams a highly attractive source for expanding the nation's renewable energy supply."[32]

B. THE HYDROPOWER REGULATORY EFFICIENCY ACT

To increase the generation of hydropower in the United States and utilize nonpowered dams, Congress enacted the Hydropower Regulatory Efficiency Act of 2013 (the Act) to streamline some of the current hydropower regulations by making it easier to develop low-impact hydropower facilities.[33] The Act expands FERC licensing exemptions for small hydropower projects by increasing their maximum installed capacity to ten megawatts; however, this only applies to newly constructed or newly updated hydropower facilities.[34] Furthermore, the Act authorizes a one-time extension of up to two years for preliminary permits, and directs FERC to investigate ways to improve the regulatory process.[35] In addition to utilizing existing nonpowered dams, the Act amends the Federal Power Act (FPA) and exempts certain qualifying conduit facilities[36] from FERC licensing.[37] To better

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industrial rivers. *See generally* Chris Hubbuch, *Hydropower Projects Nixed at Five Locks and Dams*, LACROSSE TRIB. (May 12, 2012), http://lacrossetribune.com/news/local/hydropower-projects-nixed-at-five-locks-and-dams/article_c42a000c-9bea-11e1-af69-001a4bcf887a.html (describing the potential for hydropower development along the Upper Mississippi on locks and dams as well as its limitations); Hannah Northey & Gabriel Nelson, *Utilities Squeeze Ohio River for a Few More Drops of Energy*, E & E PUBLISHING (May 4, 2012), http://www.eenews.net/stories/1059963923 (reporting that the DOE and hydropower developers "are pushing to get more electricity out of the industrial rivers in the Midwest").

32. HADJERIOUA ET AL., *supra* note 19, at vii.

33. *See* Hydropower Regulatory Efficiency Act of 2013, H.R. 267, 113th Cong. (1st Sess. 2013), *available at* http://www.ferc.gov/legal/fed-sta/bills-113hr267enr.pdf.

34. FED. ENERGY REGULATORY COMM'N, ORDER NO. 800, FERC AMENDS REGULATIONS PERTAINING TO PRELIMINARY PERMITS AND EXEMPTIONS TO CONFORM TO THE ENACTED HYDROPOWER REGULATORY EFFICIENCY ACT OF 2013 4–5 (2014) [hereinafter ORDER 800], *available at* http://www.ferc.gov/whats-new/comm-meet/2014/091814/H-1.pdf.

35. *Id.* at 2–3.

36. Conduits are defined as "any tunnel, canal, pipeline, aqueduct, flume, ditch, or similar manmade water conveyance that is operated for the distribution of water for agricultural, municipal, or industrial consumption and not primarily for the generation of electricity." H.R. 267.

understand the implications of the Act, a closer look at the dams in the United States as well as the current relicensing process and regulatory authority of FERC is discussed below.

C. BRIEF HISTORY OF DAMS IN THE UNITED STATES

Most of the dams in the United States are a product of the technologies of the nineteenth and twentieth centuries, which allowed the construction of larger and more complicated structures for hydroelectricity, flood control, drinking water, irrigation, recreation, and improved navigation.[38] The construction of dams peaked from the New Deal era through the 1960s.[39] Many of the nation's hydropower facilities were constructed and initially licensed during this time, including the Hoover Dam, Wilson Dam, and Central Valley Project.[40] While these and other large hydroelectric facilities are the most well-known dams, most dams in the United States are relatively small structures.[41] Because the dam boom occurred nearly sixty years ago, the United States now faces many costs stemming from aging dams and expiring hydropower licenses.[42]

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37. *Id*.; *see also* Gina S. Warren, *Hydropower: Time for a Small Makeover*, 24 IND. INT'L & COMP. L. REV 249, 261 (2014) ("To qualify, the conduit hydropower facility must meet several criteria. For example, it cannot have an installed capacity of greater than five MW [megawatts], and it cannot utilize a dam or other impoundment. Furthermore, the Act applies only to those facilities to be located on non-federally owned conduits, and to those facilities not previously licensed or exempted under the Federal Power Act.").

38. Poff & Hart, *supra* note 20, at 661.

39. *Id. See generally* DAMNATION, *supra* note 28 (noting that approximately 30,000 dams were completed between 1930 and 1970).

40. Charles R. Sensiba, *Hydropower*, *in* THE LAW OF CLEAN ENERGY: EFFICIENCY AND RENEWABLES 479, 481 (Michael B. Gerrard ed., 2011)*; see also* REISNER, *supra* note 28, at 134 (highlighting that some of the biggest hydroelectric projects were built during this time).

41. Poff & Hart, *supra* note 20, at 661. *See generally* LUTHER P. AADLAND, RECONNECTING RIVERS: NATURAL CHANNEL DESIGN IN DAM REMOVALS AND FISH PASSAGE 1 (1st. ed. 2010) ("The U.S. has 6,575 large dams at least 15 m high.").

42. Poff & Hart, *supra* note 20, at 662; Sensiba, *supra* note 40, at 481; *see infra* Part I.D. *See generally* AM. SOC'Y OF CIVIL ENG'RS, AMERICA'S INFRASTRUCTURE REPORT CARD: DAMS 14–16 (2013), *available at* http://www.infrastructurereportcard.org/a/documents/2013-Report-Card.pdf (describing the economic costs and safety concerns associated with aging dams); TASK COMM. ASS'N OF STATE DAM SAFETY OFFICIALS, THE COST OF REHABILITATING OUR NATION'S DAMS: A METHODOLOGY, ESTIMATE & PROPOSED FUNDING MECHANISMS (2009) [hereinafter TASK COMM.], *available at* http://www.damsafety.org/media/Documents/DownloadableDocuments

In addition to the problems associated with aging dams and expiring licenses, society is beginning to realize the economic, environmental, and social costs attributed to dams.[43] Proponents of dam removal existed during the boom of dam construction;[44] however, it was not until the 1990s that the movement for dam removal gained serious recognition.[45] Today, dams are removed "because of shifts in public opinion regarding the utility of these structures in environmental or social contexts. As such, policy changes made primarily during the latter part of the twentieth century have slowly shifted the emphasis of public debate to the negative impacts of dams."[46] Bruce Babbitt, former Secretary of the Interior wrote, "[t]he change has come. The heyday of dams has come and gone. From my perspective, there is no turning back."[47] Though the

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/RehabilitationCosts2009.pdf (noting that the number of dam failures is rising and the aggregate cost of fixing these dams is nearly insurmountable).

43. *See infra* Part I.D–F. *But see* 113 CONG. REC. 439, 440 (Feb. 12, 2013) (discussing the how dams improved Washington State's economy); Bruce Babbitt, *What Goes Up, May Come Down*, 52 BIOSCIENCE 656, 656 (2002) (discussing the "pro-dam" lobby).

44. *See generally* Babbitt, *supra* note 43, at 656–57 (discussing his years at the U.S. Department of the Interior, where he watched people protest against the construction of dams on their rivers); Bruce Babbitt, *The Dawn of Dam Removal*, PATAGONIA (2012), http://www.patagonia.com/us/patagonia.go?assetid=75082 (last visited Feb. 21, 2015) (discussing his role in changing society's perception of dams).

45. Yvon Chouinard writes, "I've been working to take down dams for most of my life. The idea, once considered crazy, is gaining momentum." Yvon Chouinard, *Tear Down 'Deadbeat' Dams*, N.Y. TIMES, May 8, 2014, at A27, *available at* http://www.nytimes.com/2014/05/08/opinion/tear-down-deadbeat-dams.html.

46. Marcus W. Beck et al., *Environmental and Livelihood Impacts of Dams: Common Lessons Across Development Gradients that Challenge Sustainability*, 10 INT'L J. RIVER BASIN MGMT. 73, 76 (2012) ("The Wild and Scenic Rivers Act of 1968, National Environmental Policy Act of 1969, Clean Water Act of 1972, and Endangered Species Act (ESA) of 1973 have enhanced the protection of riverine habitats and species. The country's environmental legislation emerged as a direct product of the environmental movement of the 1960s and provides some of the most powerful examples of legislative approaches for restoring and protecting aquatic resources. For example, the level of protection granted to imperiled species and their critical habitat under the ESA is a powerful statement of the political, and therefore public opinion, towards the environment, following substantial economic development." (citations omitted)).

47. Babbitt, *supra* note 43, at 657.

bipartisan support of the Act suggests otherwise,[48] society's perception of dams is changing, and it is something that may challenge the effectiveness of this Act.[49]

D. THE COSTS OF AGING DAMS

Because most dams in the United States were built well over fifty years ago, the nation must face the costs that result from aging infrastructure and expiring FERC licenses.[50] The lifespan of a dam and its aging process are affected by two major facts—construction materials and sediment accumulation within the dam's impoundment.[51] As dams age, owners and communities have two main choices: either continue maintaining the structure or retire and remove it.[52] The decision of continued maintenance or removal is influenced by the characteristics of the dam as well as the costs associated with the decision.[53] Case studies show that the retirement of dams, and to a lesser extent hydroelectric facilities, is influenced by a number of factors, including "dam safety concerns, aesthetics, fisheries, loss of flowage, and economics of either continued operation, rehabilitation, or maintenance

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48. The Act passed unanimously in both the House and the Senate. *Major Actions: H.R. 267—113th Congress (2013–2014)*, CONGRESS.GOV, https://www.congress.gov/bill/113th-congress/house-bill/267/actions (last visited March 7, 2015). It appears, however, that the Act fails to consider some of the policy changes made in the later part of the twentieth century that address dams' negative externalities. *See* Beck et al., *supra* note 46, at 76.

49. "Dam removal represents an unprecedented opportunity to truly breathe life back into the river where it runs through River Falls . . . . We believe that the restoration of the river corridor following dam removal will lead to a renaissance of the river and the heart of the community." Phil Pfuehler, *For River Falls, It's Dam Right...Or Wrong?*, RIVER FALLS J. (Jan. 22, 2015), http://www.riverfallsjournal.com/news/region/3660926-river-falls-its-dam-right . . . or-wrong (quoting Dave Fodroczi, Kinni River Land Trust Executive Director).

50. Poff & Hart, *supra* note 20, at 662.

51. *Id.*; *see also Hydroelectric Energy*, *supra* note 28 (noting that sediment accumulation is a limiting factor for a dam's lifespan and hydropower production).

52. The National Park Service Dam Safety Program has a motto for these options: "Maintain 'em or drain 'em." Jessie Van Berkel, *Remove or Revive? Dakota County Aims to Update Old Dams*, STAR TRIB. (Nov. 4, 2014, 6:24 AM), http://www.startribune.com/local/south/281399871.html.

53. Poff & Hart, *supra* note 20, at 665–66. In addition to economic costs, dam owners and operators will likely weigh the environmental and social costs associated with their decision.

costs."[54] While maintenance and repairs can substantially increase a dam's lifespan, these costs often outweigh any benefits that would result from keeping a relatively obsolete dam.[55] For cost conscious communities, dam removal is often the most logical choice.[56]

"According to the non-profit American Rivers, over 1,000 dams across the United States have been removed to date."[57] During the twentieth century, over 467 dams were completely or partially removed in the United States.[58] Most of the United States' 80,000 dams are considered "small structures," and because most of them serve little purpose, they are generally obsolete.[59] Additionally, small dams are often older than larger dams, making it more likely that they will be in poor condition.[60] In *How Dams Vary and Why It Matters for the Emerging Science of Dam Removal*, Poff and Hart note two

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54. GUIDELINES, *supra* note 20, at 5; *see also* Ty Ziegler et al., *Removing Dillsboro Dam: A Wise Decision*, HYDRO WORLD (July 21, 2014), http://www.hydroworld.com/articles/hr/print/volume-33/issue-6/articles/removing-dillsboro-dam-a-wise-decision.html ("Many of the about 2,500 powered dams in the U.S. provide substantial electric generation and improve the reliability of transmission systems. However, some of these powered dams no longer meet their original purpose, and removing them may provide benefits that offset the costs of maintaining them. The decision to remove a dam is based on economic (e.g., energy production, capital costs, O&M costs) and environmental considerations, both positive and negative.").

55. Poff & Hart, *supra* note 20, at 662. *See generally* Nate Sandvig, *Hydropower: The Silent and Aging Renewable*, OURENERGYPOLICY.ORG (Apr. 28, 2014, 10:53 AM), http://www.ourenergypolicy.org/hydropower-the-silent-and-aging-renewable/ (discussing the lack of funding to maintain dams at acceptable performance and efficiency levels).

56. For the City of West Bend, WI, removal of the Woolen Mills Dam saved nearly $1.8 million, restored the riverine ecosystem, and increased the recreational usage of the once impounded area. GUIDELINES, *supra* note 20, at 130; *see also* American Rivers, *Taking a Second Look: Communities and Dam Removal*, YOUTUBE (Mar. 1, 2010), https://www.youtube.com/watch?v=cCQiaT1KcPo (documenting the community's perception of the removal of the dam, the costs saved, and the benefits gained).

57. Roddy Scheer & Doug Moss, *The Downside of Dams: Is the Environmental Price of Hydroelectric Power Too High?*, SCI. AM. (Sept. 18, 2012), http://www.scientificamerican.com/article/how-do-dams-hurt-rivers/.

58. Poff & Hart, *supra* note 20, at 665 ("[A]t least another 30 dams have been completely removed through 2001.").

59. *Id.* at 662. Many of these dams are considered obsolete because they do not produce hydroelectricity, control floods, increase navigation, or improve recreation, and the economic benefits of maintaining them is minimal compared to larger dams. *Id.* at 665.

60. *Id.*

"striking" dam removal patterns: "Dams are being removed at an accelerating rate, and the majority of dams being removed are less than 5m in height . . . suggest[ing] that small dams will continue to be removed more often than large dams."[61] Small dams are more likely to be retired because the economic benefits of maintaining them are lower than those associated with larger dams.[62] Poff and Hart wrote, "[t]he rapid aging of dams . . . and the costs of maintaining old dams practically ensures that dam removal will continue at a brisk pace for the foreseeable future."[63]

E. ENVIRONMENTAL EXTERNALITIES

While the economic costs of dams are often limited to their owners,[64] a dam's environmental and social externalities almost always extend to its surrounding environment and community.[65] These externalities are most notable for their effects on the Pacific Northwest, as the construction of "numerous dams . . . transformed the once-wild Columbia and Snake Rivers into a series of flow-controlled reservoirs."[66] This transformation of the rivers nearly decimated what is

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61. *Id.*

62. *Id*. In addition to being removed, small dams are more likely to be abandoned because the owner cannot afford the maintenance. As a result, the "financial burdens associated with their safety, repair, and maintenance often fall to local governments and, ultimately, to taxpayers." *Id.* at 665–66 ("Most of these small dams do not generate hydroelectricity or control floods . . . ."); *see also* GUIDELINES, *supra* note 20, at 4 ("[O]ver the past decade over twenty dams, with the majority non-hydroelectric projects, were removed in the State of Wisconsin alone.").

63. Poff & Hart, *supra* note 20, at 667.

64. Due to economic hardship of maintaining smaller dams, they are more likely to be abandoned. *Id.* at 665–66.

65. Carney, *supra* note 21, at 309; Poff & Hart, *supra* note 20, at 659–60. *See generally* DAMNATION, *supra* note 28 (documenting the adverse effects of dams in the Pacific Northwest on salmon runs as well as their negative effects on native cultures).

66. Henry B. Lacey, *New Hope for Pacific Salmon*? Northwest Resource Information Center v. Northwest Power Planning Council, Idaho Department of Fish & Game v. National Marine Fisheries Service, *and the Aftermath of Judicial Impatience*, 3 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 19, 21 (1995). "No longer resembling the great rushing torrents they once were, the heavily exploited Columbia and Lower Snake rivers have been turned into a connected series of long, narrow lakes, stairstepping to the Pacific." Patrick Joseph, *The Battle of the Dams*, SMITHSONIAN MAG. (Nov. 1, 1998), http://www.smithsonianmag.com/science-nature/the-battle-of-the-dams-62244169/?no-ist.

considered the defining characteristic of the Pacific Northwest—"the Columbia River Basin's legendary wild salmon runs."[67] The construction of hydroelectric dams is attributable to the near extinction of salmon in the Pacific Northwest, where stocks numbering in the millions plummeted to near extinction.[68] The adverse environmental effects attributed to dams extend over 600,000 miles of what were once free flowing rivers throughout the United States,[69] causing fluctuations in water temperature,[70] unnatural nutrient load and seasonal flows,[71] blockage of fish migration,[72]

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67. Lacey, *supra* note 66, at 20.

68. *Id.* at 20–21.

69. Carney, *supra* note 21, at 311; *see also* Monique Dubos, *A New Tool for Dam Planning*, INST. ON ENV'T (Jan. 7, 2015), http://environment.umn.edu/water/a-new-tool-for-dam-planning/ (showing how dams alter rivers on a world map).

70. *See generally* AADLAND, *supra* note 41, at 11 (describing how dams significantly alter "temperature regimes"); Letter from Tom Henderson, President, Kiap TU Wish Chapter of Trout Unlimited, to Ray French, Mgmt. Analyst, City of River Falls 8 (May 11, 2014) [hereinafter TU Letter], *available at* http://www.rfcity.org/DocumentCenter/View/1054 ("The temperature, hydrologic, and water quality conditions created by the two City of River Falls hydropower impoundments have significantly impacted a 0.7-mile reach of a coldwater resource, as evidenced by the classification of Lakes George and Louise by [the Wisconsin Department of Natural Resources] as warmwater sport fisheries.").

71. AADLAND, *supra* note 41, at 10 ("Rivers can carry significant nutrient loads, especially in agricultural and urban watersheds, and reservoirs create low water velocities that favor blue-green algae (cyanobacteria) blooms.").

> In the presence of ample sunlight, favorably warm water temperatures, and adequate nutrient sources, summer algae blooms occur, creating unsightly (green) conditions, reduced water clarity, odors, possible human health impacts, and reduced oxygen concentrations. The extended water residence time also allows suspended sediment (silt) from upstream sources (both urban and agricultural) to accumulate in the lakes. In addition to in-filling the lakes, the suspended sediment carries contaminants (phosphorus, trace metals, and organic compounds (PAHs and pesticides)) that are deposited in the lake bottom, with possible impacts on benthic invertebrates and fish.

TU Letter, *supra* note 70, at 6 (describing the Project's adverse effects on the Kinnickinnic's water quality).

72. Blocking fish migration has a direct effect on the destruction of fisheries as well as the loss of other aquatic species, including mussels. *See* AADLAND, *supra* note 41, at 13 ("Some mussel species have very specific host requirements and blockage of these host species will lead to the extirpation of the mussel species."); *see also* Dan Tarlock, Symposium, *Hydro Law and the Future of Hydroelectric Power Generation in the United States*, 65 VAND. L. REV. 1723, 1736 (2012) (discussing how dams can "contribute to the decline

deposition and accumulation of sediment behind dams,[73] and "the degradation of delta wetlands caused by a lack of freshwater and saltwater intrusion."[74]

F. SOCIOECONOMIC, CULTURAL, AND RECREATIONAL EFFECTS OF DAMS

The environmental effects of dams mentioned above ultimately have socioeconomic, cultural, and recreational effects as well.[75] Dr. Luther Aadland, a river ecologist for the Minnesota Department of Natural Resources writes, "[d]am benefits, quantified by their builders, have frequently excluded not only environmental costs but direct societal and cultural costs as well."[76] For instance, the socioeconomic and cultural effects of dams are particularly devastating to native cultures.[77] Construction of Dalles Dam on the Columbia River

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and even the extinction of species that depend on longitudinal movements along the stream continuum"). *See generally* Lacey, *supra* note 66, at 20–22 (describing how blocking pacific salmon migration jeopardizes the species' survival).

73. Scheer & Moss, *supra* note 57 ("Organic materials from within and outside the river that would normally wash downstream get built up behind dams and start to consume a large amount of oxygen as they decompose. In some cases this triggers algae blooms which, in turn, create oxygen-starved 'dead zones' incapable of supporting river life of any kind.").

74. Carney, *supra* note 21, at 321. *See generally* AADLAND, *supra* note 41, at 5 (discussing how sediment interception by dams adversely affects river deltas). Edward Abbey illustrates the environmental effects of a dam and the sense of loss that results:

> What was once a mighty river. Now a ghost. Spirits of sea gulls and pelicans wing above the desiccated delta a thousand miles to seaward. Spirits of beaver nose upstream through the silt-gold surface. Great blue herons once descended, light as mosquitos, long legs dangling, to the sandbars. Wood ibis croaked in the cottonwood. Deer walked in the canyon shores. Snowy egrets in the tamarisk, plumes waving in the river breeze . . . .

EDWARD ABBEY, THE MONKEY WRENCH GANG 12 (1985).

75. AADLAND, *supra* note 41, at 7.

76. *Id. See generally Small Hydropower and a Federal Renewable Electricity Standard*, HYDROPOWER REFORM COALITION, http://www.hydroreform.org/sites/default/files/HRC2009-Small_Hydro_and_RES.pdf (last visited Apr. 4, 2015) ("Determining the economic value of hydropower must also take into account the environmental and societal impacts and costs.").

77. AADLAND, *supra* note 41, at 7; *see also* Beck et al., *supra* note 46, at 74 ("[D]am projects that displace indigenous populations can greatly erode social cohesion leading to long-term losses in culture."). *See generally* KATE BURCHENAL ET AL., UNDERSTANDING THE UPFRONT COSTS: AN ECONOMIC

in Washington flooded Celilo Falls, "one of the largest, oldest, and most important fishing sites on the Columbia River."[78] For the Native American tribes of the lower Columbia River, losing the Celilo Falls was equated with experiencing the death of a loved one,[79] and in many ways it was because losing the falls resulted in the loss of a way of life.[80]

When people think of the socioeconomic, cultural, and recreational harms caused by hydropower dams, they often think of those occurring in the Pacific Northwest; however, it is likely that there is a hydropower dam closer to their residence causing such harms, but on a smaller scale.[81] The River Falls Hydroelectric Project on the Kinnickinnic River in Wisconsin provides such an example.[82] The impoundments of the River Falls Hydroelectric Project, known as Lake George and Lake Louise, are nearly filled with sediment,[83] which makes them

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FEASIBILITY STUDY OF INCREASED HYDROELECTRICITY GENERATION AT EXISTING DAM SITES IN VERMONT 2 (2011), *available at* http://www.middlebury.edu/media/view/352079/original/econ_final_dm.pdf ("Hydro-Quebec may not be carbon neutral and as a large-scale hydropower developer, it is responsible for environmental degradation and fragmentation of river ecosystems in Northern Quebec, as well as the deterioration of the cultural heritage of the Cree people located in the area." (citation omitted)).

78. Drew Eddy et al., *Book Notes*, 12 U. DENV. WATER L. REV. 429, 451–52 (2009).

79. *Eulogy to Celilo: If the Falls Could Talk*, INDIAN EDUC. OFF., http://www.indian-ed.org/wp-content/uploads/2012/03/Storypath-Celilo_episode7.pdf (last visited Apr. 4, 2015).

80. *See also We Are Salmon People*, COLUMBIA RIVER INTER-TRIBAL FISH COMM'N, http://www.critfc.org/salmon-culture/we-are-all-salmon-people/ (last visited Apr. 4, 2015) (discussing the important role salmon plays in the native culture, and how a decreasing salmon population jeopardizes the most important aspect of their culture). *See generally* DAMNATION, *supra* note 28 (showing the devastating socioeconomic effects Columbia River Basin dams have on native peoples).

81. *See generally* Letter from Dr. Michael S. Page & Hal Watson, Friends of the Kinni, to Ray French, Mgmt. Analyst, City of River Falls (May 18, 2014) [hereinafter Friends of the Kinni Letter], *available at* http://www.rfcity.org/DocumentCenter/View/1054 (describing the socioeconomic and recreational harms caused by the Project); Ziegler et al., *supra* note 54 (describing how the removal of Dillsboro Dam in North Carolina increased recreational activities along the river).

82. *See supra* Introduction.

83. In addition to increasing a dam's environmental and social harm, sediment accumulation limits a dam's useful life. In fact, during the boom of dam construction, "sedimentation rates were not consistently factored into dam design criteria . . . and many dams are expected to fill in with sediment at rates exceeding design expectations." Poff & Hart, *supra* note 20, at 662.

shallow, euphoric, turbid, and susceptible to algae blooms.[84] Today, these "two impoundments no longer support any fishery or desirable recreational opportunities."[85] In addition to adversely affecting the riverine ecosystem and recreational activities, the impoundments adversely affect local businesses.[86]

G. REGULATIONS OF HYDROPOWER PROJECT DEVELOPMENT

Under the current FERC regulatory regime, hydropower development faces "a comprehensive regulatory approval process that involves many participants, including FERC, Federal and State resource agencies, local governments, tribes, non-governmental organizations, and the public."[87] Additionally, the regulatory process for hydropower projects is considerably more extensive and time consuming than other renewable energy resources.[88] Apart from being time consuming, the hydropower regulatory process is expensive.[89]

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84. TU Letter, *supra* note 70.

85. Friends of the Kinni Letter, *supra* note 81 ("Fishing and kayaking are not the only recreational uses that have been negatively affected by the dams. Recollections of lifelong River Falls residents include swimming, canoeing, waterskiing, and catching warm water fish species from the two impoundments, and also catching trout from the spring ponds just to the west of the upper dam."). In fact, this stretch of river has not supported trout for nearly 120 years. Interview with Michael Page, Spokesperson, Friends of the Kinni, in River Falls, WI (Nov. 11, 2014).

> However, within the heart of River Falls where the dams and impoundments impede flow, there is no sport fishing, there are no (surviving) macroinvertebrates, and the river is effectively dead as a natural ecosystem . . . . If you were to try to walk across the river there, you would get stuck in the muck and need a lot of help getting out.

Pfuehler, *supra* note 49.

86. Friends of the Kinni Letter, *supra* note 81 ("Recreational kayaking now supports three distinct businesses in town; however, their utilization of the river is limited to areas outside of the project due to the lack of portages around the dams and the limited appeal of kayaking or fishing on the two impoundments.").

87. COMM. ON ENERGY & COMMERCE, HYDROPOWER REGULATORY EFFICIENCY ACT OF 2013, H.R. REP. NO. 113-6, at 3 (2013).

88. *Id.* ("For example, FERC's Integrated Licensing Process established specifically for hydropower projects is structured to be completed in 5 years, while the development timeline for wind and solar projects can be as short as 18 to 24 months.").

89. For the Project, FERC licensing fees could cost up to $100,000 and proposed studies could cost anywhere from $100,000 to $1,000,000. Michael Page, Friends of the Kinni: Help Put the Falls Back in River Falls (Nov. 12, 2014) (unpublished PowerPoint) (on file with author).

The costs associated with licensing are often a disincentive for the development of small hydropower projects, and preparation for the FERC license exemption can be lengthy and time consuming as well.[90] For example, Congress notes, "[f]or very small projects, the cost of FERC compliance can potentially exceed the cost of hydro equipment."[91]

H. FERC'S JURISDICTION UNDER THE FPA

The FPA was originally enacted as the Federal Water Power Act with the intention of promoting hydropower development in the United States by "centralizing federal licensing and regulatory authority of hydropower projects in the Federal Power Commission (FPC), FERC's predecessor agency, and by establishing fixed license terms."[92] Like FERC, the FPC had the technical expertise to issue and regulate hydropower licenses in accordance with a "comprehensive plan for improving or developing" the nation's waterways.[93] In 1935, the Public Utility Act amended the FPA, retitling it as Part I of the FPA.[94] This amendment extended the FPA's jurisdictional reach to include hydropower projects.[95] FERC assumed the FPA's authority with the passage of the Department of Energy Organization Act of 1977.[96] As a result, FERC's jurisdiction extends to a vast majority of hydropower projects in the country.[97] Dams "located on nonfederal lands along non-navigable creeks and streams in remote areas unconnected to the interstate transmission grid" are not subject to FERC's jurisdiction.[98]

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90. H.R. REP. NO. 113-6, at 3.

91. *Id.*; *see also* BURCHENAL ET AL., *supra* note 77, at 22–44 (showing licensing, permitting, and infrastructure costs for the dams in the report's case studies).

92. Sensiba, *supra* note 40, at 480.

93. 16 U.S.C. § 803(a)(1) (2012).

94. 16 U.S.C. § 817(1) (2012); Sensiba, *supra* note 40, at 483.

95. Jurisdictional reach included "hydropower projects that: (1) are located on non-navigable waterways that are subject to Congress's Commerce Clause jurisdiction; (2) affect interstate or foreign commerce; and (3) have undergone construction or major modification after August 26, 1935, the date of the amendment." Sensiba, *supra* note 40, at 483.

96. Department of Energy Organization Act, Pub. L. No. 95-91, 91 Stat. 565, 582 (codified as amended at 42 U.S.C. §§ 7101–7111 (2012)).

97. Sensiba, *supra* note 40, at 483.

98. *Id.*

I. PRELIMINARY PERMITS

FERC's authority to issue preliminary permits falls under FPA section 4(f).[99] FERC may issue preliminary permits for a term of up to three years, but the permitee is prohibited from construction or any other land-disturbing activities during this time.[100] The purpose of the permit is to secure the site for the permitee while it "gathers data and studies the feasibility of developing a proposed project at a particular site."[101] The permitee is expected to prepare its application for an original hydropower license during the term of the permit.[102] FERC may extend the term of a preliminary permit for up to two additional years if the permitee "carried out activities under such permit in good faith and with reasonable diligence."[103]

J. LICENSES

Section 4(e) of the FPA authorizes FERC to issue licenses to hydroelectric projects.[104] FERC may issue either "original" hydropower licenses or "new" hydropower licenses. Original licenses authorize the construction and operation of a

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> Hydropower project ownership can be categorized as federal or non-federal. The bulk of federal projects are owned and managed by the Bureau of Reclamation and the U.S. Army Corps of Engineers. These projects are typically authorized and funded by Congress. Nonfederal projects are licensed and overseen by the Federal Energy Regulatory Commission (FERC).

KELSI BRACMORT ET AL., HYDROPOWER: FEDERAL AND NONFEDERAL INVESTMENT at summary (2013), *available at* https://www.fas.org/sgp/crs/misc/R42579.pdf.

99. 16 U.S.C. § 797(f) (2012).

100. *Preliminary Permits*, FED. ENERGY REG. COMM'N, http://www.ferc.gov/industries/hydropower/gen-info/licensing/pre-permits.asp (last updated Mar. 12, 2015).

101. 16 U.S.C. § 798 (2012); FED. ENERGY REGULATORY COMM'N, HYDROPOWER LICENSING—GET INVOLVED: A GUIDE FOR THE PUBLIC 4 (2014) [hereinafter HYDROPOWER LICENSING], *available at* http://www.ferc.gov/for-citizens/citizen-guides/hydro-guide.pdf. Permit holders are not required to own a dam or land during the permit's term. *Id.* at 5.

102. § 798(a).

103. § 798(b).

104. 18 C.F.R. §§ 4.40–4.61 (2014). FERC has the authority to issue licenses "for the purpose of constructing, operating, and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project works necessary or convenient for the development and improvement of navigation and for the development, transmission, and utilization of power." 16 U.S.C. § 797(e) (2012).

hydropower license for a term of thirty to fifty years.[105] Such licenses are granted at the end of the preliminary permit's term. Pursuant to section 10 of the FPA, FERC must include certain provisions in the original license "to ensure a comprehensive development of the waterway; to protect fish and wildlife resources as recommended or prescribed by certain resource agencies . . . to establish annual charges to be paid by the licensee; and to set the term of the license."[106] In addition to these required license conditions, FERC has the authority to include additional conditions related to environmental and recreational standards.[107]

A "new" license, also known as a relicense, authorizes the continued operation of a previously licensed hydroproject.[108] When the original license expires, the licensee must apply to FERC for a new license,[109] where, like the original license, the term may be thirty to fifty years.[110] Since most hydroelectric dams were constructed in the mid-twentieth century, many of their original licenses expired, or are due to expire.[111] In fact, "6,000 MW [megawatts] of non-federal hydropower . . . will be up for re-licensing"[112] over the next five years, with that number expected to more than double over the next ten years.[113] The relicensing process, however, is nearly as time consuming and costly as the original licensing process.[114]

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105. HYDROPOWER LICENSING, *supra* note 101.

106. Sensiba, *supra* note 40, at 484; *see also* 16 U.S.C. §§ 797(d)–(e), 799, 803(a)(1), 803(e), 803(j), 811 (2012).

107. Sensiba, *supra* note 40, at 484. Such added standards include "drawdown restrictions, fish screening and ramping, minimum flows, dissolved oxygen content, and recreational access." *Id.*

108. *Id.*

109. 16 U.S.C. § 808 (2012).

110. HYDROPOWER LICENSING, *supra* note 101.

111. Sensiba, *supra* note 40, at 481.

112. AM. COUNCIL ON RENEWABLE ENERGY, *supra* note 14.

113. *Id.*

114. *See generally Hydroelectric Facilities Licensing*, *supra* note 1 (discussing the relicensing process for the Project). The relicensing process required the City of River Falls to submit its Notice of Intent (NOI) to relicense, Request to Use the Traditional Licensing Process, and Pre-Application Document and Appendices to FERC three years before the license's expiration. *Id.* The "First Stage Consultation" started when the City submitted its NOI and other initial information. *Id.* As required per the licensing process, the City notified interested parties and held a stakeholders meeting. *Id.* All interested parties and individuals had sixty days after the public meeting to submit comments on the PAD as well as any suggested

Licensees are suggested to notify FERC of their intent to seek license for the hydroelectric project at least five to seven years before the original license expires.[115] In addition to FERC and the licensee, the relicensing process involves multiple stakeholders, including federal, state, and local agencies, non-governmental organizations, and citizen groups.[116] As part of the relicensing process, FERC determines "whether issuing a new license is in the public interest, providing equal consideration to power development and nonpower uses of the river (e.g., fish and wildlife habitat, recreation, aesthetics)."[117] Such considerations are important because many of the dams due for relicensing were constructed before the enactment of many environmental laws.[118] During the relicensing process, "[t]he project, its surrounding environment and related resources are extensively studied."[119]

K. LICENSE EXEMPTIONS

Under the 1978 Public Utility Regulatory Practices Act and the 1980 Energy Security Act, certain "small-scale" hydropower projects[120] became eligible for exemptions from the

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studies to FERC and the City. *Id.* The City commenced its preliminary financial analysis and retained a firm "to provide an analysis of the licensing options available to the City and their financial implications." *Id.* The "Second State Consultation" includes the completion of all agreed upon studies by Fall 2015. *Id.* This allows time for the preparation of the Draft License Application due January 2016. *Id.* Interested stakeholders will have an opportunity to comment on the DLA prior to the Final License Application (FLA). *Id.* The "Third Stage Consultation" requires that the City file the FLA by August 31, 2016, or "no later than 24 months before the existing license expires." *Id.* At this time, FERC "undertakes its own application review process. The licensing process concludes with the issuance of a licensing order." *Id.*

115. *Id.*

116. *Relicensing Timeline*, WIS. PUB. SERV., http://www.wisconsinpublicservice.com/company/hydro/relicensing_timeline.aspx (last visited Apr. 4, 2015).

117. Margaret Bowman, *Legal Perspectives on Dam Removal*, 52 BIOSCIENCE 739, 740 (2002); *see also* 16 U.S.C. § 797(e) (2012).

118. *Relicensing Timeline*, *supra* note 116.

119. *Id.*; *see also* Sensiba, *supra* note 40, at 484–85 ("Because the relicensing process . . . requires a renewed evaluation of the project and its environs, many projects emerge from the relicensing process with different operational, recreational, and environmental conditions . . . .").

120. These "small-scale" hydropower projects include such projects at existing dams with an installed capacity less than or equal to 1.5 megawatts. 18 C.F.R. § 4.30(b)(17) (2014).

FPA's licensing requirements.[121] The purpose of granting exemptions is to encourage "the development of small hydroelectric power projects in connection with existing dams which are not being used to generate electric power."[122] Like a license, an exemption allows the development and operation of a hydropower project.[123] In contrast to a license, an exemption typically qualifies for expedited review,[124] contains conditions set by state fish and wildlife agencies rather than FERC,[125] does not grant a federal right of eminent domain,[126] and while perpetual, does not have set terms and conditions.[127]

L. RETIREMENT AND DECOMMISSIONING OF HYDROELECTRIC DAMS

Under the FPA, FERC's licensing authority also extends to license surrender, project decommissioning, and dam removal.[128] FERC has "the authority as part of a relicensing proceeding to deny a relicense application and to order a dam to be removed"[129] if it determines that continued operation of the hydropower project is not in the public's best interest.[130] This policy asserts FERC's "authority to force a licensee to

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121. Sensiba, *supra* note 40, at 485; *see also* 16 U.S.C. §§ 2701–2708 (1978).

122. 16 U.S.C. § 2701.

123. Sensiba, *supra* note 40, at 485.

124. *Id.*; *see also* 18 C.F.R. § 380.4(a)(12)–(14) (2014).

125. Sensiba, *supra* note 40, at 485; *see also* 16 U.S.C. §§ 823a(c), 2705(b), 2705(d) (2012).

126. Sensiba, *supra* note 40, at 485; *see also* 16 U.S.C. § 814 (2012) (giving the licensees the power of eminent domain).

127. *See* Sensiba, *supra* note 40, at 485 (discussing the differences between licenses and exemptions).

128. *See generally* Bowman, *supra* note 117 (discussing FERC's decommissioning and removal authority); Sensiba, *supra* note 40, at 485 (discussing the FPA's established "avenues" for retiring and decommissioning hydropower projects). FERC may also issue a "nonpower" license upon the expiration of an existing license, which gives FERC "continued oversight of the project site for a short period until an agency with regulatory authority over the site is willing to assume responsibility over the lands and facilities covered by the nonpower license." Sensiba, *supra* note 40, at 486.

129. Project Decommissioning at Relicensing: Policy Statement, 60 Fed. Reg. 339 (Jan. 4, 1995) (codified at 18 C.F.R. § 2.24 (2014)) ("[FERC] is adopting a policy statement that addresses its authority to issue or deny new hydropower licenses at the time of the relicensing, and its authority over the decommissioning of a licensed project when . . . a new license is rejected or denied."); Bowman, *supra* note 117, at 740.

130. 16 U.S.C. § 797(e) (2012); *see also* Bowman, *supra* note 117, at 740.

cease operation and pay for decommissioning costs of a hydropower facility—even where the incumbent licensee seeks to relicense and continue operation of the project."[131]

FERC may also decommission projects during the term of the license, but this requires a license surrender application.[132] Licenses, however, may be "surrendered only upon mutual agreement between the licensee and the Commission [FERC] after thirty days' public notice."[133] When ruling on surrender applications, FERC applies "a broad public interest standard."[134] This broad standard gives FERC discretion to accept license surrenders for a myriad of reasons, "most often technical infeasibility of an unconstructed project or escalating operational and repair costs at an existing facility."[135] Given the age of many dams, especially small ones, it is likely that the number of surrendered licenses will rise.[136] Additionally, license surrender is required whenever a dam owner plans to stop using the dam for hydropower generation.[137] As part of the license surrender, FERC has the authority to impose conditions for the dam's removal.[138]

M. LICENSE COMPLIANCE AND ENFORCEMENT

Upon issuing a license or exemption, FERC has explicit authority to ensure that the construction, operation, and maintenance of the hydropower project comply with the terms and conditions of the license.[139] Whether FERC exercises this authority is another matter.[140] Under FPA section 31, FERC has the authority "to monitor and investigate compliance with

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131. Sensiba, *supra* note 40, at 486. FERC exercised this authority in 1997 when it ordered the removal of the Edwards Dam. Bowman, *supra* note 117, at 740.

132. Sensiba, *supra* note 40, at 485.

133. *Id.*

134. *Id.*

135. *Id.* "At least four FERC-regulated dams have been removed where the cost of safety repairs was a factor in the removal decision." Bowman, *supra* note 117, at 740.

136. *See supra* Part I.B; *infra* Part II.A.

137. Bowman, *supra* note 117, at 741 ("FERC has the authority to order that the dam be removed, even if that is not the intention of the dam owner.").

138. *Id.*

139. 16 U.S.C. § 823b(b) (2012).

140. *See* Friends of the Kinni Letter, *supra* note 81 (noting that the Project has been in a state of "noncompliance" since 1996).

hydropower licenses, permits, and exemptions, and to issue orders as necessary to require compliance with those licenses, permits, and exemptions."[141] If a licensee, permitee, or exemptee violates, fails, or refuses to comply with their terms and conditions, FERC is empowered to impose civil penalties of up to $10,000 for each day the violation, failure, or refusal continues.[142] U.S.C. § 823b gives FERC the authority to revoke a license or exemption when the "licensee or exemptee violates a compliance order after being given a reasonable time in which to comply with the order, and after notice and an opportunity for hearing."[143]

II. ANALYSIS

The Act leaves little doubt that there is substantial potential for increasing hydropower generation by installing hydropower equipment at nonpowered dams, but at what cost? While the Act addresses the many benefits associated with utilizing nonpowered dams,[144] the legislation fails to consider the negative externalities that will undoubtedly follow,[145] values regulatory efficiency over community oversight, and

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141. Sensiba, *supra* note 40, at 492.

142. 16 U.S.C. § 823b(c). FERC is required to provide notice of the proposed penalty before assessing such a penalty against any person. *Id.*

143. § 823b(b); Sensiba, *supra* note 40, at 492.

144. 113 CONG. REC. H439–40 (daily ed. Feb. 12, 2013). In her remarks, Congresswoman McMorris Rodgers stated, "[u]nleashing American ingenuity to increase hydropower production will lower energy costs." *Id.* However, she fails to mention at what expense. In addition to lower energy costs, the benefits associated with utilizing nonpowered dams include job growth and increased hydropower production. *Id.*

145. A statement by the American Public Power Association is one of the few places in the legislative history that mentions other costs associated with utilizing nonpowered dams. *Energy Efficiency and Hydropower Bills: Hearing on H.R. 267 and 678 Before the S. Comm. on Energy & Natural Res.*, 113th Cong. 24 (2013) (statement of the American Public Power Association) ("Given this situation there is substantial potential for adding renewable hydro-electric generation to non-power dams by installing electricity generation equipment at those sites. At the same time, there are a number of regulatory, financial and other barriers impeding the commercial development of this hydropower potential."). American Rivers submitted written testimony at the 2012 hearing on the Hydropower Regulatory Efficiency Act of 2012, which identified the enormous environmental and social costs associated with hydropower development. *American Rivers Written Testimony*, *supra* note 12.

fails to address the expected increase in FERC relicense applications.[146]

A. THE REHABILITATION COSTS OF DAMS THE ACT SEEKS TO UTILIZE ARE ECONOMICALLY UNFEASIBLE AND INEFFICIENT

One of the driving forces behind the Act is the fact that only three percent of the United States' 80,000 dams produce hydropower.[147] The Act's legislative history allows the reasonable assumption that the plethora of nonpowered dams in the United States are a viable source for increased hydropower generation,[148] but a closer look at our nation's aging infrastructure suggests otherwise. The American Society of Civil Engineers gave the United States' dams a "D+ rating" in 2013.[149] This low grade is attributed to the number of aging dams in the United States,[150] which are susceptible to failure and pose many safety concerns.[151] From 1998 to 2008, the number of dams susceptible to failure increased by 137 percent, and this number will grow drastically as our nation's dams continue to age.[152]

While maintenance and repairs can fix these issues and increase a dam's lifespan, such repairs are often costly and economically unfeasible for most dam owners, especially because "finding the funds to finance needed repairs or upgrades is nearly impossible."[153] Since most repairs cost three times the one-time cost of removal, dams susceptible to failure

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146. AM. COUNCIL ON RENEWABLE ENERGY, *supra* note 14.

147. 113 CONG. REC. H439–40; *see supra* Part I.A.

148. 113 CONG. REC. H439–40; *see supra* Part I.A.

149. AM. SOC'Y OF CIVIL ENG'RS, *supra* note 42, at 3–4 ("Using a simple A to F school report card format, the Report Card provides a comprehensive assessment of current infrastructure conditions and needs, both assigning grades and making recommendations for how to raise the grades."). *See generally* TASK COMM., *supra* note 42 (discussing the increasing number of unsafe dams and dam failures in the United States attributed to aging and needed repairs).

150. AM. SOC'Y OF CIVIL ENG'RS, *supra* note 42, at 14*; see supra* Part I.D.

151. *See Dam Safety 101,* ASS'N FOR DAM SAFETY OFFICIALS, http://www.damsafety.org/news/?p=d42cd061-cae2-4039-8fc6-313975f97c36 (last visited Apr. 4, 2015).

152. *Id.*; *see* AM. SOC'Y OF CIVIL ENG'RS, *supra* note 42, at 14 ("[T]he overall number of high-hazard dams continues to increase, to nearly 14,000 in 2012. The number of deficient dams [susceptible to failure] is estimated at more than 4,000, which includes 2,000 deficient high-hazard dams.").

153. TASK COMM., *supra* note 42.

are typically removed rather than repaired.[154] After an inspection by the Wisconsin Department of Natural Resources, the Hayman Falls Dam was labeled hazardous, and an administrative order required Shawano County, Wisconsin, to either repair or remove the dam.[155] With a lack of state cost-sharing grants and repair expenses tripling the cost of removal, the choice was obvious and Shawano County removed the dam.[156] The City of West Bend, Wisconsin, faced a similar decision when it sought funds to reconstruct the Woolen Mills Dam after an administrative order required repair or removal of the dam.[157] After receiving the order, West Bend obtained a permit to build a new dam and bridge at the site of the old dam.[158] The City spent several years searching for funding to repair the dam; however, it decided to remove the structure when no state or federal funds were available for the needed repairs.[159]

The decision to remove dams is not isolated to these case studies. In fact, each week a dam is removed in the United States.[160] While even the cost of repairing a single dam is significant, like many of a dam's other costs, such costs are devastating in the aggregate.[161] The estimated rehabilitation costs for dams in the United States, which the Act seeks to utilize, tops $51,460,000,000.00.[162] Utilizing existing

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154. BUREAU OF RECLAMATION, U.S. DEP'T OF THE INTERIOR, ECONOMIC ANALYSIS OF DAM DECOMMISSIONING 16 (2003), *available at* http://www.usbr.gov/pmts/economics/reports/DamRemovalPaper2.pdf.

155. GUIDELINES, *supra* note 20, at 120–21.

156. *Id.* at 120.

157. *Id.* at 130. The administrative order noted, "the dam had structural flaws, questionable factors of safety for stability, and inadequate capacity." *Id.*; *see also* American Rivers, *Taking a Second Look: Communities and Dam Removal*, YOUTUBE (Mar. 1, 2010), https://www.youtube.com/watch?v=cCQiaT1KcPo (showing the community's decision-making process and why it is happy it removed the Woolen Mills Dam).

158. GUIDELINES, *supra* note 20, at 130.

159. *Id.* "West Bend spent several years searching for funding for the $3.3 million project. No state or federal funds were available for the construction," but funds were available for the dam's removal. *Id.*

160. Van Berkel, *supra* note 52 ("[D]am removals have multiplied sixfold since the 1980s . . . .").

161. Similarly, externalities, while harmful at the individual level, are devastating in the aggregate. *See infra* Part II.C.

162. TASK COMM., *supra* note 42, at 3.

nonpowered dams is one of the Act's key arguments, but its legislative history omits the "crisis of aging dams."[163]

B. SMALL-SCALE HYDROPOWER IS NOT AS ECONOMIC OR EFFICIENT AS THE ACT IMPLIES

The Act seeks to promote hydropower production in the United States by increasing the amount of small hydropower facilities.[164] The House Report cites to a recent report by the DOE and Oak Ridge National Laboratory (ORNL), which identified that "12,000 MW [megawatts] of new hydropower that could be developed at existing nonpowered dams."[165] What the House Report fails to mention, however, is that the analysis by the DOE and ORNL did not "consider the economic feasibility of developing each unpowered facility."[166] For many of these facilities, significant capital is needed to "rehabilitate and modernize" their structures for reliable operation.[167] Nevertheless, proponents of the Act argue "smaller projects on existing dams . . . are no less attractive to the communities they are in and the ratepayers who live nearby [because] [t]he most complicated, subject-to-delay, and politically charged part of the project is building the dams or conduits. At existing sites, the hard work has already been done."[168] For many dam

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163. The Act, the Senate and House Reports, the legislative hearings, and floor hearings mention the potential for utilizing existing infrastructure; however, none mention the critical state of the infrastructure and the costly expenses needed for repair. *Energy Efficiency and Hydropower Bills: Hearing on H.R. 267 and 678 Before the S. Comm. on Energy & Natural Res.*, 113th Cong. 24 (2013); S. REP. NO. 113-36 (2013); S. REP. NO. 113-38 (2013); COMM. ON ENERGY & COMMERCE, HYDROPOWER REGULATORY EFFICIENCY ACT OF 2013, H.R. REP. NO. 113-6 (2013); 113 CONG. REC. H439–40 (daily ed. Feb. 12, 2013).

164. *See supra* Part I.K.

165. H.R. REP. NO. 113-6, at 3.

166. HADJERIOUA ET AL., *supra* note 19, at vii. The economic feasibility would include upfront capital costs, engineering costs, costs associated with stakeholder meetings, general operational costs, etc. *See* BURCHENAL ET AL., *supra* note 77, at 22–63 (discussing the economic feasibility in various case studies).

167. Sandvig, *supra* note 55.

168. Luke Rose & Rebecca Blood, *Legislation May Usher in a New Golden Age for U.S. Hydropower*, HYDRO WORLD (July, 21 2014), http://www.hydroworld.com/articles/hr/print/volume-33/issue-6/articles/legislation-may-usher-in-a-new-golden-age-for-u-s-hydropower.html. "What is missing from the equation are developers with the financial backing to begin tackling the conversion of the 80,000 plus [nonpowered dams] . . . ." *Id.*

owners, the hard work includes the capital costs of repairing the dam and adding hydropower infrastructure, which results in a "significant deterrent[] to hydropower development."[169] A study conducted by Middlebury College on small-scale hydropower development of nonpowered dams in Vermont found that "acquisition of upfront capital is a considerable obstacle to small-scale hydropower development, despite initial beliefs."[170]

In addition to evaluating whether the upfront capital costs are worth developing or upgrading small-scale hydropower facilities, dam owners must consider whether the generated electricity is as economically efficient, clean, and renewable as the Act and its proponents advocate.[171] Particularly, the energy produced at these small-scale facilities is not as economically efficient as the Act suggests.[172] In fact, "numerous experts from utilities, private developers, and state regulators suggest that dams with less than 500 kw of power production will never reach the economies of scale necessary to be considered 'cost effective.'"[173] After a preliminary analysis, the City of River Falls concluded that the average cost to generate hydropower over the term of the license is more than the average cost to purchase wholesale power.[174] When compared to wholesale

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169. BURCHENAL ET AL., *supra* note 77, at 63. Niagara Mohawk Power Corporation removed the Hudson River Project when the "$1,385 per kW cost of dam replacement and turbine generator modifications was far greater . . . than the generation value of the facility." GUIDELINES, *supra* note 20, at 139. Additionally, the removal of this small facility "would insignificantly affect the operation of the integrated electrical system." *Id.*

170. BURCHENAL ET AL., *supra* note 77, at iv.

171. *See Dam Construction to Reduce Greenhouse Gases Causes Ecosystem Disruption*, OR. ST. U. (June 18, 2013), http://oregonstate.edu/ua/ncs/archives/2013/jun/dam-construction-reduce-greenhouse-gases-causes-ecosystem-disruption ("Researchers conclude in a new report that a global push for small hydropower projects, supported by various nations and also the Kyoto Protocol to reduce greenhouse gas emissions, may cause unanticipated and potentially significant losses of habitat and biodiversity."); *Small Hydropower and a Federal Renewable Electricity Standard*, *supra* note 76.

172. *See Small Hydropower and a Federal Renewable Electricity Standard*, *supra* note 76 (discussing how many small scale hydropower dams are economically inefficient).

173. BURCHENAL ET AL., *supra* note 77, at 8–9.

174. Memorandum from Raymond French, Mgmt. Analyst, to Mayor Toland and City Counsel 3 (Oct. 20, 2014) [hereinafter French Memorandum], *available at* http://www.rfcity.org/DocumentCenter/View/1184. Over the last

green energy, the City concluded that the "municipal hydroelectric facilities are, on average, a more affordable and local option than the bulk purchase of green energies."[175] While the hydroelectricity comes from a renewable source (falling water), most hydropower production fails to meet the EPA's definition of "green energy," which requires that "green power sources must also have been built within the last 15 years in order to support 'new' renewable energy development."[176] The energy produced by the Project, however, is not green energy because it fails to meet the EPA's requirements.[177] Additionally, the preliminary analysis fails to include certain capital expenditures and operating costs that, if factored, would likely increase the generating costs of the facility to exceed the average green energy rate.[178] If the City removes the Project, it will not affect the municipality's standing in green energy programs, because the electricity the Project produces "is sold as regular old electricity, [and] its consumption does not [count] towards any national [green energy] rankings."[179]

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ten years the cost to generate per kilowatt hour (kWh) was $0.0706 whereas the wholesale rate per kWh was $0.0699. *Id.*

175. The report shows that the cost per kWh for generation over the past five years was $0.0682 as compared to the wholesale rate of green energy, which was $0.0870 per kWh. *Id.*

176. *Green Power Defined*, U.S. ENVT'L PROTECTION AGENCY, http://www.epa.gov/greenpower/gpmarket/ (last updated Apr. 15, 2014). *See generally* E-mail from Michael Page, Spokesperson, Friends of the Kinni, to Friends of the Kinni Newsletter Subscribers (Oct. 30, 2014, 4:29 PM) [hereinafter E-mail from Michael Page] (on file with author) (noting that the comparison between hydropower produced by the dams and green energy "is not an 'apples-to-apples' comparison").

177. The Project was not built or upgraded within the last fifteen years; in fact, the original FERC application is from 1988. Friends of the Kinni Letter, *supra* note 81.

178. *See* BURCHENAL ET AL., *supra* note 77, at 63 (discussing how capital expenditures and other factors should be considered when determining the generating cost of hydroelectricity, and how such factors significantly impact the cost of generation); French Memorandum, *supra* note 174, at 3.

179. E-mail from Michael Page, *supra* note 176; *see also* COMPREHENSIVE PLAN FOR THE CITY OF RIVER FALLS, CITY OF RIVER FALLS 7-22 (2005), *available at* http://www.rfmu.org/DocumentCenter/View/48 (discussing the existing power production and delivery infrastructure of River Falls); *Questions & Answers*, FRIENDS OF KINNI, http://www.friendsofthekinni.org (last visited Apr. 4, 2015) (noting hydroelectric dams do not necessarily produce "green" energy). Besides not being economically efficient, the two dams only meet 1.5% of the River Falls' electricity needs. Pfuehler, *supra* note 49.

River Falls is just one example where the cost to generate electricity is uneconomical, inefficient, and not "green."[180] Free Flow Power surrendered its preliminary permits for hydropower projects at locks and dams on the Mississippi River, because lower than estimated water flow in addition to market forces made the projects economically unfeasible.[181] For some dam owners and communities, the costs associated with capital improvements, infrastructure repairs, and regulatory fees make the decision to surrender a license or preliminary permit easy.[182] When dam owners and communities fail to consider all the costs, their decisions, while based on partially correct information, may be costly and inefficient in the long-term. Aadland, a river ecologist for the Minnesota Department of Natural Resources, wrote, "[f]rom a strict economic view, dam and reservoir deterioration, failure risks, and costs of dealing with obsolete dams is a crisis that countries with large numbers of dams will need to face."[183]

C. NEGATIVE EXTERNALITIES LIKELY OUTWEIGH THE BENEFIT OF HYDROPOWER GENERATED BY SMALL-SCALE HYDROPOWER DAMS

In addition to economic costs, hydropower is not always a low cost energy source once environmental and societal externalities are considered.[184] A 2008 study by Stanford

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180. *See* Ziegler et al., *supra* note 54 (noting that the hydropower produced by the Dillsboro Dam on the Tuckasegee River in North Carolina was less efficient than other dams in the area).

181. Hubbuch, *supra* note 31 ("'That was predictable,' said Marc Schultz, chairman of the La Crosse County Conservation Alliance, which opposed the projects. 'When you look at how much electricity they're getting and the money and all the hurdles with the agencies, you just scratch your head and wonder.'"); *see also* Ziegler et al., *supra* note 54 (showing the cost-benefit analysis that led to the removal of the Dillsboro Dam, which only produced enough electricity to power "69 averaged-sized homes" per year, but threatened the riverine ecosystem).

182. *See generally* BURCHENAL ET AL., *supra* note 77, at 83–84 (discussing what costs should be considered when determining whether to add or upgrade hydropower equipment, and noting that it can take several years for a plant to break even).

183. AADLAND, *supra* note 41, at 1.

184. *Hydropower's Impacts on Rivers*, HYDROPOWER REFORM COALITION, http://www.hydroreform.org/abouthydro/impacts-on-rivers (last visited Apr. 4, 2015) ("All power generation—including energy generated from renewable sources—impacts local ecosystems and communities. There is a tendency, however, to turn a blind eye to these impacts and treat all renewable

Professor Mark Jacobson examined various energy sources and technologies and ranked them relative to their environmental and societal impacts—hydropower ranked seventh, just ahead of coal and nuclear.[185] Even before this report, experts have consistently questioned whether generating hydropower is worth the environmental and societal externalities.[186]

Though the Act would make one believe otherwise, "more and more people are questioning whether generating a little hydroelectric power is worth destroying riparian ecosystems from their headwaters in the mountains to their mouths at the ocean and beyond."[187] While the Act discusses the aggregate generation potential of nonpowered dams,[188] it fails to address the aggregate effects of hydropower's negative externalities. This is most notable in Congresswoman McMorris Rodgers' statement to the House of Representatives: "Sustainable hydropower is a part of a strong economy, and to see the potential and the benefits of hydropower, all you have to do is look at my home State of Washington State."[189] While correct,

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technologies as unconditionally good because they do not omit greenhouse gases."); *see also supra* note 76 and accompanying text (noting that externalities should be taken into account when determining the economic value of hydropower).

185. Louis Bergeron, *Wind, Water and Sun Beat Other Energy Alternatives, Study Finds,* STANFORD NEWS (Dec. 10, 2008), http://news.stanford.edu/news/2009/january7/power-010709.html (ranking best to worst electric power sources: (1) wind power, (2) concentrated solar power, (3) geothermal power, (4) tidal power, (5) solar photovoltaics, (6) wave power, (7) hydroelectric power, and (8) a tie between nuclear power and coal with carbon capture sequestration).

186. Scheer & Moss, *supra* note 57. The movement for dam removal began in the 1970s after the release of Abbey's *The Monkey Wrench Gang*, and gained momentum in the 1990s with Bruce Babbitt. *See* ABBEY, *supra* note 74. *See generally* Joseph, *supra* note 66 (describing Babbitt's role encouraging communities to reconsider whether their dams were worth the economic, environmental, and social costs); Babbitt, *supra* note 44 ("In the space of two decades, dam removal has evolved from a novelty to an accepted means of river restoration. Most importantly, the concept has taken root in hundreds of local communities as residents rediscover their rivers, their history, and the potential not only to restore natural systems, but, in the process, to renew their communities as well.").

187. Scheer & Moss, *supra* note 57. *See generally Small Hydropower*, HYDROPOWER REFORM COALITION, http://www.hydroreform.org/policy/smallhydro (last visited Apr. 4, 2015) ("These ['small' hydropower] dams produce substantially less power for the harm they can cause.").

188. *See supra* Part I.A.

189. 113 CONG. REC. H439–40 (daily ed. Feb. 12, 2013).

the Congresswoman's statement ignores the environmental and cultural harms hydropower caused to the riverine ecosystems and native cultures of Washington State.[190] "[W]hile the hydrosystem has turned the hills of Eastern Washington green, given the Northwest the cheapest electric rates in the country and allowed barge traffic to penetrate as far inland as Lewiston, Idaho, it has also pushed the salmon to the brink [of extinction]."[191]

Although not explicitly mentioned, the Act's purpose in utilizing nonpowered dams is arguably rooted in the assumption that the environmental consequences of small hydropower dams "are fewer and less severe than those associated with large hydropower."[192] A study on the cumulative environmental effects of small and large hydropower development found "current national and international development policies often encourage growth in the small hydropower sector while discouraging construction of large dams."[193] In fact, this study found small hydropower dams "often generate greater cumulative biophysical effects per megawatt of installed capacity than large dams."[194] This study also addresses that "the lack of analogous research addressing

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190. *See supra* Part I.

191. Joseph, *supra* note 66. Even though this article was written sixteen years ago, it applies today because of the social and environmental push to remove "deadbeat dams" and restore riverine ecosystems. *See generally* DAMNATION, *supra* note 28 (documenting devastating effects of hydropower dams and arguing for the removal "deadbeat dams").

192. Kibler & Tullos, *supra* note 30, at 3116; *see also* Warren, *supra* note 37, at 249 ("The environmental impact of small hydropower is generally minimal.").

193. Kibler & Tullos, *supra* note 30, at 3116. The Act is an example of this policy in effect. *But see American Rivers Written Testimony*, *supra* note 12, at 9 ("A balanced U.S. energy policy must recognize that hydropower has impacts as well as promise, and it should address both.").

194. Kibler & Tullos, *supra* note 30, at 3111; s*ee also Hydropower's Impacts on Rivers*, *supra* note 184 ("[T]he cumulative impacts of multiple hydropower dams are often much greater than the simple sum of their direct impacts . . . . A series of dams can severely impact an entire watershed, even if each of the individual dams seems relatively low impact when considered in isolation."). *See generally* Jeff Opperman, *Sustainable Hydropower: Are Small Dams Really Better for the Environment?*, NATURE CONSERVANCY (Mar. 17, 2014), http://blog.nature.org/science/2014/03/17/sustainable-hydropower-small-dams-better-fisheries-benefits/ ("[S]mall dams can pose a greater threat to ecosystems and natural landscapes than large dams.").

the effects of small hydropower limits opportunity to recognize potential impacts and mitigate negative consequences."[195]

When many of the United States' large hydropower dams were built, there were few resources addressing their potential impacts, and as a result, ecosystems and cultures suffered.[196] The legislature is aware of the cost of large hydropower, which is implicitly supported by the Act's intent to increase small-scale hydropower development. Given the lack of research addressing the effects of small hydropower, the legislature's decision to promote hydropower generation from small dams appears short-sighted.[197] While the Act is undoubtedly well-intentioned in limiting construction of new dams, the law should use data rather than assumptions to shape energy policy.[198] Research shows the undesirable environmental and social externalities of small dams,[199] as well as numerous examples of small hydropower dams' detrimental effects.[200] One example, not too far from where this Note was written, is

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195. Kibler & Tullos, *supra* note 30, at 3104.

196. *See* Part I.D–E.

197. *See* Kibler & Tullos, *supra* note 30, at 3104. (discussing how national energy policies promoting small hydropower dams are based off of little research and aversion to large dams).

198. *See* Ed Whitelaw & Ed MacMullan, *A Framework for Estimating the Costs and Benefits of Dam Removal*, 52 BIOSCIENCE 724, 724 (2002) ("Cost-benefit analysis is one economic tool that helps decision makers choose among policy alternatives. Ideally, cost-benefit analysis includes all of the costs and benefits associated with each policy alternative. In fact, however, costs and benefits can be difficult to measure—estimating the value of an endangered species, for example—or may not be fully recognized at the time a study is conducted." (citations omitted)). Based on the Act's legislative history, Congress only focused on the benefits of developing small-scale hydropower. *See* 113 CONG. REC. H439–40, (daily ed. Feb. 12, 2013).

199. *See generally Ecological Effects of Small Dams*, ACAD. NAT. SCI. DREXEL U., http://ansp.org/research/environmental-research/projects/small-dams/ (last visited Jan. 20, 2015) (studying the effects of small dams and whether the effects are similar to those of larger structures); Opperman, *supra* note 194 (discussing research that shows the adverse effects of small dams).

200. *See generally* Kibler & Tullos, *supra* note 30 (studying the aggregate effects of small-scale hydropower dams); Dave Levitan, *As Small Hydropower Expands, So Does Caution on Its Impacts*, YALE ENV'T 360 (Aug. 4, 2014), http://e360.yale.edu/feature/as_small_hydropower_expands_so_does_caution_on_its_impacts/2790/ (citing several studies that conclude small-scale hydropower dams are just as detrimental, if not more so, than large hydropower dams).

the River Falls Hydroelectric Project.[201] Though the legislature does not recognize the externalities of small hydropower dams, stakeholders and dam owners should consider these risks when determining whether to add hydropower facilities or relicense current ones.

D. THE ACT FAVORS EFFICIENCY OVER COMMUNITY OVERSIGHT

In addition to increasing hydropower development, the Act seeks to streamline the current regulatory process, making the licensing process less costly and time consuming.[202] By amending current law to allow FERC to "exempt small hydroelectric facilities with a generating capacity of 10 megawatts or less from FERC's licensing requirement,"[203] the Act increases regulatory efficiency, but at what cost? Though American Rivers supports the Act, it cautions the legislature not to disregard oversight for efficiency: "Our enthusiasm for regulatory reform, however, is tempered by our recognition that the existing permitting system for hydropower provides critical protections for the ecological health of our rivers, public safety, recreation, and many other non-power values."[204] Even though FERC-issued licenses are subject to National Environmental Policy Act requirements, "exemptions typically qualify for expedited review and in some instances are categorically excluded from review."[205] While the review process is time consuming and costly, it ensures stakeholders an opportunity to express their concerns.[206] Exemptions, unlike licenses, are perpetual and are not issued for specific terms or upon fixed conditions.[207] Even though exemptions have a

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201. *See supra* Part I. The Project has an output of 375 kW, which supplies approximately 1.72% of the City's electricity. COMPREHENSIVE PLAN FOR THE CITY OF RIVER FALLS, *supra* note 179.

202. "Think of it as the 1040-EZ for hydro permitting." 113 CONG. REC. H439–40 (daily ed. Feb. 12, 2013).

203. CONG. BUDGET OFFICE, COST ESTIMATE: H.R. 267 HYDROPOWER REGULATORY EFFICIENCY ACT OF 2013 (2013).

204. "American Rivers emphatically does not subscribe to the notion that our nation's environmental, health, and safety regulations constitute 'barriers' in need of streamlining, 'delays' that must be shortened, or 'costs' that need to be reduced." *American Rivers Written Testimony*, *supra* note 12.

205. Sensiba, *supra* note 40, at 485. Exemptions, however, must meet terms and conditions set by state and federal fish and wildlife agencies. *Id*.

206. *See* Interview with Michael Page, *supra* note 85.

207. *See supra* Part I.K.

higher threshold for environmental compliance,[208] the review process is more limited than for licenses,[209] and it does not always ensure a thorough cost-benefit analysis of the project. In response to the Act, FERC relaxed some of its regulatory standards for "exhibits and drawings for exemption applications."[210] Additionally, FERC "reduced the public notice period from 60 days to 30 days and the reply period from 45 days to 15 days"[211] and regarding exemption, "applicants that have filed complete and adequate applications, and for which the Commission has determined that impacts are minimal."[212]

While proponents of the Act may argue that allowing more exemptions streamlines the process, it makes one wonder whether the Act values efficiency and increased hydropower production over stakeholder oversight and environmental protection.[213] By allowing FERC to exempt small hydroelectric facilities with a generating capacity of ten megawatts or less from FERC's licensing, more hydroprojects will not be subject to the specific terms and conditions of traditional FERC licenses, which seek to ensure oversight and reevaluation of the utility of rivers occurs,[214] even if it is every thirty to fifty years. The Friends of the Kinni, a citizen group, describes relicensing as an opportunity that arises once every thirty years for stakeholders to speak their minds about dams and the health

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208. 16 U.S.C. §§ 2705(b), 2705(d) (2012). "FERC-issued exemptions must contain conditions set by federal and state fish and wildlife agencies, whereas in the licensing context, these conditions are set by FERC upon recommendation of these agencies." Sensiba, *supra* note 40, at 485 (citations omitted).

209. "Once every 30 years we get a chance to speak our minds about the dams and the health of the River." Increasing the number of exemptions will decrease this chance for stakeholders. Interview with Michael Page, *supra* note 85. *Compare supra* Part I.J. (discussing licensing requirements), *with supra* Part I.K (discussing exemption requirements).

210. S. REP. NO. 113-36, at 11 (2013).

211. *Id.*

212. *Id.*

213. *See generally* Interview with Michael Page, *supra* note 85 (discussing that the terms and conditions of FERC-issued licenses ensure community oversight as well as the reevaluation of the utility of the dammed rivers based on current perspectives, rather than the perspectives applied at the time the license was first issued).

214. *Id.* Mr. Page noted that over the course of thirty years the project's utility changes as does the community's value of the river and its ecosystem. He worries that increasing the number of exemptions will eliminate this important process along many rivers. *Id.*

of the river, and challenge the "status quo."[215] Exemptions are perpetual, and unless the exemptee violates its conditions and FERC chooses to exercise its authority, they go relatively unevaluated until the exemptee chooses to retire or decommission the hydropower project.[216]

The Senate Report describes how FERC's recently modified exemption requirements encourage the use of nonpowered dams:

> This change would promote the development of small hydropower at the nation's existing non-powered dams by allowing a larger pool of small, low-impact projects to qualify for small hydropower exemptions. Such exemptions are attractive to developers in that the exemptions are perpetual, and thus the developer need not expend the cost and effort to renew the authorization as is the case with licenses.[217]

Review, however, is an important part of the decision of whether to allow the development or continued use of a hydropower dam, something that would not occur if a facility has a perpetual exemption. The current relicensing process gives stakeholders an opportunity to evaluate the utility of the hydropower project in current environmental and social contexts.[218]

Marcus Beck, a post-doctorate fellow with the EPA, highlights the importance of stakeholder oversight in ensuring that licensees and FERC apply appropriate benchmarks for addressing environmental concerns:

> Although FERC relicensing can require new operating conditions to address environmental concerns (e.g. increase in minimum flows), these conditions are established in relation to the current river condition as a referential baseline. This approach fails to account for legacy impacts of a dam and implicitly allows loss of environmental capital over time as a result of historical cumulative impacts of the structure.[219]

The review process ensures that stakeholders "have a number of opportunities to participate in the licensing process, in order to identify potential issues and to share their views on

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215. FRIENDS OF THE KINNI, *supra* note 5; *see also* Interview with Michael Page, *supra* note 85 (describing the relicensing processes as an important opportunity for interested parties to share their perspective and challenge the "status quo" of the facility).

216. *See supra* Part I.L–M.

217. S. REP. NO. 113-36, at 13.

218. *See supra* text accompanying note 215.

219. Beck et al., *supra* note 46, at 76 (citation omitted).

how to address the effects of the project on the natural and human environment."[220] Though this applies to licensing, and not exemptions, this illustrates a potential issue with making exemptions more accessible, as it may decrease opportunities for stakeholder oversight. Instead of relaxing requirements and decreasing public notice, FERC should ensure that stakeholders have an opportunity to evaluate the utility of the licensee's project. This is especially important when the licensee seeks an exemption, as the public notice period is one of the only times stakeholder voices can be heard.

III. POLICY CONSIDERATIONS MOVING FORWARD

When shaping energy policy, the legislature and FERC should be able to demonstrate that the operation of a hydropower facility "is in the public interest, economically and environmentally."[221] In addition to improving opportunity for community oversight and stakeholder involvement, the amount of hydropower due for relicensing, as well as the potential for hydropower generation located at navigational locks and dams, may provide further opportunities for hydropower policy reform moving forward.

A. RELICENSING REQUIREMENTS SHOULD INCLUDE EFFICIENCY UPGRADES

With approximately 6000 megawatts of hydropower due for relicensing over the next five years, with numbers expected to more double the following decade,[222] there is opportunity for policy development. By not addressing the amount of hydropower due for relicensing, Congress and FERC failed to consider using relicensing to increase hydropower production.[223] As more and more licensees approach the relicensing process, Congress and FERC should consider requiring efficiency upgrades as part of the relicensing

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220. *Hydropower Licensing*, FED. ENERGY REG. COMM'N, http://www.ferc.gov/for-citizens/citizen-guides/hydro-guide.asp (last updated Aug. 4, 2011) ("This includes a pre-filing meeting required to be held before the application is filed with the Commission, during the scoping process, and when the draft environmental report is issued.").

221. Joseph, *supra* note 66.

222. *See* AM. COUNCIL ON RENEWABLE ENERGY, *supra* note 14.

223. *See generally supra* Parts I.B, II.C (describing the Act as well as its notable omissions).

requirements.[224] Upgrading existing hydropower facilities offers "both communities and utilities the opportunity to make hydropower even more cost-effective, productive and environmentally friendly."[225]

In 2009, the DOE selected seven hydropower projects to receive funding to "modernize hydropower infrastructure by increasing efficiency and reducing environmental impacts at existing facilities."[226] As of 2012, the first round of these upgrades were already producing more hydropower with an average cost of less than four cents per kilowatt-hour (kWh).[227] The approximate increase in generation by these seven projects is "187,000 MWh/year, or enough to meet the annual electric usage of more than 12,000 homes."[228] The DOE's efficiency upgrade program was designed to highlight the potential to increase hydropower production at "hundreds of other dams around the U.S. for just pennies per kilowatt-hour."[229]

In addition to the DOE's program, many others see the potential in increasing hydropower generation by upgrading existing facilities to make them more efficient. Middlebury College conducted a study that examined various "dams that could either be retrofitted to become hydroelectric systems, or could be upgraded to increase efficiency on existing generating facilities."[230] One of the existing facilities the report examined

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224. Unless an existing license holder modifies or improves its facility to comply with the exemption requirements, it must follow the lengthy and costly relicensing process. *See supra* Part II.B. The modified exemption under the Act, though not its intended purpose, could incentivize existing license holders to improve their hydropower infrastructure to qualify for an exemption.

225. Mike Reed, *Investments in Existing Hydropower Unlock More Clean Energy*, ENERGY.GOV (Aug. 14, 2013, 2:21 PM), http://energy.gov/articles/investments-existing-hydropower-unlock-more-clean-energy.

226. *Hydropower Upgrades to Yield Added Generation at Average Cost Less Than 4 Cents Per kWh—Without New Dams*, ENERGY.GOV (Nov. 4, 2009, 12:00 AM), http://energy.gov/articles/hydropower-upgrades-yield-added-generation-average-costs-less-4-cents-kwh-without-new-dams. "These projects were supported by $24.9 million in Energy Department investments under the Recovery Act." Reed, *supra* note 225.

227. Tina Casey, *How the U.S. Is Getting More Hydropower Without Building a Single New Dam*, CLEAN TECHNICA (Oct. 10, 2012), http://cleantechnica.com/2012/10/10/doe-hydropower-upgrades-boost-energy-without-new-dams/.

228. *Hydropower Upgrades to Yield Added Generation at Average Cost Less Than 4 Cents Per kWh—Without New Dams*, *supra* note 226.

229. Casey, *supra* note 227.

230. BURCHENAL ET AL., *supra* note 77, at 4.

did not install any additional generation capacity, rather, the facility owner "focused specifically on retrofits that improved efficiency by 190%. This correlated to an increase in production similar to what would have been seen as a 2280 kW capacity increase."[231] The installation of new turbines on existing hydroelectric projects is another way to achieve increased efficiency.[232] The Bonneville Power Authority upgraded the Chief Joseph Dam on Washington's Columbia River with a new turbine.[233] Upgrading the dam's turbine generated "enough power for thirty thousand homes in the Pacific Northwest."[234]

With the large number of hydropower dams due for relicensing,[235] Congress and FERC should consider amending the relicensing process to include efficiency upgrade requirements. Even though the relicensing process is already costly and time consuming,[236] requiring an efficiency upgrade will ensure that licensees and stakeholders conduct a thorough cost benefit analysis to determine whether to seek a relicense.[237] Should the licensees choose to continue with the relicensing process, the efficiency upgrade will generate more hydropower at a relatively low cost.[238] While pushback from licensees is likely, research shows that relatively inexpensive upgrades produce more "cost effective, productive and environmentally friendly" hydropower.[239] Additionally,

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231. *Id.* at 23.

232. Reed, *supra* note 225. The Boulder Canyon Hydroelectric Project generated thirty percent more power when its turbines were replaced with a more efficient 5-megawatt turbine. *Id.* The Cheoach Dam in Robbinsville, North Carolina, experienced an increase of 162 megawatts, or enough to power 8200 homes, upon an equipment upgrade. *Id.*

233. Tarlock, *supra* note 72, at 1735.

234. *Id.* ("At existing [hydropower] dams, turbines could be upgraded, [or] more water could be put through the existing turbines to generate more power . . . .").

235. *See* AM. COUNCIL ON RENEWABLE ENERGY, *supra* note 14.

236. *See supra* Part I.G. *See generally Hydroelectric Facilities Licensing*, *supra* note 1 (describing the process of relicensing).

237. *See Relicensing Timeline*, *supra* note 116; *see also* 16 U.S.C. § 797(e) (2012) (describing how FERC and stakeholders consider whether a license is in the public interest by considering environmental, economic, and social effects of the hydropower facility); Bowman, *supra* note 117, at 740 ("In 1994, FERC issued a policy statement concluding that it had the authority as part of a relicensing proceeding to deny a relicense application and to order a dam to be removed if it determines such an action is in the public interest.").

238. *See* Casey, *supra* note 227.

239. Reed, *supra* note 225.

licensees begin the relicensing process years in advance, so they would have ample time to consider and prepare for an efficiency upgrade.[240] Thus, as FERC investigates ways to further improve the regulatory process and Congress looks ahead to future energy policy, they should focus on making existing hydropower more efficient rather than encouraging development of otherwise obsolete infrastructure.

B. HYDROPOWER DEVELOPMENT SHOULD FOCUS ON INFRASTRUCTURE WITH THE GREATEST GENERATING POTENTIAL AND THE FEWEST EXTERNALITIES

When reading the Act and its legislative history, the aggregate potential of unused dams is a recurring argument, highlighting the potential for hydropower development in the United States.[241] What the Act and its history do not mention is only a fraction of the dams the Act seeks to utilize will generate a majority of the hydropower.[242] Nearly ninety percent of the estimated additional hydropower comes from 597 nonpowered dams, a majority of which is concentrated in one hundred nonpowered dams.[243] Most notably, the generating capacity of most of these nonpowered dams exceeds the Act's definition of "small hydropower,"[244] so they would only benefit from the Act's streamlined licensing—not the exemptions meant to increase small-scale hydropower.[245] Approximately eighty-seven of these sites are found at United States Army Corps of Engineer-owned and Bureau of Reclamation-owned locks and dams,[246] making them federal projects subject to the

240. *See supra* Introduction.

241. *See supra* Part I.A. "The overarching goal of [the Act] is to help alleviate some of the barriers to development of small hydropower on existing infrastructure." Warren, *supra* note 37, at 264.

242. HADJERIOUA ET AL., *supra* note 19, at 22.

243. *Id.* at viii, 23.

244. *See* Hydropower Regulatory Efficiency Act of 2013, H.R. 267, 113th Cong. (1st Sess. 2013), *available at* http://www.ferc.gov/legal/fed-sta/bills-113 hr267enr.pdf.; S. REP. NO. 113-36, at 6 (2013) (defining small hydropower projects as having a proposed installed capacity of ten megawatts or less); HADJERIOUA ET AL., *supra* note 19, at 24 (containing a map of the United States showing nonpowered dams and their generating capacity).

245. *See supra* Part I.G.

246. HADJERIOUA ET AL., *supra* note 19, at 23 ("Specifically, high potentials are found for many USACE locks and dams—87 sites with a total potential of 6.9 GW. The finding is reasonable because streamflow magnitude must be sufficiently large at locks and dams to support river transportation.").

authorization and funding of Congress. The DOE's report found that utilizing existing locks and dams has more hydropower potential than the aggregate generation potential of most nonpowered dams.[247]

In the Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs Act (H.R. 678), Congress "expedites small hydropower development at existing Bureau of Reclamation-owned canals, pipelines, aqueducts, and other manmade waterways."[248] Though conduits and navigational locks and dams are very different from one another, H.R. 678 could be the catalyst for Congress's continued authorization and funding of hydropower projects on existing locks and dams. Instead of creating a windfall for developing nonpowered dams, Congress should narrow its scope to favor existing infrastructure with the most potential for hydropower generation and the fewest externalities. While there are still negative externalities associated with adding hydropower to locks and dams,[249] they are less likely to have the aggregate effect of adding hydropower infrastructure to existing small, nonpowered dams targeted by the Act.[250] Given the navigational and social value attributed to locks and dams on these major waterways,[251] their function is multifaceted versus the minimal amount of hydropower that otherwise obsolete dams would generate.

CONCLUSION

In an effort to streamline the hydropower licensing process and promote the development of small-scale hydropower facilities on existing nonpowered dams, the legislature made several notable omissions that will likely affect that Act's implementation and success. Most notably, the Act and its legislative history focus on the roughly 77,000 nonpowered dams with the potential for hydropower development; however, neither address the critical state of this infrastructure or the

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247. *Id.* at 22.

248. *Federal Policy*, COLO. SMALL HYDRO ASS'N (Aug. 1, 2013), http://www.smallhydro.co/#!about1/c1g75.

249. *See supra* Part I.E.

250. *See supra* Part II.D.

251. *See Infrastructure*, GREAT RIVERS PARTNERSHIP, http://www.greatriverspartnership.org/en-us/industryandeconomy/pages/infrastructure.aspx (last visited Jan. 20, 2014) (discussing the benefits of navigational locks and dams).

shifts in public opinion regarding the utility of hydropower dams in the environmental and socioeconomic context.[252] After a thorough look at the economic, environmental, and social externalities of developing small-scale hydropower dams, it is clear that the legislature's cost-benefit analysis lacked a thorough analysis of the costs, and relied on assumptions rather than facts to shape energy policy.

While the Act highlights potential for roughly 60,000 megawatts of new hydropower generation by 2025,[253] it omits the number of licenses due to expire as well as the concentrated potential for increased generation in navigational locks and dams. Though the Act mainly encourages the development of small-scale hydropower on nonpowered dams by modifying FERC's exemption requirements, it does provide an opportunity for FERC to investigate ways to improve the regulatory process.[254] As FERC investigates ways to further improve the regulatory process,[255] it should ensure that stakeholder oversight is not ignored or eliminated in favor of increased efficiency.[256] Additionally, FERC's relicensing requirements should include efficiency updates, which prove to be a better alternative than developing otherwise "deadbeat" dams. As Congress continues to shape energy policy, it should continue to authorize and fund hydropower development on federally owned infrastructure—particularly navigational locks and dams. Even though hydropower is a clean, renewable energy source, its externalities have devastating effects.[257] Thus, when shaping energy policy, the legislature should be able to demonstrate that the operation of a hydropower dam "is in the public interest, economically and environmentally."[258]

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252. *See supra* Part II.C.

253. COMM. ON ENERGY & COMMERCE, HYDROPOWER REGULATORY EFFICIENCY ACT OF 2013, H.R. REP. NO. 113-6, at 2 (2013).

254. *See supra* Part I.M.

255. *See* ORDER 800, *supra* note 34.

256. *See supra* Part II.D.

257. *See supra* Part I.D.

258. Joseph, *supra* note 66, at 48.